NARMADA CONTROL AUTHORITY

Environment Sub Group

Agenda and Minutes of Meetings

PART IV

28th to 34th Meeting of the Environment Sub-Group (ESG)

1996 to 2000

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नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल Environment Sub-Group

अट्टाइसवीं बैठक की कार्यसूची Agenda for Twenty Eighth Meeting

स्थानः पर्यावरण भवन, नई विल्ली Venue: Paryavaran Bhavan, New Delhi. तारीख 14 मई, 1996, 11 बजे Date 14th May 1996. 11 A. M.

इन्दौर ं _मई, 1996

INDORE May, 1996

AGENDA FOR 28TH MEETING OF THE ENVIRONMENT SUB-GROUP NCA TO BE HELD ON 14.05.1996, AT PARYAVARAN BHAWAN, NEW DELHI.

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tem No.XXVIII-1(134): CONFIRMATION OF MINUTES OF THE 27TH MEETING.

Minutes of the 27th meeting of Environment Sub-group of Narmada Control Authority were circulated to all Members and invites vide letter No.Env-34(28)/96/142-70 dated 2nd February, 1996.

No comments have been received so far.

The minutes are put up for confirmation.

Item No.XXVIII-2(135): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

- 1. Submission of Catchment Area Treatment (CAT plans for freely draining critically degraded sub-watersheds [Item No.XXII-2(112){1}].
- a) SUBMISSION OF CAT PLAN FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS.

During the 25th meeting, Govt. of Madhya Pradesh (GOMP) and Govt. of Maharashtra (GOM) were directed to recast their plan keeping in view the guidelines for the schemes of National Afforestation Eco-development Board & River Valley Projects. Representatives of GOM & GOMP agreed to submit the plans within a months time.

Subsequently during the 26th meeting NVDA expressed difficulty in preparing Phase-2 catchment area treatment plan for SSP & NSP due to the short time available for a detailed survey. However an yearly plan an year in advance of its implementation was promised.

Annual plan for the year 1996-97 is yet awaited from GOMP & GOM.

During the meeting NVDA expressed difficulty in getting the funds for even treating the directly draining subwatersheds, due to the financial limits imposed by State Govts. Chairman of the sub-group suggested that the budget for catchment area treatment atleast for the directly draining subwatersheds (as the cost is chargeable to SSP) should be over and above the limits imposed in the State Plans. During the 27th meeting NVDA requested that this issue may be taken up at the Govt. of India level with the Planning Commission. The issue is to be taken up by Government of India with the Planning Commission.

b) **SILT MONITERING POSTS:**

1

NVDA was requested to install silt monitoring posts by engaging NVDA staff during pre and post phases of catchment area treatment on the lines being installed in Gujarat. Progress may please be reported.

2. Cost Estimates for preparation of Action plan and

implementation of environmental safeguard measures [Item No.XXII-2(112)(2)].

During the earlier meetings of the environment Subgroup it was desired that the detailed cost (estimates and expenditures) of studies and implementation of mitigation measures for suggested environmental safeguards should be presented. The information available in the office of the NCA is presented in Annex-XXVIII-1 for information and consideration of the members. Information from Govt. of Gujarat (GOG) on cost estimates of Command Area Development works as agreed during the 27th meeting is yet awaited.

Item No.XXVIII-3(136): PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS.

A copy of the status report for the quarter ending December, 1995 is enclosed and placed at Annex-XXVIII-2.

The present status of studies surveys and action plans in brief is presented below for a review by the Sub-group.

1) PHASED CATCHMENT AREA TREATMENT

Narmada Sagar Project

Government of Madhya Pradesh

According to the progress reported by NVDA during 27th meeting an area of 1607 ha was treated up against a target of 23824 ha by the end of December, 1995.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh had planned to treat 125725 ha area, out of which an area of 32791 ha has been treated by August'95. However, during the year 1995-96 against a target of 38000 ha of treatment works the progress reported so far is 11000 ha only. During the 27th meeting NVDA was requested to supply detailed information about the difficulties being experienced in CAT works.

Members may like to discuss & review.

Govt. of Gujarat

Govt. of Gujarat had taken up the entire catchment area upstream of the Sardar Sarovar Project in Gujarat for treatment.

By the end of December, 1995 an area of 28995 ha had been treated up against a target of 29284 ha. During the 27th meeting GOG agreed to make a presentation on the silt monitering exercise.

Govt. of Maharashtra

GOM had planned to treat 20,000 ha of forest areas. By the end of March, 1995 works on an area of 14016 ha had been completed.

In addition non forest area of 2768 ha was proposed to be treated by the end of 94-95. Out of this till the end of June, 1995, works over 2151 ha area had been completed. The progress of work on the remaining non forest could not be discussed during the 27th

meeting as the concerned officials were not present. After discussion it was agreed to request GOM too consider establishing a separate curthonly on the lines of GOG & GOMP.

Progress may please be reported by GOM.

GOM may like to submit the completion report of CAT works in forest and non forest areas, finished so far.

ii) COMPENSATORY AFFORESTATION

Narmada Sagar Project

Govt. of Madhya Pradesh

During the 27th meeting Compensatory afforestation over an area of 63666 ha against the target of 80,975 ha was reported to have been completed by the end of October, 1995. No further progress is reported so far.

Sardar Sarovar Project

Govt. of Madhya Pradesh

As reported during the 27th meeting Govt. of Madhya Pradesh by the end of October, 1995 had completed plantation works over an area of 8225 ha against the final target of 8740 ha. Progresss on afforestation for the balance area may please be reported.

Govt. of Gujarat

As requesteed during the 27th meeting Govt. of Gujarat had completed plantation works in the entire planned area of 13950 (including non forest and degraded forest areas) by the end of September, 1994. Progress on the suggestion given during the 27th meeting on taking up scientific observations concerning improvement of the area may please be reported.

Govt. of Maharashtra

Out of total target of 19466 ha planned for treatment in lieu of the areas undergoing submergence, an area of 19293 ha had been planted by the end of October, 1994. However detailed location map of some of the districts where compensatory afforestation works are progressing requested by NCA vide letter No.34(27)/95/1903 dated 13.11.95 is yet awaited. During the 27th meeting Chairman suggested that highlights of plantation activities in Maharashtra may be published. Progress may please be reported.

iii) COMMAND AREA DEVELOPMENT

Narmada Sagar Project

As assured during the 23rd meeting current status of preparation of comprehensive environmental impact assessment report on command area development with integrated development plan including drainage aspects for NSP was to be submitted by GOMP.

During the 27th meeting it was informed that an allocation of Rs.24.5 lakhs had been made by NVDA for the work on collection of data for study on use of insecticides, pesticides in the Command of NSP. Progress on the studies may be reported. In addition progress on preparation of integrated Command Area Development Plan may also please be reported. Information requested by NCA vide letter No.34(27)/1903 dated 13.11.95 is yet awaited.

Sardar Sarovar Project

Govt. of Gujarat

During the earlier meetings, Sub-Group noted that number of studies were commissioned by the Govt. of Gujarat on the Command Area Development. These reports were required to be categorised on the basis of issues addressed in report in consultation with Dr. Abrol of ICAR. Dr. Abrol was requested by the sub-group to refer to these studies from agriculturist point of view and to suggest whether studies were sufficient or there was something more required to be studied. studies. Besides, on the issue of irrigated Agroforestry in SSP it was agreed by NPG to refer the issues to ICAR for needful guidance. Subsequently one meeting was held with Dr. Abrol at New Delhi where it was suggested that the Planning Commission had prepared certain maps which be helpful in preparing in integrated Command Ar Development Plan. Govt. of Gujarat was requested to get touch with him with copies of the needed reports to expedite issue. During the 27th meeeting it was suggested that NPG may get in touch with DDG, ICAR, nominated for the subgroup and expedite all the related issues referred to above. Progress in this regard may please be reported.

reports related Copies of the to command development studies completed in the last two years required to be submitted to NCA and MOEF are yet awaited. Executive Summary of the final reports of the studies entitled "Flora, Fauna, EIA and EM of SSP Command (between Narmada Sabarmati) and (2) EIA studies on Inland and Marine Fisheries relevant to the command area of the Sardar Sarovar (Narmada) Projects submitted by NPG were enclosed with the agenda papers of 27th meeting for observation of members.

<u>,</u>

Govt. of Rajasthan

To finalise the report on EIA a meeting of the officials of NCA, Govt. of Rajasthan & WAPCOS was held on 1/3/96 at Jaipur & suggestion were made to improve the report further. Progress on incorporation of the comments may please be reported by GOR.

iv) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

Narmada Sagar Project

Govt. of Madhya Pradesh

Flora & Fauna studies for Narmada Sagar Project areas have been carried out by two agencies viz. Friends of Nature Society, Bhopal and Wildlife Institute of India, Dehradun. Both of these agencies have submitted their final reports. Copies of the main findings of the report were circulated to the members as annex to the minutes of 25th meeting. Action plans, based on the recommendations of these study reports were required. In accordance of one of the recommendation, NVDA had submitted proposal for the creation of special protected areas to the Govt. of M.P. During the 27th meeting NVDA informed that NBA activists have takenup this issue with the Hon'ble Chief Minister & therefore finalisation may take some time. Progress may please be reported.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Final report of the Impact Assessment studies in the areas undergoing submergence in Madhya Pradesh completed by State Forest Research Institute (SFRI), Jabalpur was made available to MOE&F & NCA. During the 27th meeting NVDA informed that SFRI is being persuaded for submission of the action plan. Progress may please be reported.

Govt. of Gujarat

During the earlier meetings Govt. of Gujarat was requested to circulate the main findings of the M.S. University to the Members of the sub-group. This is yet awaited.

During the 26th meeting of Sub-group was informed that the recommendations made by M.S. University were under review. Time frame for the review for preparation of Action Plan and implementation of the resulting recommendations requested during thee 27th meting may please be reported.

Govt. of Maharashtra

During the 27th meeting of Sub-group it was suggested that since the final report on flora, fauna studies prepared by School of Environmental Science, Pune University is taking too long for printing. It may be got done by GOM. A meeting was to be arranged by GOM with Member (E&R) & SES investigators. Progress may please be reported.

v) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Narmada Sagar Project

Govt. of Madhya Pradesh

With regards to status of Joga fort in relation to the submergence to be caused by the back water effect. During the 27th meeting, NVDA informed that Superintending Archaeologists of ASI, Bhopal had been requested to study this aspect. Progress may please be reported.

Progress on printing small booklet on the good works being done by Project authorities may be reported.

Sardar Sarovar Project

Govt. of Madhya Pradesh

A number of agencies have developed interest in archaeological & anthropological history of the Narmada Basin coordination between these organisation seems to be lacking. However GOMP are coordinating only the agencies engaged by them. A detailed review of the overall progress is however necessary for smooth implementation of the required actions in time.

NVDA may like to report on the works being done by various agencies on archaeological & anthropological aspects of Narmada basin in Madhya Pradesh.

Govt. of Gujarat

Govt. of Gujarat may like to submit a detailed report on completion of the works progress undertaken by it on development of Shoolpaneshwar temple.

Progress may also be reported on developments related to shifting of Hamfeshwar temple.

Govt. of Maharashtra

No works were required to be done in Maharashtra in this regard.

3

ANTHROPOLOGY

Sardar SArovar & Narmada Sagar Projects

Govt. of Madhya Pradesh

Necessary steps have been initiated to effect the amendment of the Constitution of India to give the benefits and privileges to the PAPs from SC & ST categories being resettled in Gujarat areas where otherwise they were not entitled to these benefits. It was also informed that the issue was under consideration of the Govt. of India, Ministry of Welfare.

Progress on procurement of the balance publication related to Tribals of Narmada from An.S.I. by NVDA may please be reported.

vi) SEISMICITY AND RIM STABILITY OF RESERVOIR

Narmada Sagar Project

Govt. of Madhya Pradesh

During the 27th meeting NVDA reported that the procurement of the balance imported seismic instrument was under consideration of Narmada Control Board. Progress may please be reported.

Sardar Sarovar Project

GSI had completed the survey and submitted its final report on rim stability analysis for the areas in Maharashtra and Madhya Pradesh in 1993. The survey for the rim stability analysis in Gujarat was completed much earlier by Jaipur branch of the GSI. In order to confirm the findings of the GSI, NVDA had entrusted some more time bound studies to CW&PRS, Pune at an estimated cost of Rs.12.55 lakhs. During the 26th meeting NVDA informed that the institute had submitted two reports No.3229 & 3234 & that these reports suggests some more time bound studies. During the 27th meeting Prof. Ramasheshan requested copies of these reports which was supplied to him by NCA. Members may like to discuss and review.

vi) HEALTH ASPECTS

Narmada Sagar Project

Govt. of Madhya Pradesh

Action taken by GOMP for detailing the cost estimates for providing the facilities as proposed in the health plan may please be reported.

Epidemeoligical surveillance studies are being persued by Gandhi Medical College, Bhopal. Copies of the 4th Six monthly report received from NVDA were review & comments were communicated to the investigators. Further progress may please be reported.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Action taken by GOMP for detailing the cost estimates for providing the facilities as proposed in the health plan may please be reported.

Report on status of epidemeoligical surveillance studies being persued by GMC, Bhopal for the SSP areas may also please be reported.

Govt. of Gujarat

GOG submitted a copy of the final report entitled "Environmental Impact Study on water related diseases in SSP command area, Gujarat, India prepared by Commissionerate of Health, Medical Services & Medical Education, GOG. The report was reviewed & comments were communicated to the investigators during the 27th meeting. Detailed action plan based on the findings of this study was under preparation. Progress may please be reported.

Govt. of Maharashtra

Detailed statement on existing infrastructure to Akarni & Akkalkua Taluk along with progress of works was reported by GOM during the 27th meeeting further progress may please be reported.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR

To speed up the work on conservation and development of the fish resources in the reservoir, sub-group recommended the formation of a group of experts. The proposal for formation of a high level expert group was approved by NCA with inclusion of one more expert member to be nominated by GOMP. Three meetings of this expert group were held & working groups have been formed for drafting the guidelines. During the third meeting it was informed that GOMP is yet to appoint a successor to Dr. G.P. Dubey who has since resigned. Expert group expresseed concern over the delay in the submission of the document expected from Dr. Dubey & requested GOMP to decide about the successor to Dr. Dubey so that expert group is not deprived of the document on time.

Revised plan on fisheries development & conservation is yet awaited from Govt. of Madhya Pradesh. Expert Group agreed that after the Action plan of GOMP & draft document from Dr. Dubey was made available it would be possible to issue the needed guidelines.

Item No.XXVIII-4(137): MONITERING OF R&R ASPECT OF NARMADA SAGAR PROJECT (NSP).

According to the clearance order issued under EPA 1986 by MOEF to NSP & SSP, responsibility for monitering of Environmental Safeguard Measures was entrusted to NCA. The suggested Environmental parameters for monitoring included R&R, CAF, CAT etc. Accordingly the scope of NCA was enlarged to include under clause 9(1) "The role of the authority will mainly comprise overall coordination and direction of the implementation of all the projects including the engineering the environmental protection measures and rehabilitation programme and to ensure the faithful compliance of the terms and conditions stipulated by the Central Government at the time of clearance of the aforesaid project.

Whereas progress on all Environmental aspects of NSP & SSP other than the R&R issues of SSP are being monitored by Environment sub-group. This sub-group on R&R issues of SSP is guided by the observations of R&R sub-group of the NCA.

During 25th meeting it was noted that R&R sub-group of NCA was monitering only the issues related to SSP. A concern was therefore expressed by the sub-group on the issues related to the monitering of R&R aspect of NSP.

However, on the objection of GOMP to the monitoring of R&R aspect of NSP by NCA, MOEF is yet to take a view.

Item No. XXVIII-5(138): ANY OTHER ITEM

DATE & VENUE OF THE NEXT MEETING

ANNEXURES

ANNEX-XXVIII(1).

ENVIRONMENTAL COST OF SSP

RELATED TO UNIT I & II DAM & POWER HOUSE :

- A) Excenditure by project authorities:
 i) Cost of Survey & Studies (in lacs.)

S.No	o. Camponent	GOG	GOM	Expenditur GOMP N		Tital
1.	Compensatory Affores- tation		<u>5.29</u> 5.29			<u>11.2475</u> 12.2475
2.	Catchment Area Treatment.	<u>8.77</u> 8.77	7.00 7.00	3.28 2.80	-	12.05 13.57
3.	Flora & Fauna	<u>52.2</u> 38.3	<u>38</u> 16	20.334 17.634		127.304 37.204
١.	Health	2.5 2.5	<u>10</u> 2.5	29.627 26.000	-	<u>47 127</u> 51.0
5.	Archaeology/Anthro- pology.	1.3 0.40	NA	<u>59</u> 36.33	-	<u>±0.3</u> Ec.73
6.	Seismicity & Rim Stability.	-	· NA	23.00 12.50		<u>14.98</u>
7.	-	N.A.	-			. -
				- (i)		286.5085 200.2815
ii)	Cost of Implementation (i	n lacs)				
1.	Compensatory Afforestation.	1809.10 1298.48	2116	1800.000 794.13		<u>5725.1</u> 3460.78
2.	Catchment Area 7 Treatment.	3509 1826.48	2894.67 445.657	<u>8835.05</u> 1861.91	- <u>1</u>	5233. ⁻ 2 478.44
	Flora & Fauna including Shoolpaneshwar	75.31 64.42	NA	NA Nil		75.31 64.42
3.	1)Fisheries	-	102.10	-	-	102.10
4.		3800.0 101	546.60 9.26	1354.63 521.2	-	5701.23 632.135
5.	Archaeology/Anthro- pology.	156.00 29		700 10	-	<u>856</u> 29
6.	Seismicity & Rim Stability.	<u>129</u> 271	-		-	1 <u>29</u> 271
7.	Command Area Development.	. N.A.	-	-	N.A.	-
			Total	- (ii)		2782 ⁻ .46 4935.775
			Total	: (i & ii)		28113.968 5136.0565

NA : Not available.

ANNEX - XXVIII-(2).

STATUS REPORT SARDAR SAROVAR PROJECT (SSP) ENVIRONMENTAL ASPECTS DECEMBER - 1995

The action plans and status of studies and implementation of Environmental Safeguard Measures upto quarter ending September, 1995 was as indicated below:

Environmental Safequard Studies/Measures

- 1) Phased Catchment Area Treatment,
- 2) Compensatory Afforestation,
- 3) Command Area Development,
- 4) Flora, Fauna & Carrying Capacity,
- 5) Seismicity,
- 6) Health Aspects,
- 7) Archaeological & Anthropological, Studies,
- 8) Fisheries,
- 9) Rim Stability Analysis.

I. CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

- more detailed surveys for prioritisation of the subcatchments in the SSP area should be undertaken;
- a phased CAT programme should be prepared and implemented ahead of reservoir filling.

GOI issued a Directive in June 1992 that, for the SSP, the project would bear the costs of the treatment of all critically degraded sub-watersheds draining directly into the reservoir. These watersheds were identified amongst those classified as either very high or high-priority categories by the All India Soil and Land Use Survey (AISLUS). The project would also be responsible for the treatment of those areas of the catchment which are directly damaged by the project activities.

In addition, plans are required to be prepared for the treatment of the balance of the critically-degraded watersheds but the cost of this will be met from other ongoing schemes and in a timeframe to be determined.

Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the SSP catchment.

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), 1985.
- Report on Prioritisation of Sub-watersheds in sub-catchments of Narmada Catchment, 1991.

I. DIRECTLY DRAINING SUB-WATERSHEDS:

Table 1.1 The total catchment area of SSP below NSP is 2442440 ha.

	GOMP	GOG	GOM	Total for the Basin
Total Catchment	2248600	30230	163610	2442440 ha
Very High & High	546702	30230	116355	688410
Directly draining Very High & High	121330	29537	28226	175565
Areas directly dama ged by project activities.		500	-	500
Planned to treat	125725	29284	22768	177.77

According to the data available in NCA office the total area of directly draining subwatersheds in M.P. is 1,14,606 ha.

Table 1.2 Summary of Status of CAT Planning

	GOG	GOM	GOMP
Preliminary Sur vey s	}		
Prioritisation of sub-watersheds			
Development of Management Options		olete for a	
Annual Action Plan	!		
Effective monitoring]		
Phased Programme	}		

Table 1.3 Principal Elements of Action Plans for CAT

Elements of Action Plans	6	GOG	GOM	GOMP
Survey work Preparation of detailed map	} : }	"Complete & all Sta		item
Micro-watershed development map	o ¦	Complete	Complete	Complete
Assignment of responsibility for conducting the work	}			
Timetable	1	"Yes" for	all item	n f o r

Budget : all States : Menu of treatment : Proposals for monitoring }

Table 1.4 Implementation of CAT

	¦ Gujarat : (29284	•	Maharash (22768)		Madhya P : (12572	
	(Ar		a to be t ackets ir		<u>in ha.</u> actual prog	ress)
	·	Non- ¦ Forest¦		Non- Forest	¦ Forest ¦	Non- Forest
Monsoon year 1990-91	4528	8 <u>98</u>	-		-	-
1991-92	(4528) <u>4770</u> (4770)	(898) <u>230</u> (230)	-	-	-	
1992- 93	6 <u>013</u> (6013)	<u>336</u> 336	**	-	-	<u>8800</u> (8800)
1993-94	<u>6000</u> (6000)	286 (286)	<u>960</u> (960)	291	<u>966</u> (966)	<u>6246</u> (6246)
1994-95	5893 5730	<u>168</u> 167	6347 6514.50	<u>1860</u> 19 80	17000 4268	<u>20000</u> 594
1995-96	162	35	<u>6653</u> 6541.97	617	18000	20000
1996-97	_		5873	<u>-</u>	15964	18749
TOTAL:	<u>27204</u> (27042)*1(<u>1953</u> 1953)*2	20000 (14016.4 7474	<u>2768</u> 47) (215		7 <u>3795</u> *4 / 2,857

^{*1} As reported by GOG 162 ha. could not be treated due to resistence from the local people.

^{*2} GOG had reported that out of 3025 ha of Agriculture are planned for tréatment earlier, 945 ha. area is untreatable hence targets are reduced from 3025 ha to 2080 ha. In the status note sent by GOG dated 27.01.96, target is shown as 1953 ha only.

^{*3} Out of 51930 ha. area, an area of 13930 ha is fully stocked where minor soil engineering works will only be carried out w.e.f.94-95 @ 4000 in (94-95),5000 (95-96) & Balance in 96-97.

^{*4} Progress of forest & non forest areas put together is reported as 32,857.

<u>Gujarat</u>	<u>Maharashtra</u>	Madhya Pradesh
Complete work	work scheduled	Complete work
scheduled to	to finish 1997.	scheduled to

finish 1997.

II. FREELY DRAINING SUBWATERSHEDS: (Excluding directly draining Subwatersheds).

Table 1.5 Summary of Status of CAT Planning:

finish 1996-97

Implementation

GOMP GOM GOG - Preliminary Survey Yes Yes Already - Prioritization of Sub-watersheds Yes Yes under - Development of Management options Yes Yes implementation Phased programme Yes Yes				
- Prioritization of Sub-watersheds Yes Yes under - Development of Management options Yes Yes implementation.		GOMP	GOM	GDG
, natural principle and princi	- Prioritization of Sub-watersheds - Development of Management options	Yes	Yes	under implemen-

Table 1.6 Principal Elements of Action Plan for CAT:

	GOMP	GOM	GOG ·
Survey work	Yes	Yes	
- Preparation of development map	Yes	Yes	Already
- Micro watershed map	Awaited	awaited	und e r
- Work responsibility	Yes	Yes	impleme-
- Menu of treatment	Yes	Yes	ntation
- Time Table	Yes	Yes	
- Proposal for monitoring	Yes	Yes	
- Budget	Yes	Yes	
- Availability of funds	*	*	,

^{*} Agreed by Planning Commission for inclusion in River Valley Project" Scheme and funds are also promised by MOE&F from National Afforestation & Eco-Development Board.

A. Govt. of Madhya Pradesh:

Table 1.7 Total Area of freely draining critically degraded subwatersheds below NSP is 54.6702 ha.

	Phase I Area (Directly draining)	Phase-II (Balance Area)	Total Area
SSP	121:330	356484	477814
Jobat	-	-	28211
Man	- .	-	12720
Maheshwar	-	-	13209
Omkareshwar	-	-	14748
			546702 *

Table 1.8

PHASE - II (356484 ha.)

Forest Area Non Forest Area
Gross Area Net Working Area
Gross Area Net working Area
1,11,479
78,368
2,66,388
2,37,750

Table 1.9 Schedule of Implementation (Madhya Pradesh): (318118 ha)

Year	Forest Area	Non Forest Area
Teal	Phy. (ha.)	Phy.in na
997-98	8000	15750
998-99	8000	15000
.999-2000	8000	16000
0000-01	8000	16000
2001-02	8000	15000
2002-03	8000	16000
2003-04	8000	15000
2004-05	8000	16000
2005-06	8000	15000
2006-07	6368	15000
2007-08	-	16000
2008-0 9	-	15000
2009-10	-	16000
2010-11	-	16300
2011-12	-	16000
	78,368	2,39,750

^{*1} NVDA had already submitted 5 schemes under RVP which have been approved for the year 94-95 to 96-97. Funds revalidated for the year 95-96 have been received. It is proposed to treat an area of 6117 ha. Work has already commenced. In addition 3 more schemes covering an area of 7186 ha from 3 subwatershed have been submitted by NVDA for seeking funds from RVP. The total schemes sent for seeking funcs cover an area of 23750 ha during 1997-98.

B. Govt. of Maharashtra:

PHASE-II

Table 1.10 Schedule of Implementation of freely draining Sub-watersheds.

Year	<u>Forest Area</u> Phy. in ha.	Non Forest Area Phy. in ha.
1994-95	5600	3145.66
1995-96	5600	4186.97
1996-97	5600	4511.86
1997-98	5600	5044.1:

1998-99	5600	4993.48
1999-2000	5600	5453.93
2000-2021	6400	-
	40,300	27.336

II. COMPENSATORY AFFORESTATION

Approval for the diversion of forest land for the SSP was granted by the MOEF in 1987, 1990 & in 1993 (including for R&R works) but several conditions were attached relating to the planning and conduct of CAF. Principal amongst these are the following stipulations.

- For every hectare of forest land submerged or diverted for construction of the project there should be Compensatory Afforestation on one hectare of non-forest land plus reforestation on two hectares of degraded forest. This represents a two fold increase of the usual requirement.
- For the 4,200 hectares of forest land in Manarashtra which is to be used for R&R, an equal area of non-forest land or double the area of degraded forest should be planted.
- The governments of the three states involved should prepare plans detailing their proposals for Compensatory Afforestation and submit these to the MOEF before work in the forest area is due to commence.
- The project should supply firewood to its construction workers, at its own cost, to prevent them from having to meet their fuel needs from the surrounding forests.

Studies

These have been a number of studies in three states aimed at assessing the extent and significance of the loss of forest land attributable to the SSP.

- Sardar Sarovar (Narmada) Project Development Plan, Volume-II
 prepared by the Narmada Planning Group (NPG) in 1983.
- Studies on Ecology and Environment by M.S. University of Baroda (MSU) in 1983.
- Sardar Sarovar Project: Preparation of Environmental Work Plan by the Forest Department of Maharashtra in 1988.
- Eco-Environmental and Wildlife Management Studies on the Sardar Sarovar Submergence Area in Gujarat 1992 by MSU.
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems by State Forest Research Institute, Jabalpur (1989-92).

1.1

- Draft report on Flora and Fauna in and Around Sardar Sarovar Project, Maharashtra by the University of Pune 1994.

The Action Plans

In compliance with the conditions set by the MOE&F, each state has prepared an action plan for the CAF of areas within its boundaries. The relevant documents are:

- Government of Gujarat Work Plan for Management of Environmental Effects, Section on Forests and Wildlife: The Compensatory Afforestation Plan for the Rann of Kutch, 1986.
- Project for Afforestation in Sardar Sarovar Project Impact
 Areas due to Diversion of Forest Lands for Sardar Sarovar
 Project (GOG), 1991.
- Compensatory Afforestation Scheme in Lieu of Sardar Sarovar Project in Dhule District, Maharashtra State (1989).
- Government of Madhya Pradesh Forest Department Action Plan of Compensatory Afforestation for Sardar Sarovar multipurpose river-valley project (1989).

These plans were submitted in varying stages of completeness but each has now been revised and updated to take account of the comments of the MOEF and the NCA. Action plans of 3 State Govts. contained following components:

- Identification of areas for CAF;
- 2. Description of selected areas.
- 3. Justification of Selection of Areas,
- 4. Identification of responsible agency,
- 5. Description of staffing requirements,
- 6. Description of material requirements,
- 7. Estimate of costs,
- 8. Identification of tree species,
- 9. Description of preparatory work needed,
- 10. Description of planting techniques,
- 11. Provision for aftercare,
- 12. Yearly planting target,
- 13. Yearly budget,
- 14. Provision made for monitoring implementation

These action plans spell out a programme of tree planting in the three states on both non-forest and degraded forest areas as shown in Table 2.1 & 2.2.

Table 2.1 Areas for Compensatory Afforestation

		Area of Forest diverted for SSP	Area of De- graded for- est to be Replanted	Area of Non- Forest Land to be Affo- rested	Total area for CAF
GOG GOM GOMP	(a)Submer. (b)R&R *	4,523 6,488* 4,200 2,732	9,300 12,980 - 6,550	4,650 6,488 4,200 2,190	13,950 19,468 4,200 8,740
TOTAL	. :	17,943	28,830	17,528	46,358

^{*} This includes 2700 ha released in 1990 & 1500 in 1993 for R&R works in Maharashtra for which only equal non forest area is being raised as stipulated.

Table 2.2a <u>Schedules for Implementation of CAF</u> (Against Submergence)

	Gujarat		Maharash	tra	Madhya P	radesh
			Afforested indicates		progress)	
	Degraded Forest		Degraded Forest	Non- Forest		Non- Forest
Monsoon year 1990		2,150 (2150)			<u>132</u> (132)	<u>716</u> (716)
1991	2,834 (2,834)	350 (350)	8,383 (8383)		1580 (1200)	400 (3 7 3)
1992	2,450 (2450)	847 (847)				400 (-)
1993	2.500 (2,500)	<u>455</u> (455)	<u>45</u> (20)	1.156 (1,156)		400
1994 1995	1,516 (1,516)	848 · (848)	-	2,911 (2894) 0,162	600*	1100*
Total:	9,300	4,650	12,977		6550	2190
Achievement in ha.	(9300)	(4650)	(12977)	(6316)	82:	

Net target considering progress of the previous years.
 ** Total Progress achieved is 8225 ha. against a target of 8740.

Table 2.2b Schedule for Implementation of CAF in lieu of Forest Land released for R&R works.

State	Land Year	released Area in ha	Target 1993-94	-	
Maharashtra	1990	2700	2192.37 (2192)	<u>307</u> (311)	197 (184.50)
	1993	1500	<u> </u>	-	1500 (896)
	TOTAL	4200	2192	307	1697
	Achievement		(2192)	(311)	(1080.50)

Other Additional Afforestation Activities:

Plantation along Canal Banks:

The total potential of canal bank plantations is estimated to be 18000 ha. A project report prepared for this purpose by forest Deptt. is under scrutiny of SSNNL. The plantation programme is likely to be launched effectively from the year 1996. However to give a start to the work of canal bank plantations, plantations on 215 ha have already been established till rains of 1994.

Additional Plantation Activities

(a) Dam Vicinity Plantation (235 ha)

An area of 240 ha. in the vicinity of the dam has also been planted. This work was completed in 1992.

(b) Revine Land Afforestation (200 ha.)

On the left bank of the river Sabarmati an area of 200 ha. in two villages i.e. Ratanpur (120 ha.) and Pirojpur (80 ha.) is also planned to for plantation. An area of 200 ha. is planted till 1994 rains.

(c) Project area plantations: (255 ha)

An area of 300 ha. has been planted in the project area as per the target and the work completed in the rain of 1992.

III. <u>COMMAND AREA DEVELOPMENT:</u> (Including Drainage Studies)

(A) Government of Gujarat:

Government of Gujarat have undertaken several studies related to the Command area development. Some of which have been completed and the remaining are in progress. Their position is as

foll	ows:		
Sl.N	o. Name of Study		Year of completion
I.	Completed Studies:		
1.	Pre-Feasibility study for Low Level Canal.	Jyoti Consultants Ltd. Vadodara.	1981
2.	Mathematical Modelling of Ground Water for system single layer model-Narmada Mahi-Doab.	Operation Research Group, Vadodara.	1982
3.	Pre-Feasibility level Drai- nage study of Narmada Mahi Doab of SSP Command.	Core Consultants Ltd. Ahmedabad.	1982
4.	Some Aspects of Role of Panchyats and Institutional Arrangements for canal irrigation in Two Talukas of Ahmedabad District.	Institute of Cultu- ral and Urban Anth- ropology, Ahmedabad.	1982
5.	A study of settlement Pattern (6 Talukhas in the Narmada Command Area of Mahesana District of Gujarat).	Department of Geography, Gujarat University, Ahmedabad.	
6.	Regionalisation of Narmada Command.	Operations Research Group, Vadodara.	1982
7.	Marginal cost study of two Typical Distributeries and Two Typical Branches.	Dr. C.R.Shah, Vadodara.	1983
8.	Socio-Economic Bench Mark survey of 62 Talukas (Sub- districts) of Narmada Command Area.	Fourteen Different Agencies Including Universities,Resear- ch Institutions etc	
9.	Population Projection and Migration study for Narmada Command Area.	Operations Research Group, Vadodara.	1983
10.	Non-Agricultural use from Narmada Project.	Gujarat Water Supply and Sewerage Board, Gandhinagar. Directorate of Economics & Statistics, Gandhinagar.	

12.	Wasteland Development Project for command Area of Narmada Canal (Region 11 and 12).	Gujarat State Rural Development Corpora- tion Ltd.,Gandhinagar.	1984
13.	Mathematical Modelling of Ground Water System Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
14.	Additional work on Mathe- matical Modelling of Ground Water System-Single Layer Model Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
15.	Rate of Adoption of Imp- roved Technology in Narmada Command and Rest of Gujarat State (Based on Analysis of Crop cutting Experiments Data).	Operations Research Group, Vadodara.	1985
16.	Computer aided Planning of conveyance and delivery Network.	Indian Institute of Management, Ahmedabad.	1986
17.	Land Use and Cropping Pattern Survey and Mapping of Narmada Command Area Zone 4A & 4B.	Department of Geography, M.S.University, Vadodara.	1986
18.	Survey and Investigation work of Ground Water Resources in Narmada-Mahi\$	Gujarat Water Resour- ces Development Cor- poration Ltd.Gandhi- Nagar.	1987
19.	Cropping Pattern and Water Demand Study in Narmada Command Area.	Operations Research Group, Vadodara.	1987
20.	Inter-Regional Water allo- cation and Determination of Branch Canal capacity.	Operations Research Group, Vadodara.	1989
21.	Extended study on Inter Regional Water Allocation and determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1989
22.	Growth of Agro-Process- ing Industries in Phase-I of the Sardar Sarovar Project.	Gujarat Industrial & Technical Consultancy Organisation Ltd. Ahmedabad.	1990

23.	Consultancy work for Control, Telemetry and Communication Net Work on Narmada Canal System for SSP.	Gujarat Communication & Electronics Ltd., Vadodara.	1991.
24.	Techno-Economic Study for utilising Village Tanks as Borrow Area for Construction of Canal Net Work.	Operations Research Group, Vadodara.	1992
25.	Area Development Strate- gies for selected Regions Adjacent to Narmada Main Canal (Vadodara, Surendra- nagar & Banas Khatha Dist.)	Operations Research Group, Vadodara.	1992
26.	Studies in Water Rates Policy in 3 parts.		
	i) Pricing of a public Utility Survey of Literature	Department of Econo- mics, South Gujarat University, Surat.	1992
	ii)Financial working of Irrigation Projects - A case of four projects in Gujarat.	Department of Econo- mics, Sardar Patel University,Vallabh Vidyanagar.	1992
	iii)Some policy issue for Canal Water Rates in Gujarat.	Department of Econo- mics, Sardar Patel University,Vallabh Vidyanagar.	1992
27.	Mathematical Modelling of Ground Water System for SSP Command between Rivers Shedhi and Sabarmati.	Consultancy Enginee- ring Services, New Delhi.	1993
28.	Mathematical Modelling of Ground Water System for SSP Command between Rivers Sabarmati and Banas.	Operation Research Group, Vadodara.	1993
29.	Mathematical Modelling of Groundwater System for SSP Command beyond Banas upto Rajasthan Border.	Dalal Consultants, Ahmedabad.	19 9 3
30.	Prefeasibility level Drainage study for SSP Command beyond Mahi.	Consultancy Enginee- ring Service, New Delhi.	19 9 3

II. ON GOING STUDIES:

- 1. Monitoring and Evaluation Centre for Social 1985 of Resettlement & Rehabili Studies, Surat. tation Programme.
- Development of Aliabet Multi Disciplinary Sept.'92
 Island in the Estuary of Expert Group.
 River Narmada.
- 3. Agricultural Eesearch Gujarat Agricultural 1987 Studies. University,
- 4. Survey and Investigation Gujarat Water Resour- 1989 Work of Grounc Water Resour- ces Development Corpoces beyond River Mahi in ration Ltd., Gandhinagar. SSP Command.
- 5. Action Research on People's Gandhi Labour Institu- 1991 Participation in Water te, Ahmedabad.

 Management in SSP.
- 6.* Development of Nal Sarovar Multi Disciplinary Sept.1992 Bird Sanctuary. Expert Group.
- 7.* Development of Black Buck Multi Disciplinary National Park at Velavadar. Expert Group.
- 8. Development of Wild Ass Multi Disciplinary Sept,1992 Sanctuary in Little Rann Expert Group. of Kachchh.
- 9.* Study on preparation of M/s Wamana Consultants Dec.1992 a detailed Integrated Command Command Area Development Plan for SSP.
- 10.* Environmental Impact Assess- M.S. University, Dec.1992 ment Studies on Inland and Vadodara.

 Marine Fisheries relevant to the Command Area of Sardar Sarovar (Narmada) Project.
- 11.*Environmental Impact Assess- Commissionerate of ment (EIA) Studies on Water Health, Medical (Final Related Diseases in Sardar Services & Medical report Sarovar Project (SSP) Command Education, Govt. of Area including the Area Down Gujarat, Gandhinagar. in NCA, Stream of the SSP Dam.
- 12.*Study of Flora and Fauna of Sardar Patel Feb.1993
 the Command Area of Sardar University,
 Sarovar (Narmada) Project: Valalabh Vidyanagar.
 Lying between the Narmada
 & Sabarmati Rivers.(EIA Studies).

1	3.*	Study on Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project Lying in Saurashtra and Kachchh Area (Environmental Impact Assessment Studies).	Saurashtra University Rajkot	, March,93
1	4.	*Study on Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project: Lying between Sabarmati River and Rajasthan Border (Environmental Impact Assessment Studies).	Gujarat University, Ahmedabad.	March,1993
1	5.	Ecological study of Wild Ass Sanctuary and surround- ing area using remote sensing technology for Environmental Impact Assessment.	Education & Research Foundation (GEER	Dec.,93
	16.	* Environmental Impact Assessment of Nal Sarovar Bird, Sanctuary.	GEER Foundation	Dec.,93
	17.4	Environmental Impact Assessment of Velavadar National Park located in the command area of SSP.	GEER Foundation	Dec.,93
	18.	Environmental Impact Assessment (EIA) studies on Aliabet Island.	Chief Engineer, (CAD SSP) Expert Multidisciplinary Gro	Dec.,93 ,
	19.	Review of ground water drainage study.	H.R.Wallingford	Jan.,94
	20.	Agro Pollution aspect of Command Area.	-do-	Jan.,94
	21.	EIA on downstream of Sardar Sarovar Dam upto Gulf of Combay.	-do-	Jan.,94

* Draft/interim reports received in NCA.

(B) Government of Rajasthan

The Government of Rajasthan had submitted a report on Environmental & Ecological aspects and remedial measures for Narmada Canal Project, Copy of the report was submitted to Ministry of Environment and Forests. Govt. of Rajasthan have assigned studies on EIA of Command area in Rajasthan portion to WAPCOS. Report is under finalisation.

IV. FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

The guidelines of the MOEF require that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present can be assessed, listed (rare and endangered) species can be detected, if present, and appropriate conservation measures devised.

On the basis of relevent details supplied by the various states, MOEF issued clea-rance for the SSP in 1987. A condition of this clearance, as far as it related specifically to the Flora & Fauna, was that Narmada Control Authority would ensure indepth studies on flora & fauna needed for implementation of Environmental Safeguard measures.

Studies/Surveys :

- Important survey work has included the following:
- The Environmental Impact Study of 1983 prepared by (MSU).
- Preliminary Report on First Botanical Exploration and Plant Collection from Narmada Valley by the Botanical Survey of India in 1986.
- Report on the Survey of the Narmada Sagar Area by Zoological Survey of India, 1988.
- Note on Sardar Sarovar Project Preparation of Environmental Work Plan for Forest and Wildlife by the State Forest Department, GOM, 1988.
- Status of Flora and Fauna in and Around Sardar Sarovar Project, Maharashtra is studied by the University of Pune (1992-94). Interim report is received in NCA.
- Eco-Environmental and Wildlife Management Studies in the Sardar Sarovar Area in Gujarat, 1992, by MSU.
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems. The study was conducted by the State Forest Research Institute (SFRI) in Jabalpur and financed by the NVDA. This study is completed & report is\$submitted in 1994.
- Workshop on Approaches to Integrated Wildlife Management in Gujarat: A Report by the SSNNL, October 1990.
- People's Involvement in Wildlife Management, by VIKSAT in 1991.
- Wildlife Management Studies in the Submergence and Catchment Area of Narmada Project: With Special Reference to Shoolpaneshwar Wildlife Sanctuary, by the SSNNL, 1992.
- Narmada Basin Water Development Plan: Development of Fisheries, 1987, was prepared by the Narmada Planning Agency, GOMP.

- Rapid Reconnaissance Survey of Limnological Aspects Part I,II and III, 1987, were undertaken by the Universities of Bhopal, Vikram and Rani Durgavati for GOMP.
- Water quality data has been collected by the Central Pollution Control Board, Central Water Commission, the State Pollution Control Boards and the National Institute of Oceanography.
- Narmada River Basin Development Project: Fisheries Component, 1991 by the German Consultants to the World Bank, GOPA.
- Sociological Survey of the Fishing Families of the Narmada River by CICFRI, 1991.
- Aquatic Fauna (Fish) Studies in Indira Sagar Submergence Area, prepared by the Friends of Nature Society in 1991 on behalf on the NVDA reported on the fish fauna of the Narmada.
- Pre-and Post-Impoundment Limnological Studies of Narmada Basin, by three universities coordinated by Barkatullah University for the NVDA. (1989-92) Study report was available in 1994.
- Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream is a desk review sponsored by the NCA and undertaken by CICFRI, 1993.
- Ecology and Fisheries of the Narmada Estuarine System with Special Reference to Proposed Impoundment (Sardar Sarovar Dam), is an ongoing study begun in 1988 by CICERI.

The Action Plans

To ensure that the wildlife conservation measures are implemented effectively, action plans for the three states were prepared as follows:

- felling plans for the forest area coming under submergence in Maharashtra and Madhya Pradesh which will avoid the possibility of animals being trapped in the submer-gence area;
- plans for improvement works in the wildlife sanctuaries of Gujarat;

Fisheries Component: .

Three state Govts. submitted the fisheries development plans which are as follows: .

The Narmada Basin Water Development Plan: The Development of Fisheries, 1984. This comprehensive plan for GOMP addressed the development of fisheries in the NSP, Omkareshwar, Maheshwar and SSP areas. Phasing and programming with respect to pre and post-impoundment, clearance of the forests,

training of fishermen, cooperative societies and postimpoundment management were proposed.

- Environmental Work Plan: Sector Fish and Fisheries, GOG, 1986. This work plan, prepared in compliance with the agreement with the World Bank included the establishment of fish hatcheries and fish farms, training of fishermen, establishing primary cooperatives, and establishing an Inter State Fisheries Board. In addition, it included proposals for conducting hydrobiological studies, studies on the morphology of the river, investigations into the physical and chemical characteristic of the water and soil, and studies on flora, fauna, fish yield, plankton, and productivity in the reservoir.
 - A Note on SSP: Preparation of Environmental Work Plan for Fisheries Development in Maharashtra, 1987. This plan included proposals for the felling in the reservoir submergence zone, fish seed, hatcheries, stocking, fishing, manpower requirements, and training and management through the Inter-State Board. Some more studies have proposed by GOM through CICFRI.

Subsequently, the state governments revised their clans with a view to address to issues as they arose. The revised plan for GOM included proposals for the fishing population to be resettled on the periphery of the reservoir or in R&R sites in Manarashtra. In addition, the establishment of low-cost hatcheries and irrigation tanks, the development of pen cage culture fisheries, and intensive fish farming were proposed. GOG also revised their plan by end 1994. The plan contained four volumes covering upstream, downstream & command areas. In view of the progressive impoundment which commenced in March, 1994. NCA has constituted an expert group to lay down the guidelines for conservation & development of fisheries & its ecosystem. The plan susmitted by state Govts. are under scruitny of this expert group.

Table 4.1 Summary of Status of Environmental Planning:

A) Wildlife

-	Gujarat	Maharashtra	Madhya Pradesh
Preliminary Surveys	Complete	Complete	Complete
In-Depth Studies	Complete	Completed	Complete
Development of Manage- ment Options	Complete for Shoolpaneshwar	Some work completed but awaiting deliberations of the expert group.	Some work comple ted but awaiting results of study and deliberation of the expert group

Action Plan			- Leave
Migratory corridors	Not needed	Completed	Complete
Sanctuary development	Complete for Shoolpaneshwar development.	Plans for esta- blishment of wildlife sanc- tuaries await study results and expert group's recommendations	Plans for estab- lishment of wild- life sanctuaries await study result and extert group's recommendations.
Wildlife conservation	Massive affor- estation in entire catch- ment of SSP	It depends on deliberations of expert group	Await final out- come of study.
Implementa- tion	Shoolpaneshwar development complete, CAT work (increasing carrying capacity)nearing completion	Awaiting out- come of the study. CAF nearly comple- tion, CAT work recently acce- lerated	Arrangements complete, awaiting final cutcome of study

Progress in Shoolpaneshwar Sanctuary Development

1	[arget	Act	ieved	i to	% Complete	
- Fencing	100km		107		100	
- Firelines	60km		251	km	100	•
- Barricades	2km		2.8	km	100	
- Check Dams	14		14		100	
- Construction of Quarters	21		21		100	
- Construction of Rest House	1		1		100	
- Improvement of Communication		km	70.	5 km	100	

The SSP will also provide an opportunity to enhance nature conservation outside the immediate catchment area of the Narmada. In particular three wildlife sanctuaries located in the command area of the project will benefit from the increased freshwater availability resulting from the project and there are plans by the GOG to further develop these. They comprise:

- Nal Sarovar, Bird Sanctuary;
- Wild Ass Sanctuary in the Rann of Kutch.
- Velvadar Black Buch Nation Park.

Summary of Status of Environmental Planning:

B) Fisheries

	GOG	GOM	GOMP	
Preliminary surveys work plan.	Yes	Yes	Yes	
Updating of Detailed surveys/studies of fish fauna	Yes	<u> </u>	Yes	
Updated Action plans	Yes	Yes	Underformu-	
Implementation	•		1411011	
1.Plan for clear felling	Completed	Yes to synchronise with submergence 26.00 ha felled marking on 714 ha.	Yes to synchronise with submergence work commenced.	
2.Development of fish farms	Under imple- mentation	Proposal under re- vision.	Proposal under re- vision.	
<pre>3.Establishment of IFDB for future R&D management 4.Expert group to }</pre>	Agreed	Agreed	Yet to agree	
lay down guide- : lines for conser- : vation & Development }		the states & wo meeting hel		

Progress of Implementation

CICFRI have already established one hatchery in Gujarat for augmenting the numbers of the Hilsa fish in the reservoir. This currently produce around 250,00 spawn per year. CICFRI have also been commissioned to monitor the whole of the estuary and their study has been extended to examine pollution and to undertake modelling studies in the downstream environment.

A draft plan for the creation of an Interstate Fisheries Development Board (IFDB) has been prepared by the NCA and agreed, in principle, by the governments of Gujarat and Maharashtra. However GOMP has disagreed & suggest an alternative proposal. Reaction from GOG & GOM are awaited. The organisation is expected to be set up and fully functioning prior to reservoir filling. An expert group has been constituted by NCA to lay down the

guidelines for fish conservation & development during progressive filling of the reservoir to advise the state executive agencies for followup action. Guidelines are on the anvil.

GOG has already provided 16 hectares of land to the project for the development of fish farms. In addition, the State Fisheries Department is exploring the development of riverine fisheries and the development of the reservoir for commercial and game fisheries.

Execution of felling in M.P. & GOM as per felling plans prepared awaits the commencement of impounding.

V. SEISMICITY

Studies

Studies of reservoir-induced seismicity (RIS) and rim stability have been carried out by the Geological Survey of India (GSI), Central Water and Power Research Station (CWPRS), University of Roorkee and World Bank Consultants. The principal studies are described below:

- University of Roorkee. 1980. Geological and Seismological Investigations of the Environs of Narmada Valley around Navagam Dam site in Gujarat.
- GSI. 1981-82 and 1982-83. A Geotechnical Report on the Reservoir Competency Investigations in Parts of Sardar Sarovar Area, Bharuch & Vadodara Districts. Volumes I&II.
- Shenoi et al. 1982. Shenoi et al presented at the New Delhi conference on the significance of seismotectonic aspects, on reservoir development.
- Balasundaram, M.S. 1982 Sardar Sarovar Project: A Geotechnical Report Compiled and Edited for the Government of Gujarat.
- MSU. 1983. The Sardar Sarovar Narmada Project Studies on Ecology and Environment.
- NVDA published a Position Paper on Seismic Studies in January 1986.
- Krishna, Dr. J. 1989. Dams and Seismicity.
- GSI.1990. Study of the Rim Stability of the SSP.
- GOI.1993. Sardar Sarovar Project Seismicity and Sardar Sarovar Dam.

Progress of Implementation

The various recommendations for modification of the dam design which have all been implemented are summarised as:

- adoption of horizontal design coefficient of 0.125g on the recommendation of the Dam Review Panel;
- installation of stress monitors in the main body of the dam;
- increase of the depth of the foundation to 18m below the lowest river bed.

The Government of Gujarat has identified 9 locations for the installation of Seismic monitoring stations, 4 each on either side of the Sardar Sarovar reservoir in Madhya Pradesh and Maharashtra and 1 at Kevadia in Gujarat. By Dec. 1994, 8 stations had been installed. Construction of building for the 9th station in progress.

The progress of implementation is illustrated in Table below:

<u>Implementation of Actions</u>

Action	Status
Dam design modifications	Complete
Installation of monitoring stations	8 stations installed by June,1994, 1 more awaited
GSI (Nagpur Division) rim stability studies	Completed
Tracer Studies by CWPRS	Ongoing (three reports submitted)

VI. <u>HEALTH ASPECTS</u>

Studies

A large number of studies have been carried out on the health profile of villages in the three affected states. The key studies are summarised below:

Narmada Programme - Schistosomiasis - Back-to-Office Report, 1986 assessment was carried out by Goodland, consultant to the World Bank, the National Institute of Communicable Diseases (NICD) and the World Health Organisation (WHO).

 Proceedings and Recommendations of the Meeting of Schistosomiasis Research and Surveillance held at NICC on 22nd November 1985.

- Disease Profile of Command Area by the State Commissariat of Health, Medical Services and Medical Education (SCHMS), 19
- Health Statistics, GOM,1987. The state department of health produced a report on the health profile of 33 projectaffected villages in Dhule District, Maharashtra.
- Health Statistic 1982-84, GOMP. This study, published by GOMP in 1985 & updated is 1994.
- The Sardar Sarovar Narmada Project Studies on Ecology and Environment by MSU in 1983 considered public health in Chapter-3.
- Numerous studies have been conducted on the incidence of malaria in India by, amongst others, by the Malaria Research Centre (MRC) and Dr. Kalra.
- Revised health plan by GOM, 1995.

Status of Implementation of Actions for Public Health

Action	Gujarat	Maharashtra	Madhya Pradesh
Baseline studies	Complete	Complete	Complete
Preparation of state action plan	Submitted and modified in 1986; Urban Malaria Scheme proposed	Original sub- mitted in 1987, revised in 1991 and 1992 & 1993	Original submitted in 1986, revised in 1988 and final plan submitted in 1991
Survey of existing facilities	Complete	Complete	Suifficient . facilities
Establishment of new facilities	Hospital at Kevadia for workers;labo- ratory and mobile unit complete,drug dispensaries	Somawal village hospital; health centres and health units sanctioned.	Hospital, mobile unit and civil dispensaries for labour; detailed scheme for resettled population
Vector control measures in place	NMEP;SSNNL work- shop on malaria control;labora- tory establish- ed; studies on health completed	NMEP; adoption malaria control guidelines of irrigation Department	NMEP; state malaria control organisations strengthened
	One senior health officer is posted at Kevadia.		Needs identified .

Disease Monitoring and responsibility

9

Entrusted to SCHMS Action Plan of 1986

Entrusted to regular health department will be revised. Survillane studies commenced.

Evaluation cell established monitoring by Gandhi Medical College, Bhopal.

EIA recort Submitted by SCHMS. Final plan awaited.

VII. ARCHAEOLOGICAL SURVEY AND ANTHROPOLOGICAL STUDIES/ ARCHAEOLOGICAL SURVEY

In the case of SSP, where some sites may be submerged NWDT award stipulated that, the entire cost of relocation and protection should be chargeable to GOG. Relocation work is to be supervised by the Department of Archaeology under the provisions of the 1958 Act.

Studies:

Survey conducted for identification of various sites & monuments of significance has included the following:

- Gujarat: Archaeological Survey of Nineteen Villages Submerged by Sardar Sarovar Reservoir, 1989.
- Maharashtra : Survey of Department of Archaeology. A survey was carried out by the Department of Archaeology of cultural sites in 24 villages of Akkrani Taluk and nine village Akkalkuwa Taluk, Dhule District.
- Madhya Pradesh: Survey of State Department of Archaeology and Museum (1992).
- Anthropological Survey of India: Narmada Salvage Plan.
- Anthropological Survey of India: People's of India.
- Parishad, A.K. Survey of Material Cultural in the Narmada Valley.
- Rashtriya Manav Sanghralaya : Narmada Salvage Plan.

Cultural Heritage in SSP Area

	Gujarat	Madhya Pradesh	Maharashtra
Relocation of Temples	8(2)* •	37 (7)	-
Excavation site(s) -	5	

Figures in brackets indicate number of sites designated for relocation.

Summary of Current Situation and Progress

	GOG	GOMP	GOM*
Survey of Villages in Submergence Zone.	} "Compl	ete" for all	item in
Identification of Cultural Sites		the States.	ICCIR III
Collection of Data and Documentation of Sites	Complete	In progress	Not required
Selection of appropriate sites.	Complete	n process	Not required
Action plan	Complete	Finalised	Not required

Survey in Maharashtra identified one temple which was on the border with Gujarat. GOG has already relocated this temple 15 km. downstream of present location.

Progress of implementation:

State	Relocation	Target	Progress
35455	110100001011	, a, goo	, . Og. C33
Gujarat	2/2		-
Maharashtra	-		
Madhya Pradesh	7/5 *1	5/3 *2	188/9 *3

Relocation/Protection

Work for relocation of following temples is in progress.

	Village	Temple	
1.	Semalda	Kalanjeshwar	<pre>} } Land allotment under } progress of estimate } under preparation.</pre>
2.	Barda	Shiv Mandir	
3.	Khujawa	Bhawani Mata temple	
4.	Khujawa	Jaleshwar temple	}
5.	Panthia	Satmata temple	
6.	Panthia	Shiv temple	

The monuments viz. Shiv temple of Religaon is proposed to be protected by constructing a wall.

*2 **Excavation**

For excavation at vill Khaparkheda & Brahmangaon. Funds sanctioned by NVDA & wprl was was completed.

- For excavation at village Utarad. Work was completed earlier by ASI, Govt. of India.

*3 Collection & display at Museum

- Land for museum at Barwani & Indore requested. Chemical treatment of rock cut statue at Piplagarhi has already been started. This monument is proposed to be shifted at relocation site.
- Construction of a section 'Narmada Dirgha' in the museum at Bhopal has been started.
- Besides, Film documentation of all the monuments of SSP is in progress through an agency 'Madhyam', engaged by state deptt. for documentation of the Impartal monuments.
- Proposal to establish Narmada park to house sculptures at Lalbagh Palace, Indore is under consideration of the state Govt.

ANTHROPOLOGICAL STUDIES

Government of Madhya Pradesh has informed that in view of the studies being carried out in connection with Narmada Sagar Project, no separate anthropological studies are required and that the Director General, Anthropological Survey of India has also expressed the same view. M.P. State Adivasi Kala Parishad has submitted its report on Tribal arts & culture. Besides Anthropological Survey of India has informed that Narmada Basin is already covered extensively under the project "people's of India". Besides Rashtriya Manav Sanghralaya has conducted needed studies in the past as follows. Further studies are covered under R&R plan of the state Governments. The work done by An.S.I is being used.

- a study of the palaeo-ecology of quaternary fossils in the central Narmada Valley;
- excavation of upper palaeolithic site of Mehtakhaeda and further exploration of Nimar;
- collection of tribal artifacts in Madhya Pradesh.

Institutional responsibility for these actions was specified in the action plan whereby the first two elements were completed by Deccan College, Puna and the third by Adivasi Kala Parished, for the Rashtriya Manav Sanghralaya, Bhopal.

STATUS REPORT NARMADA SAGAR PROJECT (NSP) ENVIRONMENTAL ASPECTS. DECEMBER, 1995

1) Phased Catchment Area Treatment:

The freely draining area of Narmada Sagar Project down stream of Bargi Dam is about 39,25,422 ha. As per the guidelines of MOWR, directly draining watersheds of very high and high priority categories only are to be treated Pari passu with the construction of the dam and at the project cost. Prioritisation survey of the watersheds was entrusted earlier to \$GSIT&S, Indore. Later on, as per GOI's instructions the prioritisation survey was entrusted to the All India Soil & Land Use Survey Organisation, New Delhi. The Survey has been completed by AISLUSO, New Delhi and the Survey reports have been received in the NVDA.

On the basis of the reports submitted by the AIS&LUSO, 30 sub-watersheds belonging to the very high and high priority categories and directly draining into the reservoir have been identified for treatment. These 30 sub-watersheds cover an area of about 73,456 ha.

I. <u>DIRECTLY DRAINING SUB-WATERSHED OF HIGH & VERY HIGH PRIORITY</u> CATEGORIES:

Critically degraded Sub-watersheds below Bargi dam (Figure in ha).,

	FOREST		NON FORE	ST	TOTAL	
	Gross	Net	Gross	Net	Gross	• Net
Critically degraded sub-watersheds.	15759	11048	57697	51927 *	73456	62975

^{*} In addition an area of 1636 ha. was treated up under pilot project earlier.

<u>Programme</u> and <u>Progress</u> of Works:

	Upto	92-93	93-94	94-95	95-96	96 - 97	
	Comulati	ve Progr	ess Target/Pro	gress	Target		
Non-For area/ h (51,927	a.	11439 .	<u>13636</u> 10261	<u>15375</u> 7224	19651 1367	3352	;
Forest (11,048	•	_	_	<u>3700</u> 2623	<u>4777</u> 240	3648	:
Total 6		11439	<u>13636</u> 10261	<u>15700</u> 9847	23824 1607	7000	

II. FREELY DRAINING AREA: (EXCLUDING DIRECT DRAINING SUB-WATERSHEDS)

Number of wat: ' . '...

: 78 Grossy Areas

Net Area

10,12,650 ha. 9,15,150 ha.

Schedule of Implementation:

Year	Forest (in ha.)	Non Forest	(in ha.)
	Gross Area	Net Area	Gross Area	Net Area
1995-96				18000
1996-97				1,8000
1997-98		10000		27000
1998-99		10000		28800
1999-2000		10000		28800
2000-2001		10000		28800
2001-2002		10000		28800
2002-2003		10000		28800
2003-2004		10000		28800
2004-2005		10000		28800
2005-2006		10000		28800
2006-2007		10000		28800 ·
2007-2008		8430		28800
2008-2009				28800
2009-2010				28800
2010-2011				28800
2011-2012				28800
2012-2013				28800
2013-2014				28800
2014-2015				
2015-2016				288 00
2016-2017				28800
2017-2018				28800
2018-2019		•		28800
2019-2020		- 4		28800
2020-2021				28800
2021-2022				28800
2022-2023				26400
2023-2024				26120
	1,24,732	1,08,430	8,96,361	8,06,720

⁵ projects for seeking funds for 40 subwatersheds covering an area of 53709 ha of forest were submitted by NVDA to National Afforestation & Eco-Development Board.

2) <u>Compensatory Afforestation</u>:

A total of 40332 ha forest land would come under submergence and an additional 779.9 ha of forest land has been diverted for the residential colony, power house complex, dam, saddle dam and

approach roads. Subsequently, another 308.4 ha of forest land was permitted to be diverted for power house. Thus a total of 41,420 ha of forest land has been permitted to be utilised for the construction of ISP. To compensate for this loss of forest, 10,143 ha of non-forest and 70,802 ha of degraded forest land has been identified for compensatory afforestation.

<u>Programme of Compensatory Afforestation:</u>

	Commulative Progress till 91-92	92-93 Target/ Progress	93-94 Target/ Progres		95-96
Degraded Forest	23048	<u>12528</u>	12400	1 <u>2400</u>	10035
area (70,802 ha)		11919	12987	4056	2902
Non-Forest area	5239	<u>1534</u>	<u>1500</u>	<u>1500</u>	<u>514</u>
(10,1 4 3 ha)		1390	1327	667	131
(80,945)	28287	<u>14062</u>	<u>13900</u>	<u>13900</u>	11549
(say 81,000 ha)		13309	14314	4723	3033

3) Command Area Development:

The Government of Madhya Pradesh has submitted command area development plan. The project on completion will provide annual irrigation to 1.69 lakh ha.

The implementation of the plan would be taken up in three phases for completion in 6/2007. Monthly observation of water levels started in November, 1991 for subsequent supply of this data to the consultants, already shortlisted, are likely to be continued for 2 seasons to draw inference for preparation of master plan for drainage. The study on impact of Agro chemicals, runoff from fields on surface & ground water quality in the command area has been assigned to J.L. Agricultural University, Jabalpur. An MOU for this work was finalised. An allocation of Rs.24.5 lakhs was made.

4) Flora, Fauna, Wildlife and Carrying Capacity:

Studies on these aspects were entrusted to the Wildlife Institute of India, Dehradun in December, 1989 and were scheduled to be completed by March, 1993. The studies have been completed. The final study report is submitted to MOE&F & NCA.

Besides this, the Friends of Nature's Society, Bhopal, was entrusted with the preparation of Wildlife Retrieval and Conservation Plan. They have submitted the final report. Action plan is under formulation.

Actions have been takenup by NVDA to implement the recommendation of the WLI regarding construction of National Park & protected areas.

5) Seismicity and Rim Stability

The reservoir competency survey has been done by GSI and report is submitted. In the report, GSI has suggested further studies for some patches of narrow water divide. As such they were requested to carry out the study in the required area. GSI is further reviewing the need to survey the area identified earlier.

Establishment of 11 nos. of seismic observatories in the Narmada Sagar Complex area is takenup NVDA these may be completed by June, 1996. Besides, 12 nos. of wood Anderson Seismometers and six nos. of photographik recorders are being procurred from IMD. Procurement of Micro Earthquake recorders is also in progress. In the mean time on the initiatives takenby NVDA, CWPRS has already installed the instrument to records. Preimpounding date and for undertaking seismic studies at NSP, Omkareshwar & Maheshwar projects through Analogic micro earthquake recorder & strong motion accillograph as an interim measure work on establishment of remaining seven observatories is in progress.

6) Health Aspect:

A note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and comments were sent for modifying the report. NVDA has submitted the revised plan costing Rs.748.73 lacs for the preventive and curative aspects of health. Regarding preventive aspects, a MOU has been signed with the Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal. Four six monthly report received. For studies on health aspect in project impact areas of SSP and NSP, work is proposed through a cell of monitoring and evaluation under the Directorate of Health Services, Bhopal. The approved plan is being implemented.

Pre-impoundment and post-impoundment Limnological studies carried out by three Universities will take care of water quality aspect. These studies have been completed and the final report is submitted. Action plan is under formulation.

7) Fisheries Development:

The studies of certain aspects of fisheries have been included in the Limnological studies being conducted by the three Universities of the State; studies in the Upper Narmada, (Bargi Reservoir) by Rani Durgawati University, Jabalpur, studies in the Middle Narmada (Tawa, Barna and Kolar Reservoirs) by Barkatullah University, Bhopal, studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have completed the studies in their respective areas as per MOU and final report is available. Acquatic fauna has also been covered under the studies completed by Friends of Nature Society, Bhopal. The draft report of FONS is also available. Action plan submitted earlier is being updated.

8) Archaeological and Anthropological Survey:

A survey of the 254 villages is required for identification of the archaeological monuments falling within the submergence area. The State Department of Archaeology and Museum, Bhopal was entrusted with the survey of 87 villages which has been completed. The state Department have already submitted an action plan for relocation of monuments of Archaeological significance. This plan is being implemented.

Excavation of the early historic mound in village Khedinama in Hoshangabad distt. is completed and report is available in NCA. Actual tools & artifacts have been found. However in order to ascertain the history after Mugal period, it is proposed to work further on this mound.

Archaeological Survey of India has also completed the survey for 167 villages for contrally protected monuments for identification of the monuments of significance.

Action plan is available. Action will be taken to preserve material of archaeological importance in consultation with experts.

As only lower bastion in north of the Joga Fort is likely to be affected by Scour action of water, this is being studied and the Siddeshwar temple is well above the FRL of 860 ft., these two structures in NSP areas are not considered as affected by the project however action is being taken by the concerned agencies to ensure safety of the monuments.

Anthropological Studies:

Efforts are being made for retrieval of bio-cultural material from the Narmada Basin. A lot of information is gathered from the field which generates immense data of Socio-Anthropological significance.

Rashtriya Manav Sanghralaya has constituted a working group for the retrieval of bio-cultural material in Narmada Basin. Survey of tribal art and handicraft entrusted to M.P. Adivasi Kala Parishad is completed and report is available. Besides Anthropological Survey of India has covered these studies under its own project called "people of India". NVDA has procurred five volumes of this report & these are being studied for use in the R&R tribal PAFs. The report is in 61 volume out of which 7 volume are under final editing. A Narmada Salvage plan is also launched by Anthropological Survey of India recently and the entire area is scanned and some ancient tools have been found.



4

नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदत्त Environment Sub-Group

अट्ठाइसवीं बैठक का कार्यवृत Minutes of the Twenty Eighth Meeting

> 14 मई, 1996 को पर्यादरण भवन नई दिस्ती में हुई

Held at
Paryavaran Bhawan
New Delhi
On
14th May, 1996

इन्दौर जून, 1996

INDORE June, 1996

MINUTES OF 28TH MEETING OF THE ENVIRONMENT SUB-GROUP NCA HELD ON 14TH MAY, 1996 AT PARYAVARAN BHAWAN, NEW DELHI

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MINUTES OF 28TH MEETING OF THE ENVIRONMENT SUB-GROUP NCA HELD ON 14TH MAY, 1996 AT PARYAVARAN BHAWAN, NEW DELHI

The Member Secretary of the Sub-group welcomed the participants to the 28th meeting. The list of participants is at $Annexure-XXVIII\ Min(1)$.

Agenda items were taken up for discussion thereafter.

Item No.XXVIII-1(134): CONFIRMATION OF MINUTES OF THE 27TH MEETING.

Minutes of the 27th meeting of Environment Sub-group of NCA as circulated among all the Members and Invitees vide letter No.Env-34(28)/96/142-170 dated 2.2.1996, were confirmed.

Dr.R.R. Shinde, Additional Chief Project Consultant and Dr.(Mrs.) N.P. Pai, Chief Project Consultant, with the help of Slides, made a brief presentation covering the analysis and recommendations emerging out of their Phase-I base line survey on health and morbidity pattern in the vicinity of SSP for the areas in Maharashtra. A copy of the conclusion drawn and recommendations made by the Study Group are placed at Annexure-XXVIII-Min-2.

Dr. N.D. Ghasura, Additional Director, Health and Family Welfare, Government of Gujarat, made a brief presentation on the findings of their study group contained in the report on Environmental Impact Studies on water related diseases in SSP impact area: Gujarat. A copy of the Executive Summery of the report was annexed with the Agenda of 27th meeting {Annexure-XXVII(6)-Page-48 and 50}.

Chief Conservator of Forests SSP, Gujarat also made a presentation on the achievements on Catchment Area Treatment and Compensatory Afforestation works being undertaken by Government of Gujarat for the SSP. He highlighted the works being executed on the Canal Bank(s) and project impact area plantation activities. He drew attention of the Members to the problems being faced by the Department regarding planting of the Vetiver Grass. According to him, roots of this Grass were used by the Tribals, therefore, its protection in the forest areas was very difficult.

The Chairman, however, suggested that Vetiver Grass is a very good soil binder and useful in soil moisture conservation works. Tribals need to the suggested that Vetiver Grass is a very good soil binder and useful in soil moisture conservation.

Item No.XXVIII-2(135): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

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- 1. SUBMISSION OF CATCHMENT AREA TREATMENT (CAT PLANS FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS [Item No.XXII-2(112){1}].
- a) <u>Submission of CAT Plan for Freely Draining Critically</u> <u>Degraded Sub-watersheds</u>.

Government of Madhya Pradesh informed that in case of NSP, NVDA had already submitted schemes to National Afforestation and Eco-Development Boards for treatment of 53,700 ha. area.

addition schemes to NATE tunds.

Regarding SSP, Member (E&F), NVDA, informed that even though as per the annual plan, the work was scheduled to commence with effect from 1997-98. However, it had already, started in some areas during the current year. Chairman suggested that since the schemes of CAT are labour intensive and generate employment,

During the earlier meeting, it was agreed that as the cost of CAT for directly draining sub water sheds was chargeable to the SSP, Planning Commission could be approached at the Government of India level for waiving off the limits on expenditure imposed by the State Governments to enable Government of Madhya Pradesh to complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time. The issue was discussed again to the complete the works of CAT in time.

The Principal Secretary (Forests), Government of Maharashtra, informed that for 35 sub water sheds proposed to be treated, six schemes have been sanctioned. But the funds given are for treatment for only one year and there is no provission of funds for maintenance works which are normally spreadd over four years. However, for the remaining four years Government of Maharashtra were exploring the availability of funds from NAEB, etc.,

for forest area spread to ten subset of the plantast secretary.

Secretary

Wever, pointed out that he had no communication with him

and requested Secretary (Environment) to coordinate the works being executed by various Departments of the State Government.

b) Silt Monitoring Posts

Shri R.K. Behre, subject matter Specialist (Hydrology and Sedimentation) of NVDA, drew attention of the Members on the work outline for monitoring sediment out-flow prepared by NVDA (placed at Annexure-XXVIII-Min-3). He informed that the detailed scheme with cost estimate was being prepared. Member (E&R), NCA, pointed out that the Chairman, during the earlier meeting, had suggested installation of a few sites for monitoring of silt flow during pre and post treatment phases of the CAT programmes, on the lines being executed in Gujarat areas. For this, he suggested that the work may be taken up only for academic purposes under the guidance of Central Soil Conservation Research and Training Institute, Dehradun. If, however, it was proposed to frame the burdening the State Government with demand of funds, he suggested that the work on silt monitoring the taken up only at few sample sites expeditiously and as such, therefore, the detailed schemes were not necessary.

2. COST ESTIMATES FOR PREPARATION OF ACTION PLAN AND IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD MEASURES [Item No.XXXII-2(112)(2)].

During the earlier meetings of the environment Subgroup it was desired that the detailed cost (estimates and expenditures) of studies and implementation of mitigation measures for suggested environmental safeguards should be presented. The information made available so far meeting is presented in Annexure-XXVIII-Min-4.

Regarding furnishing all the details on cost estimate and expenditure on the studies and works completed/ proposed to be undertaken in the Command Area of SSP, Executive Member (NPG), informed that the submission of such details would only be possible after completion of all the studies commissioned by NPG and after preparation of the Action Plans.

Item No.XXVIII-3(136): PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS.

i) PHASED CATCHMENT AREA TREATMENT

Narmada Sagar Project

Government of Madhya Pradesh

Information contained in the Agenda notes was noted and it was clarified that out of a total target of 62,975 ha. about 35,665 ha. had been treated up to the end of March, 1996.

Sardar Sarovar Project

Government of Madhya Pradesh

NVDA informed that out of 1,25,725 ha. an area of 37,895 ha. was treated up to the end of March, 1996. On the issue of submission of detailed information about the difficulties being experienced on Catchment Area Treatment

Reviewing the progress of works in Madhya Pradesh, Additional Director, Ministry of Environment & Forests, pointed out that the schedule drawn by NVDA as delineated in Annexure-XXVIII-I of the Agenda was for completion of all the works by 1996-97 and expressed that in view of the slow progress, however, targets should be revised.

Member (E&F), NVDA, stated that the revised schedule was given to the Fact Finding Committee. Member (E&R), NCA, however, respect that the information in this regard was tracted to be made available to the NCA at the earliest

Government of Gujarat

Information contained in the agenda was discussed.

Presentation on the silt monitoring exercises being undertaken in Gujarat was awaited.

Government of Maharashtra

Principal Secretary (Forests), informed that except for 1,182 ha. area, entire forest area had been treated up. Shri V.K. Gosavy, Divisional Soil Conservation Officer, Nandurbar informed that the entire non forest area of 2,768 recompletion of the work, wery some very some completion of the work.

ii) COMPENSATORY AFFORESTATION

Narmada Sagar Project

Government of Madhya Pradesh

Information contained in the Agenda was noted.

Sardar Sarovar Project

Government of Madhya Pradesh

The information contained in the Agenda was noted and in the informed that the balance works would be completed seen.

Government of Gujarat

Information contained in the Agenda was noted. The progress on the suggestions given during the 27th meeting in taking up scientific observations concerning improvement of the area received from GOG is enclosed at Annex-XXVIII-Min-(5).

Government of Maharashtra

Principal Secretary (Forests), Government of Maharashtra, informed that all works except for 127 has have been completed and these works would be taken up during 1997 references.

The progress on publication of highlights of plantation activities in Maharashtra was awaited.

iii) COMMAND AREA DEVELOPMENT

Narmada Sagar Project

Shri R.K. Behre, informed that the comments of the Members of this Sub-group on the outlines of the TOR Annexed with the Minutes of the 27th meeting, were still awaited.

Member (E&R), NCA, pointed out that in the last several meetings of the Sub-group, NVDA, had been directed to prepare a comprehensive TOR on the lines as drawn by the Government of Gujarat, for the command area of SSP. He suggested that even though conditions of the command area of Narmada Sagar might be different than that of SSP, but basic features and component might remain the same. He suggested that, if required, NCA can again send detailed information on this aspect to NVDA.

The Sub-group was informed that NVDA had released s.24.50 lakhs for the studies related to the effect of esticides, insecticides, etc. in the command area of NSP.

Sardar Sarovar Project

Government of Gujarat

Executive Member (NPG), elucidated details of the meeting he had with Dr. Abrol and his team and asserted that even they had not much to suggest over and above what was being undertaken by the Government of Gujarat on CAD works. However, on the issue of the need for taking up any studies he agreed to consult DDG who succeeded Dr. Abrol, in ICAN.

Executive Summaries of the reports on Agrochemical runoff from SSP command received from the Government of Gujarat is placed at Annexure-XXVII-Min-6.

Government of Rajasthan

Representative from Rajasthan informed that the report under reference was received by the Government and actions suggested would be expedited soon.

iv) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

Narmada Sagar Project

Government of Madhya Pradesh

It was informed that Action Plan drawn up based on the recommendations of the study reports submitted by Friends of Nature's Society, Bhopal, and Wild Life Institute of India, awaits the approval of Wild Life Board constituted for the large to take up measures to get the large by the next meeting.

Sardar Sarovar Project

Government of Madhya Pradesh

NVDA informed that the Action Plan drawn up for SSP was awaiting the approval of Wild Life Board constituted for the purpose and that efforts were being made to get the approved by the next meeting of the Environment Subgroup.

Shri O.P. Mishra, a Scientist from Botanical Survey of India, informed the Sub-group of the works done by him earlier on floral inventory of the Narmada Valley.

State a survey on the role of plants in socio-economic plan

Government of Gujarat

Copy of the Executive Summary of the report submitted by the M.S. University, Vadodara, received from NPG during the meeting is placed at Annexure-XXVIII-Min-7.

Executive Member (NPG) informed that the main recommendations of the Study Group were about the development of Shoolpaneshwar Wild Life Sanctuary. He further informed that the Action Plan for the development of the Sanctuary has been drawn up and deliberation of the Expert Group were held on lath May, 1896.

Thermod that final Action Plan would be ready in a couple of weeks' time.

Government of Maharashtra

Shri G.N. Wazade, Director (Env.), Government of Maharashtra, informed that the final report of University of Pune was under printing and would be available by the next week. It was pointed out that the draft final report of the University was not made available to NCA for incorporation of the comments and, therefore, it was suggested that the printing of the reports may be heldup for a week or two to facilitate incorporation of the comments of NCA. A copy of the draft report was requested from the Government of Maharashtra for the purpose.

v) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

<u>ARCHAEOLOGY</u>

Narmada Sagar Project

Government of Madhya Pradesh

Prof. Ramaseshan suggested that the back water studies were to be completed by NVDA and the required information was to be made available to the Superintending Archaeologist to enable him to assess its impact on the monuments. NVDA pointed out that all the information needed by him has already been made available.

Progress on printing of a book-let on the good-works being done by the Project. Authorities was awaited.

Sardar Sarovar Project

Government of Madhya Pradesh

Member (E&F), NVDA, informed that the Coordination of the works being executed by the Agency engaged by the NVDA was quite effective. However, regarding the works being done by the Agency not engaged by NVDA, NVDA had also addressed them for reporting the progress of work being undertaken by them independently.

Member (E&R), NCA, pointed out that in the Action Plan submitted by the Department of Archaeology and Museum, elevation level(s) of the monument(s) were not delineated. As such, it was difficult to assess the need for relocation of the monument.

Government of Gujarat

Detailed report on completion of works related to Shoolpaneshwar Temple and progress on Hampheshwar Temple awaited.

for making available a few 35 mm. Colour Slides of old and new Temples and its surroundings.

Government of Maharashtra

No works was required to be done in Maharashtra in this regard.

ANTHROPOLOGY

Sardar Sarovar & Narmada Sagar Projects

Government of Madhya Pradesh

The Chairman enquired about the progress related to the proposed amendment. It was informed that the issue was to be taken up with Ministry of Welfare.

Take up this issue during the next

Regarding procurement of balance publications of the Vinnes which contain the details on Gujarat, Madhya Pradesh and Maharashtra, NVDA, informed that the matter was being ed.

vi) SEISMICITY & RIM STABILITY OF RESERVOIR

Narmada Sagar Project

Government of Madhya Pradesh

Regarding programme of the balance seismic instruments, NVDA informed that the issue was under consideration of the Narmada Control Board. It was pointed out that since the cost involved was very high involving an expenditure of more than Rs.0.1 m. US dollar, it may take some more time.

Sardar Sarovar Project

Prof. Ramaseshan informed that he had not yet received the reports he requested earlier. Member (E&R), NCA, agreed to send him another set of report within couple of days to enable Prof. Ramaseshan, to give his contact.

vii) HEALTH ASPECTS

Narmada Sagar Project

Government of Madhya Pradesh

Member (F&F), NVDA, informed that the details of the cost estimates were being worked out and would be made available soon.

Sardar Sarovar Project

Government of Madhya Pradesh

Recarding epidemiological surveillance studies in SSP areas, NVDA, informed that Gandhi Medical College, Bhopshhad been requested to conduct the studies and submit the reports at the earliest.

Government of Gujarat

was informed that the implementation of the Action Plan on health aspect had already started in Kevadia Colomy.

Government of Maharashtra

Dr.N.S. Wanere, Directorate of Health Survey, Maharashtra, informed that the implementation of the Action Plan was in progress.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR

It was informed that the appointment of successor to Dr.G.P. Dubey was under consideration of the NVDA. It was also informed that the plan for development and conservation disheries related to Sardar Sarovar Reservoir was under approval of NVDA.

Item No.XXVIII-4((137): MONITORING OF R&R ASPECT OF NARMADA SAGAR PROJECT (NSP).

Detailed .discussion on the agenda item was deferred.

Item No.XXVIII-5(138): ANY OTHER ITEM.

At the end of the review, the Chairman suggested that the works being done on environmental aspect of the Sardar Sarovar Narmada Project might go a long way in guiding similar works on other projects. However, there was a need for scientific documentation of the good works being done. This was to be supported with suitable maps, charts and photographs. He desired that a suitable agency for compilation of such documents may be identified and it would be good if this could be done at the earliest. He suggested that any agency of repute like IIM, Institute of Social Sciences, School of Economics, etc., may be of good here. The suggested that this work could given be taken-up by the NPG with the help of NCA.

Executive Member (NPG), enquired, if SSP was to serve as a Modal Project for development of future Hydro Projects, whether it would be possible for MOE&F to provide the needed funds for carrying out the required jobs.

Chairman, however, expressed the opinion that so long as the studies are within the required frame work, funds may not be a constraint. However, he emphasised that the presentation needs to be of high order as it would be given wide circulation.

ANNEXURES

ANNHX. XXVIII. Min-FI).

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LIST OF PARTICIPANTS OF THE 28TH MEETING OF ENTIRONMENT SUB-GROUP HELD ON 14TH MAY, 1996 AT NEW DELHI.

COVERNMENT OF INDIA

Ministry of Environment & Forests

- 1. Shri N.R. Krishnan, Secretary, Ministry of Environment & Forests, New Delhi.
- 2. Dr.(Mrs.) Nalini Bhatt, . Director, Ministry of Environment & Forests, New Delhi.

Narmada Control Authority

- 1. Dr. A.K. Malhotra, Member (E&R), NCA and Member Secretary of the Sub-group.
- 2. Dr. Pawan Kumar, Specialist (Env.), NCA.

Sardar Sarovar Construction Advisory Committee

1. Shri R.S. Prasad, Secretary, Sard-ar Sarovar Construction Advisory Committee, Vadodara.

ICMR, New Delhi.

1. Dr. Bela Shah, ADG, ICMR, New Delhi.

Botanical Survey of India

1. Shri O.P. Mishra, Scientist, BSI, Allahabad.

GOVERNMENT OF MAHARASHTRA

- 1. Shri A.K. Mago, Principal Secretary (Forests), Government of Maharashtra, Mumbai.
- 2. Shri G.N. Wazade, Director (Env.), Government of Maharashtra, Mumbai.
- 3. Dr. N.S. Wanere, Jt. DHS, Government of Maharashtra, Mumbai.
- 4. Shri M.K. Jiwrajika, O.S.D. (Projects), Government of Maharashtra, Mumbai.

- 5. Dr.(Mrs) N.P. Pai, T.N. Medical College, Government of Maharashtra, Mumbai.
- 6. Dr.R.R. Shinde, Dy. director, Health Services, Government of Maharashtra, Mumbai.
- 7. Shri S.T. Bindu, Dy. Director (Fish), Department of Fisheries, Government of Maharashtra, Mumbai.
- 8. Shri V.K. Gosavi, Divisonal Conservation Officer, Government of Maharashtra, Mumbai.

GOVERNMENT OF GULIARAT

- 1. Shri Arjun Singh, Secretary (R&R), SSNNI, GOG,
- 2. Shri Mahesh Pathak, Executive Member, NPG., GOG.
- 3. Shri S.C. Verma, C.C.F. (SSP), Government of Gujarat.
- 4. Dr.N.D. Ghasura, Additional Director (Health), Government of Gujarat.

COVERNMENT OF MADHYA PRADESH

- 1. Shri Suresh Chandra, Member (E&F), NVDA, Bhopal
- Dr.A. Raizaza, Member (R), NVDA, Government of Madhya Pradesh.
- 3. Shri R.K.Bahere, Specialist (Hyd. & Sedi.), NVDA, Bhopal.

GOVERNMENT OF RAJASTHAN

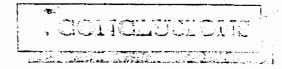
 Dr. Akshay Bhargava, Sr. Env. Engineer, Poll. Control Board, Jaipur, Government of Rajasthan.

NON OFFICIAL MEMBERS

- 1. Dr. R.K. Katti, Prof., UNEECS, Bombay.
- 2. Dr. S. Ramasheshan, Prof., IIT, Kanpur.

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Phase I : Sardar Sarovar Health Project : Mcharashara :



In the present baseline survey we have taken 10 % sample of all 3 areas, viz. Submerged (33 villages), Affected (28 villages) and Rehabilitated (5 villages). The total sample is of 425 families. Out of these 138 (32.5 %) are from submerged area, 212 (49.9 %) are from affected area and 75 (17.5 %) are from rehabilitation site.

The conclusions of our study can be summarised as follows:

- i. Out of the total families 56.9 % were Bhilla, 29.2 % were Pawara, 12.5 % were Tadvi and 1.4 % were others.
- ii. The 74.1 % families of the total were unitary families.
- iii. The 84 % of the families have farming as their occupation.
- iv. Only 5.2 % of the families were above poverty line.
- v. The poorest families were seen in submerged and affected areas, 53.6 % and 50.3 % respectively.
- vi. The housing conditions are bad. The 76.6 % stay in kuchha houses, 20.2 % in semi-pucca and only 3.8 % in pucca houses.
- vii. Main source of the water supply to the people is mostly river water and tubewells.
- viii. Only 8% are using electricity, most of which are in rehabilitation area.

- ix. The 93.8 % of families use forest wood as fuel for domestic purposes.
- The 17.4 % families do not have cattle while remaining have. The 26.1 % have cattle but do not have cattleshed.
- The mosquito breeding is enormous in affected area i.e. 54, 7% due to horizontal flow of water in the affected area and water logging.
- xii. A total of 447 under 5 children were identified in 425 families.
- The 33.3% children were born at home and the deliveries were conducted by untrained female dais in almost all cases.
- The birth weight of 53.2 % of the children was below the standard weight of 2.5 kgs while in case of only 3.9 % it was below 2 kgs.
- Only 17.9 % of the children received B.C.G. vaccine, 19.1 % Oral Polio Vaccine and 18.6 % Measles Vaccine.
- xvi. The food consumption was insufficient in, most of the under fives.
- xvii. The 60.9% children had suffered from upper respiratory tract infection followed by diarrhoea i.e. 24.9 %.
- xviii. At rehabilitation site utilization of Primary Health Centre services is better, i.e. 45.3% compared to that of in submerged area (29.2 %) and in affected area (30.5%). Morbidity in this group includes recurrent upper respiratory tract infection, diarrhoea, worms, scabies, anaemia and snakebites.
- Anaemia prevalence in this age group is 19.5 % in rehabilitation area, 33.8 % in submerged area and 46.8 % in affected area.
- xx. Total of 606 children were identified in the age group of 5-15 years. Females appear more in number than males in this age group (i.e. 52.6% vs. 47.4 %)
- xxi. Only 27.4 % of children in this age group were given DT-2.
- xxii. The 28.4 % of these children have been found consuming insufficient food.
- xxiii. The 67.0 % of these children have no pallor while 33.0 % had shown some signs of anaemia.

- univ. The morbidity pastern is same as for under five children among these while 43.9 % from affected area and 35.3 % from submerged area were ill last year.
- raiv. The 415 women for 15-45 age group i.e. reproductive age group were included in the study.
- row. The 92.7 % of these were illiterate.
- xxvii. The 49.2 % were engaged in farming and 73 (17.7%) in casual labour.
- or more than 3 alive children the majority of which are from the age group of 20-24 years. In more than 70 % women spacing of pregnancies was less than 3 years.
- wix. The 93.4% of women have not used any family planning method ever. Only 11 women (i.e. 3%) had accepted tubectomy as a method of family planning.
- Out of 413 women, 284 (68.3%) suffered from some illness last year. The incidence of upper respiratory tract infections and diarrhoea was more though other illnesses were there.
- xxxi. The 107 (37.7 %) women amongst these have not taken any treatment-while 149 (52.5 %) took treatment from Primary Health Centre.
- xxxii. Out of 413 women 192 (46.5%) were addicted to alcohol, tobacco or both.
- xxxiii. Males in 15-44 years age group were 411 in number.
- xxxiv. The weight for age pattern of these men indicate that young men between 15-19 years have weight less than 50 kg. These young men have heights between 145-155 cms. Chronic malnutrition is evident in this age group.
- xxxv. Out of 411 males 327 (78.6 %) are illiterate and 27 (6.6%) have studied upto 4th standard.
- xxxvi. The 267 (65.0 %) males out of these are farmers and only 12 (2.9 %) are in service. Rest are labourers. In both submerged and affected area more than 60 % have income less than Rs. 3000/- per anum.

- ninovii. (A s 277 minis makes (1544) greats i.e. 57.4 % had some of the other liness. The 127 (-4.7%) had apper respiratory tract infection, 92 (25.2%) had distributed and 20 (10.4%) had every infections.
- modeli. The 333 i.e. \$1.2% of the male in the age groups of 15-45 show addition of alochel for several reasons.
- rough. The 28.2 % have shown some signs of mild pallor in this group.
- id. Total number of people above 45 years of age from the 425 families is 188.
- xii. In the rehabilitation area there are only 32 (18.1 %) persons above 45 years of age as compared to the affected area 109 (58.0%).
- xlii. The 97 % of these are illiterate.
- ::liii. The 18.1 % persons are not working in this age group while 64.3 % are having farming as their occupation.
- xliv. The 118 (62.8 %) gave the history of addiction. The type of addiction is mainly alcohol. Addiction in rehabilitation area is less 24 (20.3 %) as compared to submerged (31.4 %) and affected (48.3 %) areas.
- Morbidity pattern of the age group of 45 and above is same as others. The 58 (49.2 %) had upper respiratory tract infection and 33 (32.2 %) had diarrhoea.
- xlvi. The 92 (43. 9 %) had reported affected vision. The Cataract was found one of the major reasons for the same. The 33 persons (17.6%) had immature cataract and 2 (1.1 %) had mature cataract.
- xlvii. The 90 persons (47.8 %) in this age group had clinically mild to severe anaemia.



The data analysis and conclusions were made in view of objectives of the project. The conclusions of the study have provided the necessary guidelines to formulate the approaches and strategies, which have been expressed as the recommendation of this study.

The recommendations have been grouped as follows:-

- I. Strengthening of health services in the submerged, affected and rehabilitation area.
- II. Community participation in health programmes.
- III. Accelerating overall socio-economic development.
- IV. Modifying health education strategies.

Primary Health Cure appressin allowed by coinformed in the submarged offected and reliabilitation area. The basic principles of mobilisation of political and social will, equilable distribution, intersectoral co-ordination, appropriate technologies should be operationalised in the study area. Therefore, the promotion of health should be based on actions in socio-occument spheres as well as in the health sector itself. Our recommendations in the array area are as follows:-

> lites : Religious Eron

At present there are 33 villages in the submerged area, which have a substantial population which is yet to be shifted in the rehabilitation area. Currently there are rescue camps established in each of these villages which are manned by a S.R.P. (Police Dept.), a special executive magistrate along with a wireless set. A floating dispensary (launch) accompanying a medical officer and Health Assistant visits every village to provide health services every week. During rainy season only, Medical Officers with fixed monthly stipends are appointed on adhee basis and stationed 24 hours at these rescue camps. Their activities are co-ordinated by the office of the Sardar Sarovar Project for Maharashtra at Kevadia Colony, Gujrat and the District Health Officer, Dhule.

During non-rainy season, Medical officers from other Primary health centres are given monthly posting at Kevadia Colony, to provide health services to the people in submerged area. M.O. mobilised from other Primary health centre has to make arrangement at his old Primary health centre on his own and they report to work in the submerged area. Also sometimes reliever Medical Officer does not arrive at the submerged area in the time (after one month) due to a number of impending factors at his Primary health centre. During this one month posting these M.O.s are away from their families and environment of their old Primary Health Centres and therefore view this posting in submerged area negatively. We observed that the police (S.R.P.) personnel which also are posted in the area, in rotation, are mobilised from all the districts of Maharashtra, but M.O.s are mobilised only from Dhule District alone.

la suola a situatio i wa recommend -

- . Two posts of Medical Officer Class III (Agrancefic and Alii to 1, 10 to proved for submerged area, should be precised. These way be alread to be the in the rehabilitation areas when the process of salicbilitation is complete.
- One effection Options will be sentened at Keynolia Colony Cl. Fourt to co-ordinate health convides in submerged area.
- a. This M.C. at Kevadia will be-ordinate with S.J.P. office and belt incommissionative logistics, programme planning, implementation of Hearth Programmes, liasion activities, reporting to D.H.O. Daule and managing any health problem that may arise in the area.
- d. The second M.O. will be in the desting dispensory and will visit 3 villages per day starting from day 1 of the week.
- a. Sinduri, Gaman, Paula, Danel, Mukhadi are the villages which are far away from the dam site. In such situation on option is that the IM.O. of floating dispensary, in mid week (Wednesday or Thursday) can stay overnight at the resourcemp at either at Bamani or Sinduri and start his journey next day from this village to the remote villages. This will reduce the time factor tremendously. The return journey from the last, village (Pimpalchauk) to the dam site can be done in the same manner.
- f. This activity can be done in 15 days in rotation along with the M.O. who is stationed at the Kevadia colony.
- g. In case there is any emergency during the non-visit day of the floating dispensary, same can be communicated to the M.O. at Kevadia colony through wireless set for necessary action.
- h. The overall work of these specially appointed Medical Officers may be supervised by an Addl. District Health Officer (ITDP), Dhule district.
- i. The posting of health assistants may be considered in a similar manner.
- j. One health assistant must accompany the M.O. of floating dispensary.
- k. Vehicle, if and when requested by the M.O. at Kevadia should be provided by the office of S.S.P. Maharashtra, Kevadia Colony at request.
- 1. A special allowance, ranging from Rs. 300-500 should be considered for 14.0, and Health assistants working in remote difficult tribal areas.

- n. The embegg to emblous difficion of A.O. on morae many a for the house maining miny section. The pariod of the extension of the interpretation of the interpretation of the interpretation of the increased, minimum upon 6 moraes (i.e. they as Teach of the
- a. Referral centre sactual be identified near Kemalia Onlary in Bujita to refer cases from submerged area to Gujitat.

A Translation

The affected area is characterised by lanchia roads, difficult terminatense forests, ghats, scattered houses, incomplete health in hestructure, slow progress of developmental activities and poor utilisation of health numbers. Hence, the interventions planned, go beyond the domain of the health sector. Based on our observations and study Andings our recommendations are:-

- a. The existing norm of 1 Primary Health Centre for 20,000 population and 1 subcentre for 3000 population in tribal areas should be modified as 1 Primary Health Centre for 10,000 population and 1 subcentre for 1000 population.
- b. These Primary health centres and subcentres should be established triving into consideration the needs of study area. A map showing existing and proposed infrastructure has been prepared accordingly and may be referred while planning the same.
- c. The existing incomplete infrastructure should be completed speedily and the bottlenecks in executing the same be removed. It is learnt that many a times, local contractors are reluctant to undertake any construction work, as it is difficult and less profiting for them. Also, there are a lot of bureaucratic impediments for recovery of their dues. The reasons for non-reluctance may be explored and if necessary the financial allocation and accounting should be decentralised upto Taluka level in the study area. However proper evaluation of the work done, should be done by competent independent authority.
- d. Incomplete and abandoned construction works at Rajbardi, Dhanaje, Khuntamodi should be revived and done at the earliest. At Dhanaje, the sets for the construction of new Primary health centre has been identified

in the reason of a such examined so the let Dajershi, the construction of a such and a first them to such a such as the side of them in the complete such as the companies and companies as the companies as the companies as the companies as the companies of the companies and the companies are companies as the companies are companies and the companies are personal companies.

- il. Wathi and blolagi are the two aspress Primary houth centres at present in the diffected area, we recommend to establish the proposed new much hospital in affected area, to be constructed at Morgi, preferentially.
- g. Mahumition arrongst under 5 children in affected areas is empacted to be prevalent in affected and rehabilitated area due to various socio-economic and cultural factors. Our objectives in the study is to adeast prevent deaths due to severe mainutrition in the study area. At present there are ICDS blocks in some of the villages in the study area where autitional supplements are being given to the children between 3-5 years. The attendance of children at these arganwadis is satisfactory but all the beneficiary target group is not being reached by the existing arganwadis. To effectively encounter the problems of malnutrition in tribal areas, the following measures may be undertaken.
 - i. Establishing the mechanism of nutritional surveillance in the area by adopting a 3 tier strategy.
 - A. All anganwadis under ITDP should be upgraded by creating additional post of Anganwadi assistants. The beneficiery should be from 0-5 years children. The formal education will remain valid only for 3-5 years age group, but nutritional suppliments should be extended to 0-5 years.
 - B. Establishing mini Anganwadis in remote and difficult villages with only one anganwadi worker preferably from

- Introduct on latifacts. She will emist emicrea of that the provide ready to emissional empositions to the children.
- O. Homblishing fooding contres only on the 'padas', where houses are consured over a large distance, or village where food or ration is provided may be made as main centre of the feeding centre. In feeding centre only mainourished obfactor with he given the quadrional supplement.
- i. The divinges in the effected autiliteabilitation area should be soverable by the abovernmentic and strategy. If federicity here ICDS block may be identified to establish new angentwedic.
- The nutritional supplement should be prepared from locally growing crop with a hiddenni ingredients supplied by the Government for eg. Postidge with mix of hiddennia or Registered with soya powder boiled with milk may be inted. Additional munitional menu can be devised on further research of the available food resources, the Soya flour and milk required for the nutritional supplement thould be easily available in the necessary local market. At least Joya flour should be available at all raden shops at subsidised rates. The acceptance of the multi-mix by the children should be demonstrated, before any such steps are taken.
- iv. In the initial phase, only Grade III and Grade IV malnourished children should be preferentially or rather explusively given the ready to eat nutritional supplement daily, supervised by anganwadi assistant, till they revert back to Grade I. Thereafter it is the responsibility of the mother for the same.
- v. Those children who are not malnourished can continue to avail exclusive nutritional supplement provided in the ICDs blocks.
- h. Near Kathi Primary health centre there was a vacant 3 storied building which was proposed to be a 'growth centre'. The building should be revived and one of it's unit should be Nutritional Rehabilitation Centre.
 - i. At this centre grade IV and Grade III malnourished children can be admitted for one or two weeks.

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- i. 1 వర్గుల్ జాగా మూడేయిను తోమేమున్ని మహార్క్ ప్రశావుతోందారు. ప్రైవేషన్నారు. స్ట కుట్నాముమునుకి అనే ప్రశ్నేమికికే.
- III. III. suindob medicael progressus about la so-reflectation en condise of Kaud Frincey health neutre.
- iv. The coord 14.0. or Hathi Primary health owner may be given hat additional mange. The FUR.C. should preferrably there a Her fit is additional mange who will have the teriffic whiters of his morning who will have the teriffic whiters of his programme of the common programme of the common
- i. Reddineral posts of inforstory tecamicians should be exactioned and filled an for all Frimary health centrels in subscaled (and whabilitated)gran, they should be trained openifically for lessantary disprecised in the Flavines and other arthrepool bound diseases.
- i. In remote allected cress there should be one displacing selecting to about 3-4 villages. The M.O. of accrest Primary health centre will visit this dispension catering to about 3-4 villages, once or twice a week. Also drug import for certain drugs like Thioroguine, ORS, Analgesics, Antibiolics only that Id be established in selected villages in difficult area. A local inhabitant may be trained for proper utilisation of the drugs by the beneficiery.
- In this recommended that a well motivated youth should be identified in every village. He may be given responsibility of:
 - i. chlorination of water sources daily;
 - ii. motivation of people to use chlorine tablets in stored water;
 - iii. identification of cases of fever, diarrhoes and other illnesses daily;
 - iv. roporting of cases of malaria to the nearest subcentre or M.O. of visiting health units immediately,
 - v. and also supervising nutritional supplimentation programme in his village.
 - vi. He should be given an incentive of Rs. 20/- per day as daily wages.

- (ii) Meant product of the Art of the country of the control of
- Pariodio eproprony no use unan mobil inserviolena pur enulip C elementaria chemic de antico desa Mare el D.M.O. (MIDM) unop les chroniques desarge of les unas condiciones introducations del angioneoring cui a confincia de electro cuadid le control des condiciones de la disposición.

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- in The prepent post of ALD, LO, (NOP) any in any act of this condition is a large section of DH,O, which addressed to discuss the relationality of A.D.H.O.(Repactification).
- ii. Alternatively an C.S.D. (Conser on Special Deep) is the let model. D. H. O. can be appointed for this job.
- II. The past should be desuct alised and one office the fill include a security facility. Assitant, finalize with the biford area, a secretar (peon) and a clark own typics (CCT). There should be provision of a repasse venions along with a driver.
- W. The H.D.H.O. may be given additional abunge of provision of Verlin cervices in entire submerged, affected and relabilitation uses.
- v. The A.D.H.O. (Rehabilitation) will perform managerial functions vin pleasing, organizing, respervision, budgeting and no-activation with the objective of implementing primary health condess in the ribus areas.
- vi. Specifically, the A.D.H.O. (Rehabilitation)
 - s. can op-ordinate health activities with D.H.C. Divide, Panchayet Samida of Taloda, Akkalkuva and Dividenta. Daputy Secretary

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- in the firm of the make manifest and the contract of the contr
- a. THE De alloqued has made they to increase of them. The local personnel for effective fallowing of Principle. Health I is described.
- i. This ideal is rion Covernance in the content of the factor authorities;
- e. Will also enlist the 'mealth basesengura' factulifer in mall willings and evaluate their performance;
- il util superviso de l'equidenne roles giftarien programme for provocalon of fectus fac to malaurither in les seney area;
- g. will execute the administration, logistics and any other special project undertaken in the area;
- in with not an a Heison and extend an-operation to the perconner deputed on special duty in the smily area;
- i. will conduct weekly visits once, in submerged, affected and rehabilitation area:
- j. will be the apex authority during the comminment of an epidemic in the area;
- k. will organise regular periodic C.M.E. activities for M.O. PHCs, reorientation training programmes for health workers, trained dois and 'Health Messenger's of each village with emphasis on prevention and control of malaria, filariasis, diarrhoea, acute respiratory infections, malnutrition, maternal health, child health and family welfare;
- 1. will also help in improvement of communication and motivation skills of health functionaries by means of special training.



- n. The local New Governmental Organisations working for the offen anomal fee Identified and encouraged to co-ordinate with The entiments of the Infrastructure.
- b. They should be entrusted the primary responsibility of engagished within community one mobilising them for greater utilisation of health sor loss.
- They can organise camps in the affected area and a file of the production precising health invariances unleaget people.
- d. The MGOs can be definitely beneficial for hiplants and a CF (Maternal and Child Health) sorvices. They can trib to the pure is provision of health services of grassroots levels.
- a. A.D.P.O. Readbilitudous should develop a pinn for large of read of NGCs in bey issues such as maintaining, material to the area. The health, family welfare, in some generating scheme in the area. The nutritional supplementation programmes, disease surveillunce and linkings of social development are the activities which can be falted up independently by the NGCs.
- A specified financial adocation should be provided in the budget for establishment of MGOs in the area. Their role can be defined more precisely by regular discussion at later stage.
- g. 14.0. and other beaith staff familiar with tribul language and suiture should be posted in these areas, as far as possible.
- h. Health education techniques should be modified to suite local communication needs and understanding.

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Study Area.

The development process in the study area is in transition phase at present. However our observations have endorsed the coasensus that development will not materialise unless the scattered tribal people cluster together so as to merge in the main streamline. Therefore the rehabilitation of the oustees near Taloda, will certainly facilitate success of developmental activities of the area. The health services package will be accessible, affordable, appropriate and if not now, gradually acceptable. Hence there is a need to concentrate the health services in the rehabilitation and affected area as per modified norm suggested earlier.

- a. Most of the roads in the interior are kuchha and so transport becomes extremely difficult, exhausting and unsafe. In rainy season some villages are cut off from the world. In such a situation it becomes extremely difficult to deliver health care services also. Hence the roads in the interior of affected and rehabilitated areas be repaired and make pucca for easy transports and communications.
- b. The construction of PHCs and the subcentres is pending in study area and in some places the construction work is half way through and abandoned. We recommended early revival of these construction works. If necessary extra funds should be produced and decentralisation of the authority should be permitted.
- c. With the increasing height of the dam, the level of river will rise and more area will come under submergence. In such a situation water will enter into the rocky crevices and low level land area. This will be a potential breeding place for mosquitoes and will also help increase humidity in atmosphere conducive for growth of the vector. Thus arthropod borne diseases like malaria and filariasis would rise. Therefore there is an urgent need to plan and implement minor engineering works such as land levelling and drainage, operations. These should be carried out by the irrigation and public works departments of government.
- d. Innovative techniques such as introduction of gambusia fish, lobster reticualtans which are known to eat up mosquito larvae in collected water

Phase I : Sardar Sarovar Health Project : Maharashtra : Page 67

should be introduced. The potential mosquito breading plants in the course area should be identified and immediate steps need to be calten.

- e. It is suggested that regular spraying with insecticide should be done in study areas. The insecticide of choice to be used is Deltarnethrin which is effective against DDT resistant vectors.
- f. The antipoverty programmes in the area should be reinforced and proper supervision and evaluation of the projects should be done to ensure that every beneficiary is reached. For this purpose the ITDP blocks need to be appraised with manpower, analog and material resources.
- g. A special vocational training programme for active youth member of every family member should be organised at taluka levels. Low-tost, energy saving, productive agricultural technology, animal husbandry, poultry, kitchen gardening, adult literacy, skilled work such as carpentry, masoary labouring etc. are the topics in which training can be given.
- h The Rojgar Hami Yojana may be intensified especially in the affected areas.
- i. There is a very high dropout rate in primary schools and in some places the schools are not functioning. Teachers are reluctant to stay in the area because adequate facilities are not provided to them. The educational system should be geared to suit local environment and the facilities additional incentives, security for the school teachers be ensured. The MGOs can be involved in planning the promotion of education
- j. Food should be easily available at ration shops, at special subsidised rate at all times. 'The NavSanjivani' scheme to provide free food on ration during rainy season is appreciable.
- k. Transport facilities in area should be increased. The number and frequency of State Transport (S.T.) buses travelling to the interior from the taluka places should be increased. The demand of the people for the same may be taken into consideration, immediately. In tribal areas because of scattered but small population, the expected turnover of passengers travelling by S.T. Bus, may not be met. In such situation plying of buses on alternate days may be considered. At the extreme end subsidisced loans for purchase of bicycles may be given to needy members of the population.

- 1. Froblem villages for water should be identified in particular and water resources for them should be tapped with the help of geological expens.
- m. Co-operative ventures such as dairy co-operative, credit co-operatives fruits and vegetable marketing co-operatives should be encouraged in the tribal population.
- n. The tribal art and skilled work should be promoted and marketed by the government. In near future a training, promotion and marketing centre for the same may be established at taluka places.
- o. The concept of Panchayat Raj' and its role in development should be actively promoted in the tribal population. NGOs / Mahila Mandals / Youth Groups of local village can undertake this activity in affected and rehabilitation areas.
- p. Decentralisation of administration for tribal blocks will be effective in accelerating developmental process in the area.

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The literary rate in trival communities is as low as 6-7 %. The people speck in a people imaging, understand only unique violect and no original reading or writing material is seen in the community. They also tend to adopt "crisis oriented approach" in health mattern. (i.e. they do not report to health penties, unless it is an emergency simulical.) Hence, creating the awareness for adoption of preventive health probations is an extremely challenging task. Therefore, there is need to modify the health education strategies for this community.

The recommendations are:

- a. A local inhabitant, having some leadership qualities should be identified and trained in basic preventive care to be designated as 'Arogya Sandeshvahak' as mentioned earlier. Along with other entrusted responsibilities, he will organize health education sessions in the village especially for issues such as diarrhoea, malaria, managing fevers, M.C.H., registration of under 5 children, ICDS, chlorination of water and malnutrition.
- b. The "Arogya Sandesh Vahak " will translate all the health messages in local language and communicate with the same to the people. The folk songs, role-play, sociodrama would be the most effective mediums for communicating health messages to them.
- c. An individual who has experienced favourable results on utilisation of health services, should be used as a motivating medium for the other persons. Similarly if an educated person is identified in community, he should be motivated first who in turn will influence others.
- d. It is necessary to ensure that the communicator is familiar to the socio-economic, cultural and environmental background and is acceptable to the community. Local influential persons should be taken in confidence for the same.
- e. Concepts of information, education and communication techniques should be modified to suite the "felt needs" of the people and their social needs must be linked with the objectives of the health programmes. The

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- communicator at every level, should be able to promote health as a means to solicize the perceived socio-economic development.
- 1. The health staff including M.O. appointed in the study area, should be familiar with local dialect, customs and tradition.
- g. The festival celebrated by tribal such as Holi, annual celebrations of their deities should be taken into account while planning health education programmes.
- in School teachers, Anganwadi worker, Sarpanch can be identified as key persons to deliver the health education. Even women utilising health services can be effective persons to motivate other women on health matters in this community. The NGO s can play a pivotal role in initiating the same.

Epidemiological considerations for Information Education and Communication in Tribal Area.

PERSON	PLACE	TIME
Arogya Sandeshvahak	Home	Any time of the Day
Trained Dai	Source Of Water	No Holidays
Sarpanch	Ration Shop	Few days after overcoming
Local influential leader	Farms	health crisis in the family
Beneficiaries	Market Place	Festivals
Vaidu	Place of Yatra	Yatras
Bhagat	Temple	A.N.C. / P.N.C. Checkup
Respected Elderly Person	Launch / Bus	Treatment of Disease
School Teacher	Anganwadi	,
Health worker	School	
Medical Officer	Govt. Offices	
Govt. Official		The same of the sa

Phase I: Sardar Sarovar Health Project: Maharashtra: Page 71

The phase II of the Serdar Sarovar Health Project need to be initiated at the entitlest as the present findings are only the findings of approximate study. Also it is too early to evaluate the long term impact of the Serdar Serovar Projects on the health status of the population.

The phase II (2 years) includes establishment of effective disease surveillance mechanism in the study area, while Phase III (3 years) is the maintenance phase of the project.

During Phase II a set of health interventions will be plarted in order to develop a module for effective disease surveillance in the affected and rehabilitation area. The research avenues which need to be explored are:

- i. Development of a module for Nutritional Rehabilitation of under 5 children with objective of preventing deaths due to malnutrition.
- ii. Monitoring of Health and morbidity indicators through modified management information systems.
- iii. Module for I.E.C. activities in the study area, for promotion of primary Health care.
- iv. Strategies for effective implementation of CSSM (Child Survival and Safe Motherhood), Family Welfare, Malaria Control programmes.
- v. Strategies for effective utilisation of health services.



ANNEX-XXVIII-Min.(3).

ANNENURE-I

WORK OUTLINE FOR MONITORING SILT FLOW FROM DIRECTLY DRAINING SUB-WATERSHEDS IN SSP AREAS

Fourty two suc-watersheds in SSP occupy more than one lac ha land requiring more than 170 raingauges to interpolate the erosivity of rainfall which is necessary te relate soil loss from the area of known sediment yield index. Out of these, atleast 25% raindauces would be recording type and remaining ones would be non-recording type. Seventeen orouts identified earlier would require 34 recording type raincauges to assess soil loss from the micro-watersheds under both pre treatment and post treatment phases. The area of micro watershed varied from . 50-100 ha where from the runoff & sediment, originate. This would be simitored at suitable places by constructing a V-notch & making periodic sampling of water in the rivulet alongwith recording the stages of water flow by reading/analysing the graph recorded , through the automatic stage recorders. Discharge passing through the V-notch would be known at these stages. By knowing the concentration silt/sediment load in the water, in turn would provide outflow of sediment from the watershed with the runoff crossing the V-notch.

Since the treatment in most of the sub-watersheds have commenced, we are facing difficulty in locating the micro-watershed of similar mapping unit under untreated condition. Now most of the planning part, is over and NVDA would be able to comeup with a proposal in this respect shortly.

ANNEX-XXVIII-(Min.4).

ENVIRONMENTAL COST OF SSP

RELATED TO UNIT I & II DAM & POWER HOUSE :

A) Expenditure by project authorities:

l)	Cost	or Su	ırvey	& Stu	aies	(ln	tacs.)				
									_			

			mate/Actual	Expenditu	<u>ire</u>	•	
No. Compo	nent	GOG	GOM	GOMP	NCA/GOR	Total	
. Compensator	y Affores-	4.52	5.29	<u>2.44</u>		12.25	
tation	J	$\frac{1.52}{4.52}$	5.29	$\frac{2.11}{2.44}$		12.25	
 Catchment A 	rea	$\frac{8.77}{1.00}$	7.00	$\frac{3.28}{1.28}$	-	19.05	
Treatment.		8.77	7.00	2.80	_	18.57	
. Flora & Fau	ma	52 2	38	20.33	15 27	125.80	
· (1014 & 144	a u.a	$\frac{52.2}{38.3}$	<u>38</u> 16	$\frac{20.63}{17.63}$	$\frac{15.27}{15.27}$	87.20	
					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
. Health		$\frac{2.5}{2.5}$	$\frac{10}{2.5}$	<u>29.63</u>		42.13	
		2.5	2.5	26.00	-	31.0	
5. Archaeology	γ/Anthro-	1.3	NA	<u>59</u>		60.3	
pology.	/ Allchio-	$\frac{1}{0.40}$	NA	36.33	_	36.73	
P01051.		0.10		30.00		03.70	
6. Seismicity	& Rim	-	NA	23.00	1.98		
Stability.				12.50	1.98		
7. Command Are	ea Develop me nt	N.A.	-	_	N.A	٠	
			Total	AND THE RESERVE TO SERVE TO SE	Transpire address	manine a fining of the	- 10 miles
			10ta1-	(1)		200.23	
ii) Cost of Im	olementation (ir	lacs)					
 Compensator 	ry Affo-	1809.10	<u>2116</u>	1800.000		<u>5725.1</u>	
restation.		1298.48	1650.27	819.54		3768. 2 9	
2. Catchment	Area	3509	2894.67	8835.05	<u>.</u>	15238. 72	
Treatment.	ni ea	1826.48	445.657	2418.80		469 0.9 37	
		1020110	1101001	2110100		1000100.	
3. Flora & Far		<u>75.31</u>	NA	<u>NA</u>	-	<u>75.31</u>	
ding Shool	paneshwar	64.42	_	Nil		64.42	
3.1)Fisheries		-	102.10	-	-	<u> 102.10</u>	
4. Health (in	cremental	3800.0	- 546.60	1354.63	٠ ـ	- 5701.23	
	e)for 10 yrs.	101	9.26	521.20		631.46	
:	-,101 10 9100		0.23	551.24	-	0-1-10	
5. Archaeolog	y/Anthro	<u>156.00</u>		<u>700</u>	-	<u>856</u>	
pology.		29		12.97		41.97	
6 G.: :	. e n:	100				100	
6. Seismicity	& Klm	129 271	-		-	<u>129</u> 271	
Stability.		211					
7. Command Ar	ea Development.	N.A.	_	_	N.A.		
			Total	- (ii)		27827.46	
		•	-			9468.977	
		•	Total	: (i & ,ii	<u> </u>	28111.97	
			iotai	. /1 & ,11	,	9668.307	··.

NA : Not available.

ANNEX-XXVIII-Min. (5).

A preliminary Report on Compensatory Afforestation in Kachchh: Sardar Sarovar Project.

Environment Cell, S.S.P.A.

Introduction: It was suggested in the discussion of 27th meeting of Environment sub-group held on 18.12.95 in Paryavaran Bhawan, New Delhi that scientific observations may be taken up on improvement of the area, enrichment and biodiversity, improvement of soil humus and overall ecological restoration of the area which have been covered with excellent plantation in the Runn of Kachchh, Gujarat.

Recently the work has been entrusted to the Environment Cell, SSPA under the leadership of Dr. Sanat Chavan, IFS, Addl. Chief Conservator of Forests, SSPA. A preliminary report on the reconnaissance survey of the area is presented herewith. A detailed analysis of different aspects will be taken up after monsoon when the area will be suitable for assessing the impacts.

- 2. Project Site: Compensatory Afforestation was taken up in 4650 ha. in Gujarat against the area going under submergence, in Kachchh district. Suitable areas were found in Anjar, Bhachau, Mandvi and Abdasa Taluka. The programme was started in 1988-89. The year-wise physical achievements are given in Annexure I.
- 3. Technique Adopted: Kachchh district being arid area, selection of site and site preparation was given prime importance.

The area selected was first cleared off of unwanted weeds, burning has ploughed and wherever necessary SMC works were taken up.

Trench-cum-live hedge fencing has been made around plantations.

The selection of species have been a very important aspect in the arid area. Accordingly, Xerophytic and deciduous spp. have been selected for planting, which include Neem, Desi-Babul, Khijdi, Ficus spp., Acacia spp., Karanj, Amla, Goras Amli, Gugal, Ardusa etc. which can come up satisfactorily in these type of arid and refractory areas. During the rains 2500 plants were planted ing every hectare. FYM and Gypsum was added wherever necesary. Three waterings were carried out in the first year, two waterings in the second year and support watering in the subsequent years.

4. Environmental impact of Compensatory Afforestation:

- a) Grass Cover Before taking up the plantations the area was totally degraded and barren with poor and unpalatable species of grasses and herbs. "However, now after afforestation, the natural ground cover has improved. In place of poor unpalatable species like Eragrostis, Aristida, better species like Dicanthium, Apluda, Desmostachys, Cenchrus spp. etc. have come up in succession.
- b) Wildlife There has been a positive increase in wildlife such as Chinkara, Nilgai and rare and endangered birds like Great Indian Bustard, Houbara Bustard and others like, Larks, Pipits, Chats etc. The population of Chinkaras have increased three to four times in areas where they were in negligible number earlier.

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Similarly, with good protection siting of Bustards have increased.

c) Improvement in soil and water quality -

From the soil testing carried out by the Forest Department, it was seen that there is slight change in soil humos improving its richness. More studies will be undertaken later on..

Due to regular leaf fall from the tree species planted, soil seems to be getting richer in the organic matter, more suitable for the plant growth. Moreover, water retention capacity of the soil also seems to have improved, as can be seen from the improvement in ground cover in the plant succession.

5. Socio-Economic impact of Compensatory Afforestation: -

- a) Wind Breaks The plantations are acting as wind breaks and protecting the area around it. The cultivated fields are giving better production in agricultural crops as noted from local population.
- b) Grass production # The local populace is taking sizable quantity of grass from the compensatory afforestation areas.

 This appears as a boon in this arid area.
- c) Employment generation The Compensatory afforestation works have generated a lot of employment epportunities for the local people.

14/

conclusion: As the study has been taken up very recently, only a preliminary report is given based on first observation. With the onset of rains, when vegetation comes up, more detailed studies will be taken up regarding ground cover, natural regeneration, soil and water analysis, status of different animals and birds, and social and economic impact of plantations on local population.

However, from the preliminary survey of the Compensatory Afforestation raised in Kachchh, the result seems to be excellant considering the fact that the entire area is arid. As this is likely to create very positive impact on surrounding population, wildlife and environment etc., it is strongly felt that this plantation should be maintained for another three years by way of ploughing, soil working, support watering and other necessary measures.

ANNEXURE I

Physical Achievement.

Sr. No.	Year	Kacachh East Division	Kachchh West Division	(in hectares) Total
	1988-89 1989-90 1990-91 1991-92	300 300 250 32	200 300 800 98	500 600 1050 150
	" S.M.C Works	133.90		199.90
5:	1992-93 " S.M.C	9 -	600	697
	Works.	153		150
.6:	1993-94		460	460
7:	1994-95		843.10	843.10
Tota	al Planta-			
tio	n.	933.00	3,301.10	4,300.10
S.M	.C. Works	349.90		349.90
		1,348.90	3,301.10	4,650.00



ANNEX-XXVII.Min-(6).

Summary

Potential for agro-chemical pollution from the Sardar Sarovar Command Area, India

Volume 1 Summary Report

Report EX 3177: Volume 1 November 1995

Information and guidance on the potential for agro-chamical pollution from the Sardar Sarovar Project Command Area are presented in this 3 volume report. The Gross Command Area covers 2.1Mha in Gujarat State, and will be supplied with water from the Sardar Sarovar Dam project on the River Narmada, India's largest west-flowing river.

The study, which was carried out as a number of component studies during 1994, identified the current situation for agro-chemical use in the existing SSP area and also in the already functioning, adjacent Mahi irrigation scheme. Farmers on the Mahi RBO scheme were found to use more fertilisers than recommended, but less biccides. It also attempted to assess actual levels of pesticide pollution in 3 main drains in the Mahi scheme. These results are presented in an evaluation of the potential for agro-chemical pollution in the main drains and groundwater of the SSP. During the monitoring of the grains, traces were found of HCH and Aldrin but not of DDT. The main transfer mechanism seems to be transport of contaminated soil particles, but the actual levels are too low to be of immediate concern (although guidelines for drinking water standards were exceeded by some pesticides in the drainwater).

On balance, agro-chemical pollution due to pesticides is found to be low in the Mahi system and can most probably be expected to be even lower in the future SSP system. Pollution due to fertilisers is also not expected to be a problem in the SSP system, for although in Mahi RBC System farmers apply more nitrates than recommendation, any excess emerging into the drains is quickly absorbed by the aquatic ecosystem. Thus nitrates are not expected to be a future problem in the SSP drains either, although the danger of excess nitrate pollution to groundwater should be guarded against. This report gives recommendations on how to evaluate methods to contain such potential pollution from agro-chemicals (particularly biocides), and to monitor agro-chemical levels reliably.

Conclusions are presented from a review of recent literature concerning agrochemical pollution in irrigation schemes similar to SSP.

Assessment of standard pollution parameters obtained from the GEMS/MINARS programme shows that present pollution concentrations in most local major rivers and groundwater in Gujarat were relatively low and within acceptable standards.

Eco Environmental Studies of SARDAR SAROVAR ENVIRONS

Executive Summary

Project Director
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Sponsors

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Sardar Sarovar Narmada Nigam Limited
Govt. of Gujarat

Gandhinagar.

SUMMARY

Shoolpaneshwar Sanctuary Management Action Plan is based on strategies which combine land use, and ecosystem classification to develop management zones for the Sanctuary, and which induce a small but sustained movement of humans from relatively well forested areas to less forested areas and from less forested areas to outside the Sanctuary. The movement is to be entirely voluntary and well assisted by agencies set up for the purpose. As more and more areas of the Sanctuary are made available, the ecosystem restoration can proceed. Under this scheme, it is expected that it will take between two and five years to relieve the biotic pressure on the Sanctuary and about 10 years to nearly eliminate it. However, a proper legal framework for initiating the plan, and achieving full goals is necessary; therefore the legal strategy is considered first. The steps to be taken are -

Step - 1 Legal

- All Sanctuary area is to be placed under Dediyapada Taluka.
- 2. Frame legislation at the centre and the state level to make transfer of lands from forest to revenue department and from revenue department to forest department possible for specific areas.
- 3. Transfer all revenue areas within the Sanctuary to forest department, without prejudice to local land owner's right and in exchange of similar lands from outside the Sanctuary from forest department to revenue department.
- 4. These outside lands are to be used for settlement of Sanctuary residents.
- 5. A Shgoolpaneshwar Sanctuary authority should be constituted. The authority may consist of personnel of NPG, Department of forests, Karjan Dam authorities, and M.S.U. of Barcda and will be the governing body of the Sanctuary.
- 6. It will appoint the Sanctuary manager and set up the necessary chain of command and infrastructure.
- A legal apparatus to try and punish offenders is to be set up quickly.
- 8. Legislation is to be passed to set up different management zones within the Sanctuary and to give them legal status.
- 9. Legal measures to protect adivasi population of the Sanctuary against money lenders of the past loans is to be enacted.

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Step = 2 duman Strategy

- Stop new influx of all people and cattle into the Sanctuary.
- Identify all families and individuals living in ecogrades 1, 2 & 3.
- 3. Exchange forest area in neighboring region for revenue land in Shoolpaneshwar Sanctuary. First in eco-grades 1, 2 & 3 and then for all the eco-grades of the Sanctuary.
- 4. Offer lands from these other areas, to residents of Shoolpaneshwar Sanctuary eco-grades 1, 2 & 3 in exchange for their present lands.
- 5. Offer space within the Sanctuary in eco-grades 5 & 6 to residents of eco-grades 1, 2 & 3.
- 6. In eco-grades 4 & 5 supply free fuel and grains to residents in exchange for their giving up cattle and land.
- 7. Pay Rs.800/- a month, for a family in-exchange for cattle and land. They would be free to seek jobs outside the Sanctuary.
- 8. Those residents that are landless can be employed for canal maintenance and similar work; after training they would be placed outside the Sanctuary.
- 9. A programme for reduction of cattle and sheep population is to be undertaken. This would include both prevention of reproduction as well as selling the livestock to outside owners.
- 10. Train young adults in eco-grades 5, 6 1 7 for outside jobs and place them on a more permanent footing on out of area jobs.
- 11. Appoint guards from families of the area after training and with two conditions.
 - (a) They will not raise cattle and
 - (b) they will not practice agriculture in the Sanctuary area.

Management of Zones

- The relatively sparsely populated and better areas of the Sanctuary will be first returned to wilderness and developed into scientific and primitive zones.
- 2. The existing species are to be planted in areas vacated by populations and the anthropogenic species may be destroyed.
- These will comprise lands of eco-grades 1, 2 & 3.

- 4. The areas of eco-grades 4, 5 & parts of eco-grades 6 are to be assigned to natural recovery zones. There may not be any tourism in these areas during the recovery period.
- 5. Other areas of eco-grades 6 may be used for special zones for administration, research, training and infrastructure facilities.
- 6: Other areas of this grades may be used for tourist purposes.
- 7. Buffer zone will comprise of periphery areas of ecogrades 6 & 7 or 7h.
- The buffer zones will be two layered; a relatively soft outside layer in which needs of the local population are met and in contrast a very hard zone in which it will be very difficult to penetrate and none of its products are to be useful for human needs.

General

Special purpose areas for fishing and tourist related activities along Karjan Dam reservoir exist. Also a number of wildlife water holes or conservation check dams may be profitably installed in the Sanctuary area. However, specific sites, budgets and operational modalities are subject to detailed cartographic and economic quantification, and must be considered only in the next phase of development of plans.

Management Strategies for Right Bank Catchment Area of Sardar Sarovar (RCAS)

Legal

- 1. All the RCAS area should be placed in administration of one Taluka. It can be either Nandod in Bharuch District or Chhotaudepur in Baroda District. Ideally a new Taluka of Kevadia in Baroda district should be formed.
- 2. Legislation to give legal status to different management practices and zones needs to be passed.
- A study to determine the optimum management structure should be undertaken. The Shoolpaneshwar model can be adopted only if the area is declared notified or a Sanctuary. If this is not done the different responsibilities, power, authorities and limitation of these powers of the departments of forests and revenues should be clearly stated in terms of law.
- 4. A council should be set up for inter department and inter agency co-operation.
- A legal apparatus to try and punish offenders of management laws quickly is to be set up.

6. A legal structure for management of economy of the zone including provision to transfer funds for the Development of REA from income of the RCAS, is to be created.

Eco - Enhancement

- Identify all families and individuals living in RCAS zone.
- 2. Stop influx of all new people to reside in the area.
- 3. Operate programmes 4,5,6 & 7 of the Shoolpaneshwar Sanctuary.
- 4. Train selected residents for fishery operations in the RCAS zone and provide the necessary infrastructure.
- 5. Stop the on going afforestation programme.
- 6. Do not plant any thing useful to cattle or to humans for local use in the area.
- Create a massive bamboo plantation through out the RCAS.
- 3. Operate the plantation to yield commercial yield. The plantation should be created in the next four to five years to yield continuous yield from there on .
- In order to prevent over harvesting, the harvesting operations should be directly taken up by forest department or local organisation set up for the purpose. Adequate replanting programmes should also be maintained.
- 10. Areas on the other side of the divide line should be marked and operated for social forestry purposes for the benefit of the RCAS and REA populations.

Management Zones

The RCAS is to be operated essentially as a layered buffer zones.

- 1. The first layer near the bank of the Sardar Sarovar is a soft zone devoted to fishing and tourist industry.
- 2. The second zone, beginning from the divide line and covering most of the RCAS is a hard buffer zone in which the bomboo forest will prevent undue penetration of human and cattle and also provide strong conservation and stabilisation milieu. Some space for isolated villges will have to be provided for; but this is a hard zone even when used commercially.
- 3. The areas immediately north of the divide line and beloging to REA will provide soft protective zone to

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RCAS. They will provide fuel for populations of both zones and would have to be intensively managed for the purpose.

Management Strategies for Right Bank Extended Catchment Area (REA)

The legal Situation

The legal situation in the REA is not a factor in the development of the region because it is not planned to isolate the area or to give it protected status. Therefore no changes in the present set up are contemplated. If however, when the plans of the development are complete and it is decided to initiate action on the basis of cooperative effort or landuse principles, it may be necessary to make some legal provisions for the same.

<u>General</u> <u>Strategy - land</u>

- Grade 8 areas of organised agriculture are to be left undisturbed. They are to be helped to achieve better productivity.
- 2. Detailed land maps to be prepared of the REA. They should be based on Geological Survey of India land maps of greater detail than 1:50,000 topo sheets and also on aerial photographs.
- Information base of these maps is to be used to develop detailed land use maps.
- 4. The information derieved in (3) is to be used for detailed location plans with regards to social forestry, regular forests of different types, forests or tree plantations near or along water courses, check dams, different types of water bodies, pastures, tree farming, crop farming and soil erosion and flood control structures.
- Develop village area land use plans from (4)
- Obtain village population or individual farmers agreement to follow these plans.

Organisational

- Identify the areas in which the NPG is interested; and define their physical boundearies
- Discuss and formalise development plans with allied organisations.
- 3. Establish an executive agency
- 4. Establish a separate monitoring and feedback organisation.
- Start the programme.

Energy

- 1. The REA and all its parts are energy deficient in terms of both conventional and non conventional energy
- The REA's dependence on wood as a source of energy would have to be reduced to a considerable extent if the region is to flourish in ecological terms.
- 3. It must be recognised that besides the rural areas, considerable amount of wood is used as fuel by neighboring townships. Supply of mined coal and other geological forms of energy will definitely help reduce the fuel wood requirement.
- 4. Considerably more energy will be needed in this region if it is to be developed in a manner that will integrate nature conservation, economic development and social change. This aspect should be paid attention to when development plans are formulated.

Water Regime

- Modification of the hydrological cycle and control of the water regime are two principal requirements for the betterment of the ecological system of the area.
- The management of such an effort should be on water shed basis and water districts should be formed as and when practicable.
- 3. Both vegetational approach and building of structures should be employed to keep small streams and water courses running for longer periods of time during the year.
- 4. The planning should include both irrigation and spot drainage lines where necessary.

Livestock

- 1. The livestock presently in the area is in excess of its carrying capacity and is not valued for its economic importance. Measures to reduce the number of heads, increase the quality of stock and put the entire operation on economic footing are necessary both to upgrade the lives of the residents of the area and improve the natural ecosystems.
- Such an economy and commerce based approach is also necesary for establishment of apiary and poultry activities. These should also help a number of income generating employment opportunities for landless labourers or marginalfarmers.

Commerce

1. It is important to develop viable markets for products and services of the people of REA. In their absence, the incentive to develop is lost and the REA

- people will become disheartened.
 - 2. In the past over exploitation by local traders has resulted in this sort of disheartening. The alternatives tried by co-operatives or governmental agencies have also not worked because of either the politicans substituting for local traders or the inefficiency of governmental departments.
 - 3. It is necessary to bring outside market forces into the area before these obstacles can be overcome.

Finally

The management strategies and action plans outlined here indicate that development and environmental progress are not necessarily against each other. It is the wrong kind of development that creates environmental damage through neglect or through harmful policies.

In order to protect our damaged ecosystems and to restore them to health it is necessary to undertake development programmes in rural areas, that regard natural watershed and all the communities in it as a unit, improve hydrological regime of the unit, institute rational land use planning, undertake reseeding programmes, and induce each unit of the state to solve its own problems rather than transfer its biotic load to other units. Equally important steps are those of putting these areas on strong cash economy, training the manpower for necessary industrial skills and establishing interactive relationships among different units of the state. Availability of trained manpower from these regions is likely to prove a boon to further economic. development of the state and in its absence , either plans will be seriuously flawed or the state will have to import trained people from outside while leaving its other citizens in poverty. An independent monitoring and evaluating infrastructure is an absolute necessity for successful execution of these strategies and action plans.

केवल सरकारी प्रयोग के लिए FOR OFFICIAL USE ONLY



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल Environment Sub-Group

उनतीसवीं बैठक की कार्यस्ची Agenda for Twenty Ninth Meeting

स्थान : पर्यावरण भवन, नई दिल्ली

Venue : Paryavaran Bhavan,

t di yavaran bilavar

New Delhi

तारीख: 11 अक्टूबर, 1996, 3-00 बजे

Date: 11th October, 1996, 3.00 P.M.

इन्दोर

अक्टूबर, 1996

INDORE

October, 1996

AGENDA FOR 29TH MEETING OF THE ENVIRONMENT SUB-GROUP NCA TO BE HELD ON 11.10.1996, AT PARYAVARAN BHAWAN, NEW DELHI.

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Item No.XXIX-1(138):

CONFIRMATION OF MINUTES OF THE 28TH MEETING.

Minutes of the 28th meeting of Environment Sub-group of Narmada Control Authority were circulated to all Members and invitees vide letter No.Env-34(28)/96/1027-52 dated 19th June, 1996.

No comments have been received so far.

The minutes are put up for confirmation.

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Item No.XXIX-2(139): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

- 1. Submission of Catchment Area Treatment (CAT plans for freely draining critically degraded sub-watersheds [Item No.XXII-2(112).
- a) SUBMISSION OF MICRO WATERSHED PLAN FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS BY GOVT.OF MAHARASHTRA AND MADHYA PRADESH.

During the 25th meeting, Govt. of Madhya Pradesh (GOMP) and Govt. of Maharashtra (GOM) were directed to recast their plans keeping in view the guidelines for the schemes of National Afforestation Eco-development Board & River Valley Projects. Representatives of GOM & GOMP agreed to submit the plans within a month's time. Subsequently during the 26th meeting, NVDA expressed difficulty in preparing Phase-2 catchment area treatment plan for SSP & NSP due to the short time available for a detailed survey. However an yearly plan an year in advance of its implementation was promised. Annual plan for the year 1996-97 is yet awaited from GOMP & GOM.

Regarding difficulty being experienced in obtaining funds for treatment of phase-II works. Chairman during the 28th meeting suggested that since the schemes for CAT are labour intensive and generate employment beside contributing to the development of the area, the concerned Govt. may explore the possibility for getting funds from the district Collector(s). Progress may please be reported

During the 28th meeting Secretary (Environment) has agreed to coordinate the Phase-2 CAT plan & works related to agriculture dept. also. Details of plan & availability of the funds may please be reported. Progress on treatment works for both forest & non-forest area may please be reported.

b) FUNDS FOR TREATING CRITICALLY DEGRADED, DIRECTLY DRAINING SUBWATERSHEDS IN MADHYA PRADESH.

During the earlier meetings, NVDA expressed difficulty in getting the funds for even treating the directly draining sub-watersheds, due to the financial limits imposed by State Govt. Chairman of the sub-group suggested that the budget for catchment area treatment atleast for the directly draining subwatersheds (as the cost is chargeable to SSP) should be over and above the limits imposed in the State Plans. During the 28th meeting it was agreed that Govt. of Madhya Pradesh would make a formal request to the Chairman, Environment sub-group, delineating clearly the requirements of funds, giving detail of the funds already available and

the additional requirements keeping in view the ability to utilise the funds during the given year. This is yet awaited.

c) SILT MONITORING POSTS:

NVDA was requested to install silt monitoring posts at few selected sample sites by engaging NVDA staff during pre and post phases of catchment area treatment on the lines being installed in Gujarat, under the guidance of Central Soil Research Institute, Dehradoon. It was suggested muring the 28th meeting that as the work was required to be executed expeditiously detailed schemes were not necessary. Progress may please be reported.

2. Cost Estimates for preparation of Action plan and implementation of environmental safeguard measures [Item No.XXII-2(112)(2)].

During the earlier meetings of the environment Subgroup it was desired that the detailed cost (estimates and expenditures) of studies and implementation of mitigation measures for suggested environmental safeguards should be presented. The information available in the office of the NCA is presented in Annex-XXIX-1 for information and consideration of the members. Compilation of the cost estimates on command area development works in Gujarat & Rajasthan awaits completion of studies & preparation of action plan.

3. Establishing a separate authority for coordinating Environmental works in Maharashtra [XXVIII-3(136)(1)].

Environment sub-group during the 28th meeting discussed the need for having a separate agency for coordination and monitoring of the survey, studies & implementation of the action plans on Environment & requested Govt. of Maharashtra for consideration.

Progress may please be reported.

4. Publications on Environment

(XXVIII-3(136)ii/-3(136)v/3(136):

Chairman during the earlier meeting had suggested that the works being done on environmental aspect of the Sardar Sarovar Narmada Project might go a long way in guiding similar works on other projects. However, there was a need for scientific documentation of the good works being done. This was to be supported with suitable maps, charts and photographs. He desired that a suitable agency for compilation of such documents may be identified and it would be useful if this could be done at the earliest. Progress may please be reported by GOM, GOMP & GOG.

Item No.XXIX-3(140): PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS.

A copy of the status report for the quarter ending June, 1996 is enclosed and placed at Annex-XXIX-2.

The present status of studies, surveys and action plans in brief is presented below for a review by the Sub-group.

1) PHASED CATCHMENT AREA TREATMENT

Narmada Sagar Project

Government of Madhya Pradesh

According to the progress reported by NVDA by the end of Sept'96 an area of 38711 ha was treated up against a cumulative target of 62975 ha. Out of 38711 ha area treated up so far, 1046 ha area was treated up during 1996-97.

Sardar Sarovar Project

A map showing directly draining sub-watersheds under treatment is placed at **Annex-XXIX-3**. The cumulative progress reported so far is 50% of the total targets.

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh had planned to treat 125725 ha area, out of which an area of 39207 ha has been treated by the end of September, 1996. The cumulative progress reported so far is 31.18% of the total targets.

During the year 1996-97, against a target of 38000 ha of treatment works the progress reported so far is 1312 ha only. As per discussion in the 28th meeting, NVDA was to provide revised schedule for treatment of CAT works. This is yet awaited.

Govt. of Gujarat

Govt. of Gujarat had taken up the entire catchment area upstream of the Sardar Sarovar Project in Gujarat for treatment.

By the end of September, 1996 an area of 28995 ha had been treated up against a target of 29284 ha. The cumulative progress reported so far is 99.44% of the total targets.

Presentation on the silt monitoring exercise is awaited from Govt. of Gujarat.

Govt. of Maharashtra

GOM had planned to treat 22768 ha covering forest and non-forest area. By the end of September, 1996 works on an area of 21519 ha had been completed. The cumulative progress reported sofar is 93.75% of the total targets.

Further progress, if any may please be reported by GOM.

Completion report of CAT works completed so far in forest and non-forest areas, is yet awaited from Govt. of Maharashtra.

ii) COMPENSATORY AFFORESTATION

Narmada Sagar Project

Govt. of Madhya Pradesh

Compensatory afforestation works over an area of 63666 ha against the target of 80,975 ha were reported to have been completed by the end of June, 1996. Progress of plantations during the current monsoon may please be reported.

Sardar Sarovar Project

A map showing the compensatory afforestation sites is placed at Annex-XXVII-4. The cumulative progress reported sofar is 98.39% of the total targets.

Govt. of Madhya Pradesh

By the end of October, 1995 Govt. of M.P. had completed plantation works over an area of 8225 ha against the final target of 8740 ha. Progress on afforestation for the balance area may please be reported.

Govt. of Gujarat

By the end of September, 1994, Govt. of Gujarat had completed plantation works in the entire planned area of 13950 (including non forest and degraded forest areas).

A preliminary report on the suggestion given during the 27th meeting on taking up scientific observations concerning improvement of the area planted up was annexed with the minutes of the 28th meeting. A field visit to plantation area was undertaken by Specialist (Env.) of NCA & suggestions were given. TOR for the proposed study may please be made available.

Govt. of Maharashtra

Out of total target of 19466 ha planned for treatment in lieu of the areas undergoing submergence, an area of 19293 ha had been planted by the end of October, 1994. However detailed location map of some of the districts where compensatory afforestation works are progressing is yet awaited. Earlier, Chairman had suggested that highlights of plantation activities in Maharashtra may be published. Progress may please be reported.

iii) COMMAND AREA DEVELOPMENT

Narmada Sagar Project

Outlines of the TOR for the command area of NSP annexed with agenda papers of the 27th meeting were reviewed by the sub-group during 28th meeting & it was suggested that detailed terms of reference may be drafted by the NVDA on the lines of TOR framed by GOG for the command area of SSP. This is yet awaited.

During the 27th meeting it was informed that an allocation of Rs.24.5 lakhs had been made by NVDA for the work on collection of data for study on use of insecticides, pesticides in the Command of NSP. Progress on the studies may be reported.

Sardar Sarovar Project

Govt. of Gujarat

During the earlier meetings, Sub-Group noted that a number of studies were commissioned by the Govt. of Gujarat on the Command Area Development. These reports were required to be categorised on the basis of issues addressed in each report in consultation with Dr. Abrol of ICAR. Dr. Abrol was requested by the sub-group to refer to these studies from agriculturist point of view and to suggest whether studies were sufficient or there was something more required irrigated be studied. Besides, on the issue of Agroforestry in SSP it was agreed by NPG to refer the issues to ICAR for needful guidance. Subsequently one meeting was held with Dr. Abrol at New Delhi where it was suggested that the Planning Commission had prepared certain maps which may helpful in preparing an integrated Command Area Development Plan. Govt. of Gujarat was requested to get in touch with him with copies of the needed reports to expedite the issue. During the 28th meeting it was suggested that NPG may get in touch with DDG, ICAR, who succeeded Dr. Abrol in ICAR and expedite all the related issues referred to above. Progress in this regard may please be reported.

Copies of the reports related to command area development studies completed during the last two years required to be submitted to NCA and MOEF are yet awaited. Observations of NCA officers on the interim reports of the studies entitled "EIA of the Black Buck National Park" located in the command area of SSP are placed at Annex-XXIX-5 for observation of the members.

An Executive Summary of the study entitled "Hydrogeological Impact Assessment" for the SSP carried out by "H.R. Wallingford is placed at Annex-XXIX-6 for information of the members.

Govt. of Rajasthan

To finalise the report on EIA of the SSP command in Rajasthan. Information requested has been made available by S.E. Jalore an 1.5.96. GOR may please inform the action taken to expedite the report of WAPCOS.

iv) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

To realise the objectives set forth in the D.O. letter No.3/87/90/RCT/ENV-5/IA dated 4th Feb.1988 of the then Secretary, Environment & Forests, Govt. of India Shri, T.N. Sheshan with regard to the studies on flora & fauna of SSP & NSP, second meeting on flora fauna and carrying capacity aspects for reviewing the status of upstream environment of Sardar Sarovar & Narmada Sagar Project was convened by NCA on 26th Sept.1996. Summary records of the meeting are placed at Annex-XXIX-7 for information of the members. The main points that emerged from the discussions were as follows.

- 1. That there is no endemic rare or threatened species of animal or plant within the submergence area of Sardar Sarovar Project, as such there is no danger of loosing any genetic resource.
- 2. For SSP one sanctuary Shoolpaneshwar 15 being developed in Gujarat may also be useful in accommodating the wildlife moving out from the submergence area and that there was no need for creating any sanctuary/National park either in Madhya Pradesh or in Maharashtra for the areas of SSP. For NSP action is already being taken for creation of National parks as recommended by WLI.
- 3. That Carrying capacity of the adjoining forest areas within the impact zone is being improved through soil moisture conservation and afforestation/reforestation works being executed under catchment area treatment programme.

V) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Narmada Sagar Project

Govt. of Madhya Pradesh

With regard to status of Joga fort in relation to the submergence to be caused by the back water effect, during the 28th meeting, NVDA informed that Superintending Archaeologists of ASI, Bhopal had been requested to study this aspect and that all the information needed was made available to him. Progress may please be reported.

Progress on printing small booklet on the good works being done by Project authorities may be reported.

Sardar Sarovar Project

Govt. of Madhya Pradesh

A number of agencies have developed interest in archaeological & anthropological history the Narmada Basin. NVDA is coordinating the organis engaged by them. In addition, the agencies not engaged by working in the Narmada Valley are also being addressed for better coordination by NVDA. A comprehensive review of the overall progress may please be presented by COMP.

During the 28th meeting NVDA agreed to takeup the issue of delineating reduced levels of the monuments proposed for protection and/or shifting. Progress may please be reported.

Govt. of Gujarat

Govt. of Gujarat may like to submit a detailed report on completion of the works undertaken by it on development of Shoolpaneshwar temple.

Progress may also be reported on developments related to shifting of Hamfeshwar temple.

A few colour 35 mm. slides of old & new temple(s), requested during the 28th meeting are yet awaited.

Govt. of Maharashtra

No works were required to be done in Maharashtra in this regard.

ANTHROPOLOGY

Sardar SAroyar & Narmada Sagar Projects

Govt. of Madhya Pradesh

Necessary steps have been initiated to effect the amendment of the Constitution of India to give the benefits and privileges to the PAPs from SC & ST categories being resettled in Gujarat areas where otherwise they were not entitled to these benefits. It was also informed that the issue was under consideration of the Govt. of India, Ministry of Welfare. According to the recommendations of the 28th meeting the issue is being takenup during the next meeting of R&R sub-group to be convened shortly.

Progress on procurement of the publication related to Tribals of Narmada from An.S.I. by NVDA may please be reported.

vi) SEISMICITY AND RIM STABILITY OF RESERVOIR

Narmada Sagar Project

Govt. of Madhya Pradesh

During the 28th meeting, NVDA reported that the procurement of the balance imported seismic instrument was under consideration of Narmada Control Board and that as the cost involved was high it was expected that it may take more time. Progress may please be reported.

Sardar Sarovar Project

GSI had completed the survey and submitted its final report on rim stability analysis for the areas Maharashtra and Madhya Pradesh in 1993. The survey for areas rim stability analysis in Gujarat was completed much earlier by Jaipur branch of the GSI. In order to confirm the findings of the GSI, NVDA had entrusted some more time bound studies to CW&PRS, Pune at an estimated cost of Rs. 12.55 lakhs. During the 26th meeting NVDA informed that the institute had submitted two reports No.3229 & 3234 & that these reports suggests some more time bound studies. However Prof. Ramasheshan suggested that further studies may not be He requested copies of these reports which were necessary. supplied to him by NCA. Further follow-up action on recommendations of the study group awaits direction of sub-group. Members may like to discuss and review.

vi) HEALTH ASPECTS

Narmada Sagar Project

Govt. of Madhya Pradesh

Action taken by GOMP for detailing the cost estimates for providing the facilities as proposed in the health plan may please be reported.

Epidemeoligical surveillance studies are being pursued by Gandhi Medical College, Bhopal. Fourth interim reports was submitted much earlier, 5th report relating to survey of SSP area is yet awaited.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Action taken by GOMP for detailing the cost estimates for providing the facilities as proposed in the health plan may please be reported.

Report on status of epidemeoligical surveillance studies being pursued by GMC, Bhopal for the SSP areas may also please be reported.

Govt. of Gujarat

GOG submitted a copy of the final report entitled "Environmental Impact Study on water related diseases in SSP command area, Gujarat, India prepared by Commissionerate of Health, Medical Services & Medical Education, GOG. The report was reviewed & comments were communicated to the investigators during the 27th meeting. Detailed action plan based on the findings of this study was under preparation. Progress may please be reported.

In view of the progressive filling of the reservoir action taken so far to safeguard the interest of the people at the project site and on the periphery of the reservoir may please be reported.

Govt. of Maharashtra

Detailed statement on existing infrastructure at Akarni & Akkalkua Taluk along with progress of works was reported by GOM during the 27th meeting. Incremental health facilities provided by GOM are presented in Annex-XXIX-8. Further progress may please be reported.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR

To speed up the work on conservation and development of the fish resources in the reservoir, sub-group recommended the formation of a group of experts. The proposal for formation of a high level expert group was approved by NCA with inclusion of one more expert member to be nominated by GOMP. Three meetings of this expert group were held & working groups have been formed for drafting the guidelines. NVDA has nominated Mr. S.N. Chatterjee on the panel of the expert group in place of Dr. G.P. Dubey who has since resigned.

Revised plan on fisheries development & conservation is yet awaited from Govt. of Madhya Pradesh. Expert Group agreed that after receipt of the Action plan of GOMP & draft document from Dr. Dubey it would be possible to issue the needed guidelines. Progress may please be reported by Govt. of M.P..

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Item No. XXIX-5(141):

ANY OTHER ITEM

DATE & VENUE OF THE NEXT MEETING

ANNEXURES

3,

ENVIRONMENTAL COST OF SSP

RELATED TO UNIT I & II DAM & POWER HOUSE:

- A) Expenditure by project authorities:
- i) Cost of Survey & Studies (in lacs.)

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C M	'a Carmanant		mate/Actival			m . 4 - 1	
S.N	o Component	GOG	GOM	GOMP	NCA/GOR	Total.	
1.	Compensatory Affores-	4.52	5.29	2.44	_	12.25	
	tation	4.52	$\frac{5.29}{5.29}$	2.44		$\frac{12.25}{12.25}$	
		1102	0.20	37 1 1		18.80	
2.	Catchment Area	8.77	7.00	3.28	_	19.05	
9	Treatment.	8.77	7.00	2.80	-	18.57	
3.	Flora & Fauna	52.2	<u>38</u>	20.33		125.80	
		38.3	16	17.6 3	15.27	87.20	
			4.0				
4.	Health	$\frac{2.5}{2.5}$	10	29.63		42.13	
	•	2.5	2.5	26.00	-	31.0	
_	Amala an Lactur (Amalama	1 2	BT A	50		CO 2	
5.	Archaeology/Anthro-	$\frac{1.3}{0.40}$	NA	<u>59</u>		60.3	
	pology.	W.4W		36.33	_	36.73	
6.	Seismicity & Rim	_	NA	23.00	1.98	24.98	
0.	Stability.	_	IVA	$\frac{23.00}{12.50}$	$\frac{1.38}{1.98}$		
7.		N. A	_	-	N.A.		
, .	Commente Area Developmente	и.д.			N.A.		-
			Total	- (i)		284.51	
				(-/		200.23	
i.i)	Cost of Implementation (i	n lacs)					
1.	Compensatory Affo-	1809.10	<u>2116</u>	1800.000	- 5	725.1	
	restation.	1298.48	1650.27	819.54	3	768.29	
_							
2.		3509	2894.67	8835.05		238.72	
	Treatment.	1826.48	445.657	2418.80	4	1690.937	
3.	Plane & Forms inclu	75 21	NIA	N T A		75 21	
٥.	Flora & Fauna including Shoolpaneshwar	$\frac{75.31}{64.42}$	NA	<u>NA</u> Nil	_	75.31 64.42	
2 1)Fisheries	-	102.10	MIT	_ 1	04.42	
3.1	if tallettes		102.10			-	
4.	Health (incremental	3800.0	546.60	1354.63	_	5701.23	
	expenditure) for 10 yrs.	101	9.26	521.20		631.46	
			2.23				
5.	Archaeology/Anthro-	156.00		700	_	<u>856</u>	
	pology.	29		$\overline{12.97}$		41.97	
6.	Seismicity & Rim	<u>129</u>	-		-	129	
	Stability	271	•			271	
_	•						
7.	Command Area Development.	N.A.	-	. –	N.A.	-	
				/:·\			
,			Total	- (ii)		7827.46	
					5	468.077	
			Total.	(i & ii)		8111.97	
			iotai:	(T 02 TT)	4	9668.307	
	~~ = ~	·					

NA : Not available.

ANNEX-XXIX- (2).

STATUS REPORT SARDAR SAROVAR PROJECT (SSP) ENVIRONMENTAL ASPECTS JUNE - 1996

The action plans and status of studies and implementation of Environmental Safeguard Measures upto quarter ending June, 1996 are as indicated below:

Environmental Safeguard Studies/Measures

- 1) Phased Catchment Area Treatment,
- 2) Compensatory Afforestation,
- 3) Command Area Development,
- 4) Flora, Fauna & Carrying Capacity,
- 5) Seismicity,
- 6) Health Aspects,
- 7) Archaeological & Anthropological, Studies,
- 8) Fisheries,
- 9) Rim Stability Analysis.

I. CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

- more detailed surveys for prioritisation of the subcatchments in the SSP area should be undertaken;
- a phased CAT programme should be prepared and implemented ahead of reservoir filling.

GOI issued a Directive in June 1992 that, for the SSP, the project would bear the costs of the treatment of all critically degraded sub-watersheds draining directly into the reservoir. These watersheds were identified amongst those classified as either very high or high-priority categories by the All India Soil and Land Use Survey (AISLUS). The project would also be responsible for the treatment of those areas of the catchment which are directly damaged by the project activities.

In addition, plans are required to be prepared for the treatment of the balance of the critically-degraded watersheds but the cost of this will be met from other ongoing schemes and in a timeframe to be determined.

Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the SSP catchment.

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), 1985.
- Report on Prioritisation of Sub-watersheds in sub-catchments of Narmada Catchment, 1991 by AIS & LUSO, New Delhi.

I. <u>DIRECTLY DRAINING SUB-WATERSHEDS:</u>

Table 1.1 The total catchment area of SSP below NSP is 2442440 ha.

	GOMP	GOG	GOM	Total for the Basin
Total Catchment	2248600	30230	163610	2442440 ha
Very High & High	546702	3.0230	116355	688410
Directly draining Very High & High	121330	29537	28226	175565
Areas directly dama- ged by project acti- vities.		500	-	500
Planned to treat	125725	29157	22768	177.65

According to the data available in NCA office the total area of directly draining subwatersheds in M.P. is 1,14,606 ha.

Table 1.2 Summary of Status of CAT Planning

	GOG	GOM	GOMP
Preliminary Surveys	_		
Prioritisation of sub-watersheds			
Development of Management Options		plete for all States	
Annual Action Plan	in a	all States	• "
Effective monitoring			
Phased Programme			

Table 1.3 Principal Elements of Action Plans for CAT

Elements of Action Plans	GOG	GOM	GOMP
Survey work	_	ete" for al States.	ll item
Preparation of detailed map			
Micro-watershed development map	Comple	te Complet	te Complete
Assignment of responsibility for conducting the work		•	
Timetable	"Yes"	for all ite	em for

Budget all States

Menu of treatment

Proposals for monitoring

Table 1.4 <u>Implementation of CAT</u> 1,77.650/(89,721) = 50.50% All figures in hactares.

		Gujarat ö Maharashtra ö Madhya Pradesh (29157)=16.41% ö (22768)=12.82% ö (125725)=70.77%						
	(A	Area to be treated in ha. (Area in brackets indicate actual progress)						
	Forest	Forest Non- Forest Non- Forest Forest						
Monsoon year			 					
1990-91	(4528)	(898)	_	-	_	_		
1991-92	(4770)	(230)	_		_	_		
1992-93	(6013)	(336)	-	_	_	(8800)		
1993-94	(6000)	(286)	(960)		(966)	(6246)		
1994-95	(5730)	(168)	(6514.50)	(1980)	(4268)	(594)		
1995-96	(NIL)	(35)	(6541.97)	(788)	(a)	(17021-a)		
1996-97	162	-	4735	-	(b)	(1312-b)		
TOTAL: Targets		1953 1(1953)*	20000 2(18751.4	2768 7) (2768		*3 <u>73795</u> (39207-c		

Total 29159/28995=99.44%,22768/18751.47=93.75%,125725/39207=31.18%. for the state.

The Control of the Co

^{*1} As reported by GOG 162 ha. could not be treated due to resistence from the local people.

^{*2} GOG had reported that out of 3025 ha of Agriculture are planned for treatment earlier, 1072 ha. area is untreatable hence targets are reduced from 3025 ha to 1953 ha.

^{*3} Out of 51930 ha. area, an area of 13930 ha is fully stocked where minor soil engineering works will only be carried out w.e.f.94-95 § 4000 in (94-95),5000 (95-96) & Balance in 96-97.

II. FREELY DRAINING SUBVATERSHEDS: (Excluding directly draining Subvatersheds).

Table 1.5 Summary of Status of CAT Planning:

	GOMP	GOM	GOG
 Preliminary Survey Prioritization of Sub-watersheds Development of Management options monitoring Phased programme 	Yes Yes Yes	Yes Yes Yes	Already under implemen- tation.

Table 1.6 Principal Elements of Action Plan for CAT:

	GOMP	GOM	GOG
- Survey work - Preparation of development map - Micro watershed map - Work responsibility - Menu of treatment - Time Table - Proposal for monitoring - Budget - Availability of funds	Yes Yes Awaited Yes Yes Yes Yes Yes Yes	Yes Yes awaited Yes Yes Yes Yes Yes Yes Yes	Already under impleme- ntation

^{*} Agreed by Planning Commission for inclusion in River Valley Project" Scheme and funds are also promised by MOE&F from National Afforestation & Eco-Development Board. Work commenced on 6 schemes in Maharashtra & a few others in Madhya Pradesh.

A. Govt. of Madhya Pradesh:

Table 1.7 Total Area of freely draining critically degraded subwatersheds below NSP is 54,6702 ha.

	Phase I Area (Directly draining)	Phase-II (Balance Area)	Total Area
SSP	121330	356484	477814
Jobat	<u>-</u>	-	28211
Man	-	-	12720
Maheshwar	-	- -	13209
Omkareshwar	_	-	14748
			546702 *

Table 1.8

PHASE - II (356484 ha.)

Forest Area Non Forest Area

Gross Area Net Working Area Gross Area Net working Area

able 1.9 <u>Sch</u> e	edule of Implementat	ion (Madhya	Pradesh): (318118 h
	Forest Area		Non Forest Area
Year -	Phy. (ha.)		Phy.in ha
1997-98	8000		15750
998-99	8000		16000
1999-2000	8000		16000
2000-01	8000		16000
2001-02	8000		16000
2002-03	8000		16000
2003-04	8000		16000
2004-05	8000		16000
2005-06	8000		16000
2006-07	6368		16000
2007-08	_		16000
2008-09	_		16000
2009-10	-		16000
2010-11	_		16000
2011-12	-		16000

*1 NVDA had already submitted 5 schemes under RVP which have been approved for the year 94-95 to 96-97. Funds revalidated for the year 95-96 have been received. It is proposed to treat an area of 6117 ha. Work has already commenced. In addition 3 more schemes covering an area of 7186 ha from 3 subwatershed have been submitted by NVDA for seeking funds from RVP. The total schemes sent for seeking funds cover an area of 23750 ha.

B. Govt. of Maharashtra:

PHASE-II

Table 1.10 Schedule of Implementation of freely draining Sub-watersheds.*

Year	Forest Area Phy. in ha.	Non Forest Area Phy. in ha.
1994-95	5600	3145.66
1995-96	5600	4186.97
1996-97	5600	4511.86
1997-98	5600	5044.1
1998-99	5600	4993.48

	40,000	 27,336
1999-2000	5600 6400	 5 4 53.93

^{*} Six schemes sanctioned.

II. COMPENSATORY AFFORESTATION

Approval for the diversion of forest land for the SSP was granted by the MOEF in 1987, 1996 & in 1993 (including for R&R works) but several conditions were attached relating to the planning and conduct of CAF. Principal amongst these are the following stipulations.

- For every hectare of forest land submerged or diverted for construction of the project there should be Compensatory Afforestation on one hectare of non-forest land plus reforestation on two hectares of degraded forest. This represents a two fold increase of the usual requirement.
- For the 4,200 hectares of forest land in Maharashtra which is to be used for R&R, an equal area of non-forest land or double the area of degraded forest should be planted.
- The governments of the three states involved should prepare plans detailing their proposals for Compensatory Afforestation and submit these to the MOEF before work in the forest area is due to commence.
- The project should supply firewood to its construction workers, at its own cost, to prevent them from having to meet their fuel needs from the surrounding forests.

<u>Studies</u>

These have been a number of studies in three states aimed at assessing the extent and significance of the loss of forest land attributable to the SSP.

- Sardar Sarovar (Narmada) Project Development Plan, Volume-II prepared by the Narmada Planning Group (NPG) in 1983.
- Studies on Ecology and Environment by M.S. University of Baroda (MSU) in 1983.
- Sardar Sarovar Project: Preparation of Environmental Work Plan by the Forest Department of Maharashtra in 1988.
- Eco-Environmental and Wildlife Management Studies on the Sardar Sarovar Submergence Area in Gujarat 1992 by MSU.
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems by State Forest Research Institute, Jabalpur (1989-92).

 Draft report on Flora and Fauna in and Around Sardar Sarovar Project, Maharashtra by the University of Pune 1994.

The Action Plans

In compliance with the conditions set by the MOE&F, each state has prepared an action plan for the CAF of areas within its boundaries. The relevant documents are:

- Government of Gujarat Work Plan for Management of Environmental Effects, Section on Forests and Wildlife: The Compensatory Afforestation Plan for the Rann of Kutch, 1986.
- Project for Afforestation in Sardar Sarovar Project Impact Areas due to Diversion of Forest Lands for Sardar Sarovar Project (GOG), 1991.
- Compensatory Afforestation Scheme in Lieu of Sardar Sarovar Project in Dhule District, Maharashtra State (1989).
- Government of Madhya Pradesh Forest Department Action Plan of Compensatory Afforestation for Sardar Sarovar multipurpose river-valley project (1989).

These plans were submitted in varying stages of completeness but each has now been revised and updated to take account of the comments of the MOEF and the NCA. Action plans of 3 State Govts. contained following components:

- Identification of areas for CAF;
- 2. Description of selected areas,
- 3. Justification of Selection of Areas,
- 4. Identification of responsible agency,
- 5. Description of staffing requirements,
- 6. Description of material requirements,
- 7. Estimate of costs,
- 8. Identification of tree species,
- 9. Description of preparatory work needed,
- 10. Description of planting techniques,
- 11. Provision for aftercare,
- 12. Yearly planting target,
 - 13. Yearly budget,
 - 14. Provision made for monitoring implementation

These action plans spell out a programme of tree planting in the three states on both non-forest and degraded forest areas as shown in Table 2.1 & 2.2.

Table 2.1 Areas for Compensatory Afforestation

	Area of	Area of De-	Area of Non-	Total
	Forest	graded for-	Forest Land	area
	diverted	est to be	to be Affo-	for
	for SSP	Replanted	rested	CAF
GOG	4,523	9,300	4,650	13,950
GOM (a)Submer.	6,488*	12,980	6,488	19,468
(b)R&R *	4,200	-	4,200	4,200
GOMP	2,732	6,550	2,190	8,740
TOTAL :	17,943	28,830	17,528	46,358

^{*} This includes 2700 ha released in 1990 & 1500 in 1993 for R&R works in Maharashtra for which only equal non forest area is being raised as stipulated.

Table 2.2a Schedules for Implementation of CAF (Against Submergence) 42155/(41,478) = 98.39%

	Gujara 1395 0/ (13950		Maharash 9630(19478		Madhya 1874 0 /822	
			Afforested indicates		progress)	
	Degraded Forest	Non- Forest	Degraded Forest	Non- Forest	Degraded Forest	Non- Forest
Target:	9,300	4,650	12,977	6,488	6550	2190
Monsoon ye	ar	(2150)			(132)	(716)
1991	(2,834)	(350)	(8383)		(1200)	(373)
1992	(2450)	(847)	(4552)	(2276)	(2400)	(-)
1993	(2,500)	(455)	(20)	(1,156)	(2215)	(-)
1994	(1,516)	(848)		(2894)	(a)	(1189-a
1995	Completed	Completed	Completed	NIL	NIL	NIL
1996	-	· -	-	0,162	b	(515-b

Table 2.2b Schedule for Implementation of CAF in lieu of Forest
Land released for R&R works.

State		Land released	T É	'arget &	Progress	3
	Year	Area in ha.	1993-94	94-95	95-98	96-97
Maharashtra	1990	2700	2192.37 (2192)	$\frac{307}{(311)}$	197 (184.50	12.5
	1993	1500		-	15 0 0 (896)	604
4200=85.32% (3583)	Total Targe		2192	307	1697	616.5
	Achie	vement	(2192)	(311)	(1080.	5 0)

Other Additional Afforestation Activities:

Plantation along Canal Banks:

The total potential of canal bank plantations is estimated to be 18000 ha. A project report prepared for this purpose by forest Deptt. is under scrutiny of SSNNL. The plantation programme is likely to be launched effectively from the year 1996. However to give a start to the work of canal bank plantations, plantations on 425 ha have already been established till rains of 1995. There is a target of 200 ha. canal bank plantation for 1996-97.

Additional Plantation Activities

(a) Dam Vicinity Plantation (235 ha)

An area of 240 ha. in the vicinity of the dam has also been planted. This work was completed in 1992.

(b) Ravine Land Afforestation (200 ha.)

On the left bank of the river Sabarmati an area of 200 ha. in two villages i.e. Ratanpur (120 ha.) and Pirojpur (80 ha.) has also planned for plantation. An area of 200 ha. is planted till 1994 rains.

(c) Project area plantations: (255 ha)

An area of 300 ha. has been planted in the project area as per the target and the work completed in the rain of 1992.

III. <u>COMMAND AREA DEVELOPMENT:</u> (Including Drainage Studies)

(A) Government of Gujarat:

Government of Gujarat have undertaken several studies related to the Command area development. Some of which have been

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completed and the remaining are in progress. Their position is as follows:

S1.No	o. Name of Study		Year of completion
I. C	completed Studies:		
		Jyoti Consultants Ltd. Vadodara.	1981
2.	Mathematical Modelling of Ground Water for system single layer model-Narmada Mahi-Doab.	Operation Research Group, Vadodara.	1982
3.	Pre-Feasibility level Drainage study of Narmada Mahi Doab of SSP Command.		1982
4.	Some Aspects of Role of Panchyats and Institutional Arrangements for canal irri- gation in Two Talukas of Ahmedabad District.	ral and Urban Anth-	1982
5.	A study of settlement Pattern (6 Talukhas in the Narmada Command Area of Mahesana District of Gujarat).	Department of Geography, Gujarat University, Ahmedabad.	- 1982
6.	Regionalisation of Narmada Command.	Operations Research Group, Vadodara.	1982
7.	Marginal cost study of two Typical Distributeries and Two Typical Branches.	Dr. C.R.Shah, Vadodara.	1983
8.	Socio-Economic Bench Mark survey of 62 Talukas (Sub- districts) of Narmada Command Area.	Fourteen Different Agencies Including Universities, Resear- ch Institutions etc	Between 1982 & 1983
9.	Population Projection and Migration study for Narmada Command Area.	Operations Research Group, Vadodara.	1983
10.	Study on Water Demand for Non-Agricultural use from Narmada Project.	Gujarat Water Supply and Sewerage Board, Gandhinagar.	1983
11.	Consumer Expenditure, Assets and Indebtedness of Rural Households of the Command Areas of Sardar Sarovar (Narmada) Project,19	Directorate of Econo mics & Statistics, Gandhinagar.	- 1983

12.	Wasteland Development Project for command Area of Narmada Canal (Region 11 and 12).	Gujarat State Rural Development Corpora- tion Ltd., Gandhinagar.	1984
13.	Mathematical Modelling of Ground Water System Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
14.	Additional work on Mathe- matical Modelling of Ground Water System-Single Layer Model Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
15.	Rate of Adoption of Improved Technology in Narmada Command and Rest of Gujarat State (Based on Analysis of Crop cutting Experiments Data).	Operations Research Group, Vadodara.	1985
16.	Computer aided Planning of conveyance and delivery Network.	Indian Institute of Management, Ahmedabad.	1986
17.	Land Use and Cropping Pattern Survey and Mapping of Narmada Command Area Zone 4A & 4B.	Department of Geogra- phy, M.S.University, Vadodara.	1986
18.	Survey and Investigation work of Ground Water Resources in Narmada-Mahi\$	Gujarat Water Resour- ces Development Cor- poration Ltd.Gandhi- Nagar.	1987
19.	Cropping Pattern and Water Demand Study in Narmada Command Area.	Operations Research Group, Vadodara.	1987
20.	Inter-Regional Water allo- cation and Determination of Branch Canal capacity.	Operations Research Group, Vadodara.	1989
21.	Extended study on Inter Regional Water Alloca- tion and determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1989
22.	Growth of Agro-Process- ing Industries in Phase-I of the Sardar Sarovar Project.	Gujarat Industrial & Technical Consultancy Organisation Ltd. Ahmedabad.	1990

23.	Consultancy work for Cont- rol, Telemetry and Communi- cation Net Work on Narmada Canal System for SSP.	Gujarat Communication & Electronics Ltd., Vadodara.	1991
24.	Techno-Economic Study for utilising Village Tanks as Borrow Area for Construction of Canal Net Work.	Operations Research Group, Vadodara.	1992
25.	Area Development Strate- gies for selected Regions Adjacent to Narmada Main Canal (Vadodara, Surendra- nagar & Banas Khatha Dist.)	Operations Research Group, Vadodara.	1992
26.	Studies in Water Rates Policy in 3 parts.		
	i) Pricing of a public Utility Survey of Literature	Department of Econo- mics, South Gujarat University, Surat.	1992
	ii)Financial working of Irrigation Projects - A case of four projects in Gujarat.	Department of Econo- mics, Sardar Patel University, Vallabh Vidyanagar.	1992
	iii)Some policy issue for Canal Water Rates in Gujarat.	Department of Econo- mics, Sardar Patel University, Vallabh Vidyanagar.	1992
27.	Mathematical Modelling of Ground Water System for SSP Command between Rivers Shedhi and Sabarmati.	Consultancy Enginee- ring Services, New Delhi.	1993
28.	Mathematical Modelling of Ground Water System for SSP Command between Rivers Sabarmati and Banas.	Operation Research Group, Vadodara.	1993
29.	Mathematical Modelling of Groundwater System for SSP Command beyond Banas upto Rajasthan Border.	Dalal Consultants, Ahmedabad.	1993
30.	Prefeasibility level Drai- nage study for SSP Command beyond Mahi.	Consultancy Enginee- ring Service, New Delhi.	1993

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31. Study on preparation of a detailed Integrated Command Command Area Development Plan for SSP.

M/s Wamana Consultants Pvt.Ltd., Hyderabad. May, 1994.

32. Environmental Impact Assessment Studies on Inland and Marine Fisheries relevant to the Command Area of Sardar Sarovar (Narmada) Project.

M.S. University, Nov.1994 Vadodara.

33. Environmental Impact Assessment (EIA) Studies on Water Related Diseases in Sardar Sarovar Project (SSP) Command Education, Govt. of Area including the Area Down Stream of the SSP Dam.

Commissionerate of Oct.1995 Health, Medical Services & Medical Gujarat, Gandhinagar.

34. Study of Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project : Lying between the Narmada & Sabarmati Rivers. (EIA Studies).

Sardar Patel University, Valalabh Vidyanagar.

Nov.1995

35. EIA on downstream of Sardar Sarovar Dam upto Gulf of Combay.

H.R. Wallingford.

April'95

36. Economic Dimension of the Sardar Sarovar Project.

S.P.Institute of May, 1995 Social & Economic Research, Ahmedabad. Saurashtra University, Jan. 1996 Rajkot.

37. Study on Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project Lying in Saurashtra and Kachchh Area (Environmental Impact Assessment Studies).

38. Review of ground water drainage study.

H.R. Wallingford

Feb. 1996

39. Agro Pollution aspect of Command Area.

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Control South Control South

Feb. 1996

II. ON GOING STUDIES:

1.* Development of Aliabet Island in the Estuary of River Narmada.

Sept.'92 Multi Disciplinary Expert Group.

- Environmental Impact Assessment (EIA) studies on Aliabet Island.

Dec., 93 Chief Engineer, (CAD SSP) Expert Multidisciplinary Group.

Agricultural Research Studies.

Gujarat Agricultural 1987 University,

Survey and Investigation Work of Ground Water Resources beyond River Mahi in SSP Command.

Gujarat Water Resour- 1989 ces Development Corporation Ltd., Gandhinagar.

Action Research on People's Participation in Water Management in SSP.

Gandhi Labour Institu- 1991 te, Ahmedabad.

5.* Study on Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project: Lying between Sabarmati River and Rajasthan Border (Environmental Impact Assessment Studies).

Gujarat University, March, 1993 Ahmedabad.

6.* Ecological study of Wild Ass Sanctuary and surrounding area using remote sensing Foundation (GEER technology for Environmental Foundation), Gandhi-Impact Assessment.

Guj. Ecological Dec., 93 Education & Research nagar.

7.* Environmental Impact Assessment of Nal Sarovar Bird, Sanctuary.

GEER Foundation Dec., 93

8.* Environmental Impact Assess- GEER Foundation ment of Velavadar National Park located in the command area of SSP.

Dec., 93

* Draft/interim reports received in NCA.

Govt. of Gujarat has formed an expert multidisciplinary group to coordinate the studies & for drawingup the needed plans.

(B) Government of Rajasthan

The Government of Rajasthan had submitted a report Environmental & Ecological aspects and remedial measures for Narmada Canal Project, · Copy of the report was submitted to Ministry of Environment and Forests. Govt. of Rajasthan have assigned studies on EIA of Command area in Rajasthan portion to WAPCOS. Field studies on soil profile is completed. Report on drainage design is being drafted by WAPCOS.

IV. FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

The guidelines of the MOEF require that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present can

be assessed, listed (rare and endangered) species can be detected, if present, and appropriate conservation measures devised.

On the basis of relevent details supplied by the various states, MOEF issued clea-rance for the SSP in 1987. A condition of this clearance, as far as it related specifically to the Flora & Fauna, was that Narmada Control Authority would ensure indepth studies on flora & fauna needed for implementation of Environmental Safeguard measures.

Studies/Surveys :

- Important survey work has included the following:
- The Environmental Impact Study of 1983 prepared by (MSU).
- Preliminary Report on First Botanical Exploration and Plant Collection from Narmada Valley by the Botanical Survey of India in 1986.
- Report on the Survey of the Narmada Sagar Area by Zoological Survey of India, 1988.
- Note on Sardar Sarovar Project Preparation of Environmental Work Plan for Forest and Wildlife by the State Forest Department, GOM, 1988.
- Status of Flora and Fauna in and Around Sardar Sarovar Project, Maharashtra is studied by the University of Pune (1992-94). Interim report is received in NCA.
- Eco-Environmental and Wildlife Management Studies in the Sardar Sarovar Area in Gujarat, 1992, by MSU.
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems. The study was conducted by the State Forest Research Institute (SFRI) in Jabalpur and financed by the NVDA. This study is completed & report is \$ submitted in 1994.
- Workshop on Approaches to Integrated Wildlife Management in Gujarat: A Report by the SSNNL, October 1990.
- People's Involvement in Wildlife Management, by VIKSAT in 1991.
- Wildlife Management Studies in the Submergence and Catchment Area of Narmada Project: With Special Reference to Shoolpaneshwar Wildlife Sanctuary, by the SSNNL, 1992.
- Narmada Basin Water Development Plan: Development of Fisheries, 1987, was prepared by the Narmada Planning Agency, GOMP.
- Rapid Reconnaissance Survey of Limnological Aspects Part I, II and III, 1987, were undertaken by the Universities of Bhopal, Vikram and Rani Durgavati for GOMP.

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- Water quality data has been collected by the Central Pollution Control Board, Central Water Commission, the State Pollution Control Boards and the National Institute of Oceanography.
- Narmada River Basin Development Project: Fisheries Component, 1991 by the German Consultants to the World Bank, GOPA.
- Sociological Survey of the Fishing Families of the Narmada River by CICFRI, 1991.
- Aquatic Fauna (Fish) Studies in Indira Sagar Submergence Area, prepared by the Friends of Nature Society in 1991 on behalf on the NVDA reported on the fish fauna of the Narmada.
- Pre-and Post-Impoundment Limnological Studies of Narmada Basin, by three universities coordinated by Barkatullah University for the NVDA. (1989-92) Study report was available in 1994.
- Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream is a desk review sponsored by the NCA and undertaken by CICFRI, 1993.
- Ecology and Fisheries of the Narmada Estuarine System with Special Reference to Proposed Impoundment (Sardar Sarovar Dam), is an ongoing study begun in 1988 by CICFRI.

The Action Plans

To ensure that the wildlife conservation measures are implemented effectively, action plans for the three states were prepared as follows:

- felling plans for the forest area coming under submergence in Maharashtra and Madhya Pradesh which will avoid the possibility of animals being trapped in the submer-gence area;
- plans for improvement works in the wildlife sanctuaries of Gujarat. Shoolpaneshwar sanctuary development action plan prepared by GOG is 1996.

Fisheries Component:

Three state Govts. submitted the fisheries development plans which are as follows:

- The Narmada Basin Water Development Plan: The Development of Fisheries, 1984. This comprehensive plan for GOMP addressed the development of fisheries in the NSP, Omkareshwar, Maheshwar and SSP areas. Phasing and programming with respect to pre and post-impoundment, clearance of the forests, training of fishermen, cooperative societies and post-impoundment management were proposed.

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- Environmental Work Plan: Sector Fish and Fisheries, GOG, 1986. This work plan, prepared in compliance with the agreement with the World Bank included the establishment of fish hatcheries and fish farms, training of fishermen, establishing primary cooperatives, and establishing an Inter State Fisheries Board. In addition, it included proposals for conducting hydrobiological studies, studies on the morphology of the river, investigations into the physical and chemical characteristic of the water and soil, and studies on flora, fauna, fish yield, plankton, and productivity in the reservoir.
- A Note on SSP: Preparation of Environmental Work Plan for Fisheries Development in Maharashtra, 1987. This plan included proposals for the felling in the reservoir submergence zone, fish seed, hatcheries, stocking, fishing, manpower requirements, and training and management through the Inter-State Board. Some more studies have proposed by GOM through CICFRI.

Subsequently, the state governments revised their plans with a view to address to issues as they arose. The revised plan for GOM included proposals for the fishing population to be resettled on the periphery of the reservoir or in R&R sites in Maharashtra. In addition, the establishment of low-cost hatcheries and irrigation tanks, the development of pen cage culture fisheries, and intensive fish farming were proposed. GOG also revised their plan by end 1994. The plan contained four volumes covering upstream, downstream & command areas. In view of the progressive impoundment which commenced in March, 1994. NCA has constituted an expert group to lay down the guidelines for conservation & development of fisheries & its ecosystem. The plan submitted by state Govts. are under scruitny of this expert group.

Table 4.1 Sunmary of Status of Environmental Planning:

A) Wildlife

	Gujarat	Haharashtra	Madhya Pradesh
Preliminary Surveys	Complete	Complete	Complete
In-Depth Studies	Complete .	Completed	Complete
Development of Manage- ment Options	Complete for Shoolpaneshwar	Some work completed but awaiting results of study awaiting deliberations of the expert group	the expert group

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Action Plan

Migratory corridors	Not needed	Completed	Complete
Sanctuary development	Complete for Shoolpaneshwar development Management plan prepared	Plans for establishment of wildlife sanctuaries await study results and expert group's recommendations	Plans for estab- lishment of wild- life sanctuaries await study result and expert group's recommendations.
Wildlife conservation	Massive affor- estation in entire catch- ment of SSP	It depends on deliberations of expert group	Await final out- come of study.
Implementa- tion	Shoolpaneshwar development complete, CAT work (increasing carrying capacity)nearing completion	Awaiting out- come of the study. CAF nearly comple- tion, CAT work recently acce- lerated	Arrangements complete, awaiting final outcome of study

Progress in Shoolpaneshwar Sanctuary Development

	Target	Achieved to	% Complete
Fencing	100km	107	100
Firelines	60km	251 km	100
Barricades	2km	2.8 km	100
Check Dams	14	1 4	100
Construction of Quarters	21	21	100
Construction of Rest House	1	1	1.00
Improvement of Communication		70.5 km	100

The SSP will also provide an opportunity to enhance nature conservation outside the immediate catchment area of the Narmada. In particular three wildlife sanctuaries located in the command area of the project will benefit from the increased freshwater availability resulting from the project and there are plans by the GOG to further develop these. They comprise:

- Nal Sarovar, Bird Sanctuary;
- Wild Ass Sanctuary in the Rann of Kutch.
- Velvadar Black Buch National Park.

Suprary of Status of Environmental Planning:

B) Fisheries

	GOG	GOM	GOMP
Preliminary surveys work plan.	Yes	Yes	Yes
Updating of Detailed surveys/studies of fish fauna	Yes	-	Yes
Updated Action plans	Yes	Yes	Underformu-
Implementation			lation
1.Plan for clear felling	Completed	Yes to synchronise with submergence 26.00 ha felled marking on 714 ha.	Yes to synchronise with submergence work commenced.
2.Development of fish farms	Under imple- mentation	Proposal under re- vision.	Proposal under re- vision.
3.Establishment of IFDB for future R&D management 4.Expert group to lay down guide-lines for conservation & Development	_	Agreed the states & hree meetings	

Progress of Implementation

CICFRI have already established one hatchery in Gujarat for augmenting the numbers of the Hilsa fish in the reservoir. This currently produce around 250,00 spawn per year. CICFRI have also been commissioned to monitor the whole of the estuary and their study has been extended to examine pollution and to undertake modelling studies in the downstream environment.

A draft plan for the creation of an Interstate Fisheries Development Board (IFDB) has been prepared by the NCA and agreed, in principle, by the governments of Gujarat and Maharashtra. However GOMP has disagreed & suggest an alternative proposal. Reaction from GOG & GOM are awaited. The organisation is expected to be set up and fully functioning prior to reservoir filling. An expert group has been constituted by NCA to lay down the

guidelines for fish conservation & development during progressive filling of the reservoir to advise the state executive agencies for followup action. Guidelines are on the anvil.

GOG has already provided 16 hectares of land to the project for the development of fish farms. In addition, the State Fisheries Department is exploring the development of riverine fisheries and the development of the reservoir for commercial and game fisheries.

In Gujarat reservoir bowl is already cleared of all vegetative growth. Execution of felling in M.P. & GOM as per felling plans prepared awaits the commencement of impounding.

V. SEISMICITYÖ

<u>Studies</u>

Studies of reservoir-induced seismicity (RIS) and rim stability have been carried out by the Geological Survey of India (GSI), Central Water and Power Research Station (CWPRS), University of Roorkee and World Bank Consultants. The principal studies are described below:

- University of Roorkee. 1980. Geological and Seismological Investigations of the Environs of Narmada Valley around Navagam Dam site in Gujarat.
- GSI. 1981-82 and 1982-83. A Geotechnical Report on the Reservoir Competency Investigations in Parts of Sardar Sarovar Area, Bharuch & Vadodara Districts. Volumes I&II.
- Shenoi et al. 1982. Shenoi et al presented at the New Delhi conference on the significance of seismotectonic aspects on reservoir development.
- Balasundaram, M.S. 1982 Sardar Sarovar Project: A Geotechnical Report Compiled and Edited for the Government of Gujarat.
- MSU. 1983. The Sardar Sarovar Narmada Project Studies on Ecology and Environment.
- NVDA published a Position Paper on Seismic Studies in January 1986.
- Krishna, Dr. J. 1989. Dams and Seismicity.
- GSI.1990. Study of the Rim Stability of the SSP.
- GOI.1993. Sardar Sarovar Project Seismicity and Sardar Sarovar Dam.

Progress of Implementation

The various recommendations for modification of the dam design which have all been implemented are summarised as:

- adoption of horizontal design coefficient of 0.125g on the recommendation of the Dam Review Panel;
- installation of stress monitors in the main body of the dam:
- increase of the depth of the foundation to 18m below the lowest river bed.

The Government of Gujarat has identified 9 locations for the installation of seismic monitoring stations, 4 each on either side and one at the downstream of the Sardar Sarovar reservoir out of a total of 9 stations there are 3 in M.P., 1 in Maharashtra & 5 in Gujarat. By Dec. 1994, 8 stations was had been installed. Construction of building for the 9th station in progress.

The progress of implementation is illustrated in Table below:

Implementation of Actions

Action	Status
Dam design modifications	Complete
Installation of monitoring stations	8 stations installed by June, 1994, 1 more awaited
GSI (Nagpur Division) rim stability studies	Completed
Tracer Studies by CWPRS	Reports submitted.

VI. <u>HEALTH ASPECTS</u>

Studies

A large number of studies have been carried out on the health profile of villages in the three affected states. The key studies are summarised below:

- Narmada Programme Schistosomiasis Back-to-Office Report, 1986 assessment was carried out by Goodland, consultant to the World Bank, the National Institute of Communicable Diseases (NICD) and the World Health Organisation (WHO).
- Proceedings and Recommendations of the Meeting on Schistosomiasis Research and Surveillance held at NICD on 22nd November 1985.

- Disease Profile of Command Area by the State Commissariat of Health, Medical Services and Medical Education (SCHMS), 1986.
- Health Statistics, GOM, 1987. The state department of health produced a report on the health profile of 33 project-affected villages in Dhule District, Maharashtra.
- Health Statistic 1982-84, GOMP. This study, published by GOMP in 1985 & updated is 1994.
- The Sardar Sarovar Narmada Project Studies on Ecology and Environment by MSU in 1983 considered public health in Chapter-3.
- Numerous studies have been conducted on the incidence of malaria in India by, amongst others, by the Malaria Research Centre (MRC) and Dr. Kalra.
- Revised health plan by GOM, 1995.
- Revised health plan by GOG, 1996.
- Epidemiological Survelliance studies by GOM, 1996.

Status of Implementation of Actions for Public Health

Action	Gujarat	Maharashtra	Madhya Pradesh
Baseline studies	Complete and updated'95.	Complete being updated.	Complete being updated.
Preparation of state action plan	Submitted and modified in 1986; Urban Malaria Scheme proposed	Original sub- mitted in 1987, revised in 1991 and 1992 & 1993	Original submitte in 1986, revised in 1988 and final plan submitted in 1991
Survey of existing facilities	Complete	Complete	Complete
Establishment of new facilities	Hospital at Kevadia for workers; labo- ratory and mobile unit complete, drug dispensaries	Somawal village hospital; health centres and health units sanctioned.	Hospital, mobile unit and civil dispensaries for labour; detailed scheme for resettled population
Vector control measures in place	NMEP; SSNNL work- shop on malaria control; labora- tory establish- ed; studies on health completed	NMEP; adoption malaria control guidelines of irrigation Department	NMEP; state malaria control organisations strengthened

Appointment staff

One senior health Yes one PHC, 3 Needs identified of specialist officer is posted dispensaries &

at Kevadia. one floating dispensaries established & 33 posts

filledup.

Disease Monitoring and responsibility

Entrusted to SCHMS EIA report regular health submitted. Action department plan of 1986 revised.

Entrusted to Survillane studies commenced. Phase-I survey

Evaluation cell established monitoring by Gandhi Medical College, Bhopal.

report submitted by T.N. Medical College.

VII. ARCHAEOLOGICAL SURVEY AND ANTHROPOLOGICAL STUDIES/ ARCHAEOLOGICAL SURVEY

In the case of SSP, where some sites may be submerged the NWDT award stipulated that, the entire cost of relocation and protection should be chargeable to GOG. Relocation work is to be supervised by the Department of Archaeology under the provisions of the 1958 Act.

Studies:

Survey conducted for identification of various sites & monuments of significance has included the following:

- Gujarat: Archaeological Survey of Nineteen Villages Submerged by Sardar Sarovar Reservoir, 1989.
- Maharashtra : Survey of Department of Archaeology. A survey was carried out by the Department of Archaeology of cultural sites in 24 villages of Akkrani Taluk and nine village from Akkalkuwa Taluk, Dhule District.
- Madhya Pradesh: Survey of State Department of Archaeology and Museum (1992), in sixteen volumes.
- Anthropological Survey of India: Narmada Salvage Plan.
- Anthropological Survey of India: People's of India.
- Parishad, A.K. Survey of Material Cultural in the Narmada Valley.
- Rashtriya Manav Sanghralaya : Narmada Salvage Plan.

Cultural Heritage in SSP Area

		Gujarat	Madhya Pradesh	Maharashtra
,	Relocation of temples	2	7	-
	Excavation site(s)	-	5	

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Summary of Current Situation and Progress

	GOG	GOMP	GOH*
Survey of Villages in Submergence Zone.		. !! .	
Identification of Cultural Sites	"Complete" for all item in all the States.		
Collection of Data and Documentation of Sites	Complete	In progress	Not required
Selection of appropriate sites.	Complete	In process	Not required
Action plan-	Complete	Finalised	Not required

^{*} Survey in Maharashtra identified one temple which was on the border with Gujarat. GOG has already relocated this temple 15 km. downstream of present location.

Progress of implementation:

State	Relocation of temple Target/progress	Excavation Target/Progress	Sculptures Target/Progress
Gujarat Maharashtrā Madhya Pradesh	2/2 - 7/6 *1	5/3 *2	188/9 *3

*1 Relocation/Protection

Work for relocation of following temples is in progress.

	Village	Temple
1. 2. 3.	Semalda Barda Khujawa	Kalanjeshwar Shiv Mandir Bhawani Mata temple progress of estimate under preparation.
4. 5. 6.	Khujawa Panthia Panthia	Jaleshwar temple Satmata temple Shiv temple

The monuments viz. Shiv temple of Religaon is proposed to be protected by constructing a wall.

*2 Excavation

 For excavation at vill Khaparkheda & Brahmangaon. Funds sanctioned by NVDA & work was completed. - For excavation at village Utawad. Work was completed earlier by ASI, Govt. of India.

*3 Collection & display at Museum

- Land for museum at Barwani & Indore requested. Chemical treatment of rock cut statue at Piplagarhi has already been started. This monument is proposed to be shifted at relocation site.
- Construction of a section 'Narmada Dirgha' in the museum at Bhopal has been started.
- Besides, Film documentation of all the monuments of SSP is in progress through an agency 'Madhyam', engaged by state deptt. for documentation of the Important monuments.
- Proposal to establish Narmada park to house sculptures at Lalbagh Palace, Indore is under consideration of the state Govt.

ANTHROPOLOGICAL STUDIES

Government of Madhya Pradesh has informed that in view of the studies being carried out in connection with Narmada Sagar Project, no separate anthropological studies are required and that the Director General, Anthropological Survey of India has also expressed the same view. M.P. State Adivasi Kala Parishad has submitted its report on Tribal arts & culture. Besides Anthropological Survey of India has informed that Narmada Basin is already covered extensively under the project "people's of India". Besides Rashtriya Manav Sanghralaya has conducted needed studies in the past as follows. Further studies are covered under R&R plan of the state Governments. The work done by An.S.I is being used.

- a study of the palaeo-ecology of quaternary fossils in the central Narmada Valley;
- excavation of upper palaeolithic site of Mehtakhaeda and further exploration of Nimar;
- collection of tribal artifacts in Madhya Pradesh.

Institutional responsibility for these actions was specified in the action plan whereby the first two elements were completed by Deccan College, Puna and the third by Adivasi Kala Parished, for the Rashtriya Manav Sanghralaya, Bhopal.

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STATUS REPORT NARHADA SAGAR PROJECT (NSP) ENVIRONMENTAL ASPECTS, JUNE, 1996

1) Phased Catchment Area Treatment:

The freely draining area of Narmada Sagar Project down stream of Bargi Dam is about 39,25,422 ha. As per the guidelines of MOWR, directly draining watersheds of very high and high priority categories only are to be treated Pari passu with the construction of the dam and at the project cost. Prioritisation survey of the watersheds was entrusted earlier to SGSIT&S, Indore. Later on, as per GOI's instructions the prioritisation survey was entrusted to the All India Soil & Land Use Survey Organisation, New Delhi. The Survey has been completed by AISLUSO, New Delhi and the Survey reports have been received in the NVDA.

On the basis of the reports submitted by the AIS&LUSO, 30 sub-watersheds belonging to the very high and high priority categories and directly draining into the reservoir have been identified for treatment. These 30 sub-watersheds cover an area of about 73,456 ha.

I. DIRECTLY DRAINING SUB-WATERSHED OF HIGH & VERY HIGH PRIORITY CATEGORIES:

Critically degraded Sub-watersheds below Bargi dam (Figure in ha).

	FOREST		NON FOREST		TOTAL	
	Gross	Net	Gross	Net	Gross	Net
Critically degraded sub-watersheds.	15759	11048	57697	51927 *	73456	62975

^{*} In addition an area of 1636 ha. was treated up under pilot project earlier.

Programme and Progress of Works:

	Jpto 92-93 Lative Progre	93-94 ess Target/Pr	94-95 rogress	95-96 Target	96-97
Non-Forest area/ ha. (51,927 ha)	11439	13636 10261	<u>15375</u> 7224	19651 3878	19125 1046
Forest area/ (11,048 ha)	' –	-	3700 2623	4777 240	8185 NIL
Total Area: (62,975 ha)	11439	13636 10261	<u>19075</u> 9847	23428 4118	2731 0 1046

100 March 1985

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II. FREELY DRAINING AREA: (EXCLUDING DIRECT DRAINING SUB-WATERSHEDS)

Number of watersheds Gross Area

Net Area

- 478

- 10,12,650 ha.

- 9,15,150 ha.

Schedule of Implementation:

Year	Forest (in ha.)		Non Forest	Non Forest (in ha.)		
	Gross Area	Net Area	Gross Area	Net Area		
1995-96	e m			18000		
1996-97				18000		
1997-98		10000	•	27000		
1998-99		10000		28800		
1999-2000		10000		28800		
2000-2001		10000		28800		
2001-2002		10000		28800		
2002-2003		10000		28800		
2003-2004		10000		28800		
2004-2005		10000		28800		
2005-2006		10000		28800		
2006-2007		10000		28800		
2007-2008		8430		28800		
2008-2009				28800		
2009-2010				28800		
2010-2011				28800		
2011-2012				28800		
2012-2013				28800		
2013-2014				28800		
2014-2015						
2015-2016				28800		
2016-2017				28800		
2017-2018				28800		
2018-2019				28800		
2019-2020				28800		
2020-2021				28800		
2021-2022			*	28800		
2022-2023				26400		
2023-2024				26120		
:	1,24,732	 1,08,430	8,96,361	8,06,720		

^{* 5} projects for seeking funds for 40 subwatersheds covering an area of 53709 ha of forest were submitted by NVDA to National Afforestation & Eco-Development Board.

2) Compensatory Afforestation:

A total of 40332 ha forest land would come under submergence and an additional 779.9 ha of forest land has been diverted for the residential colony, power house complex, dam, saddle dam and approach roads. Subsequently, another 308.4 ha of forest land was

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permitted to be diverted for power house. Thus a total of 41,420 ha of forest land has been permitted to be utilised for the construction of ISP. To compensate for this loss of forest, 10,143 ha of non-forest and 70,802 ha of degraded forest land has been identified for compensatory afforestation.

Programme of Compensatory Afforestation:

	Commulative Progress till 91-92	92-93 Target/ Progress	93-94 Target/ Progres		95-96	96-97
Degraded Forest	23048	12528	12400	12400	11035	8174
area (70,802 ha)		11919	12987	4056	2902	NIL
Non-Forest area (10,143 ha)	5239	$\frac{1534}{1390}$	$\frac{1500}{1327}$	1500 667	$\frac{514}{131}$	1100 NIL
(80,945)	28287	14062	13900	13900	11549	9274
(say 81,000 ha)		13309	14314	4723	3033	NIL

3) Command Area Development:

The Government of Madhya Pradesh has submitted command area development plan. The project on completion will provide annual irrigation to 1.69 lakh ha.

The implementation of the plan would be taken up in three phases for completion in 6/2007. The study on impact of Agro chemicals, runoff from fields on surface & ground water quality in the command area has been assigned to J.L. Agricultural University, Jabalpur. An MOU for this work was finalised. An allocation of Rs.24.5 lakhs was made.

4) Flora, Fauna, Wildlife and Carrying Capacity:

Botanical exploration of Indira Sagar Dam was carried out by Botanical Survey of India during 1985. Besides, wetland and aquatic flora of Narmada Valley in Madhya Pradesh was also published in 1991 in Vol 15 No.3 in J.Econ.Toxicology.Bot.

Studies on these aspects were entrusted to the Wildlife Institute of India, Dehradun in December, 1989 and were completed by March, 1994. The final study report is submitted to MOE&F & NCA.

Besides this, the Friends of Nature's Society, Bhopal, was entrusted with the preparation of Wildlife Retrieval and Conservation Plan. They have submitted the final report. Action plan is under formulation.

Actions have been takenup by NVDA to implement the recommendation of the WLI regarding construction of National Park & protected areas.

5) Seismicity and Rim Stability

The reservoir competency survey has been done by GSI and report is submitted. In the report, GSI has suggested further studies for some patches of narrow water divide. This study has been undertaken by GSI.

Establishment of 10 nos. of seismic observatories in the Narmada Sagar Complex area is takenup NVDA. Besides, 12 nos. of wood Anderson Seismometers and six nos. of photographic recorders are being procurred from IMD supply has commenced. Procurement of Micro Earthquake recorders is completed. In the mean time on the initiatives takenby NVDA, CWPRS has already installed the instrument to records. Preimpounding date and for undertaking seismic studies at NSP, Omkareshwar & Maheshwar projects through Analogic micro earthquake recorder & strong motion accillograph as an interim measure. Data will be interpreted by IMD.

6) Health Aspect:

A note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and comments were sent for modifying the report. NVDA has submitted the revised plan costing Rs.748.73 lacs for the preventive and curative aspects of health. Regarding preventive aspects, a MOU has been signed with the Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal. Four six monthly report received. For studies on health aspect in project impact areas of SSP and NSP, work is proposed through a cell of monitoring and evaluation under the Directorate of Health Services, Bhopal. The approved plan is being implemented.

Pre-impoundment and post-impoundment Limnological studies carried out by three Universities will take care of water quality aspect. These studies have been completed and the final report is submitted. Action plan is under approval of NVDA.

7) Fisheries Development:

The studies of certain aspects of fisheries have been included in the Limnological studies being conducted by the three Universities of the State; studies in the Upper Narmada, (Bargi Reservoir) by Rani Durgawati University, Jabalpur, studies in the Middle Narmada (Tawa, Barna and Kolar Reservoirs) by Barkatullah University, Bhopal, studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have completed the studies in their respective areas as per MOU and final report is available. According action plan has also been drawnup to conduct pre & post impoundment studies on Fish & Fisheries & Hydrobiological studies to the extent of Fish Abundance. This is under approval of NVDA. Acquatic fauna has also been covered under the studies completed by Friends of Nature Society, Bhopal. The draft report of FONS is also available. Action plan submitted earlier is being updated.

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8) Archaeological and Anthropological Survey:

A survey of the 254 villages is required for identification of the archaeological monuments falling within the submergence area. The State Department of Archaeology and Museum, Bhopal was entrusted with the survey of 87 villages which has been completed. The state Department have already submitted an action plan for relocation of monuments of Archaeological significance. This plan is being implemented.

Archaeological Survey of India has also completed the survey for 167 villages for contrally protected monuments for identification of the monuments of significance. Implementation of the action plan is already initiated.

As only lower bastion in north of the Joga Fort is likely to be affected by Scour action of water, this is being studied and the Siddeshwar temple is well above the FRL of 860 ft., these two structures in NSP areas are not considered as affected by the project however action is being taken by the concerned agencies to ensure safety of the monuments.

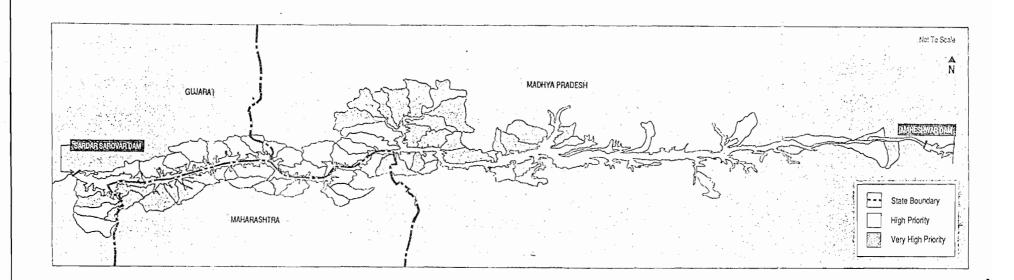
Excavation of the early historic mound in village Khedinama in Hoshangabad distt. is completed and report is available in NCA. Actual tools & artifacts have been found. Nagpur branch of ASI has also completed excavations at village Utawad.

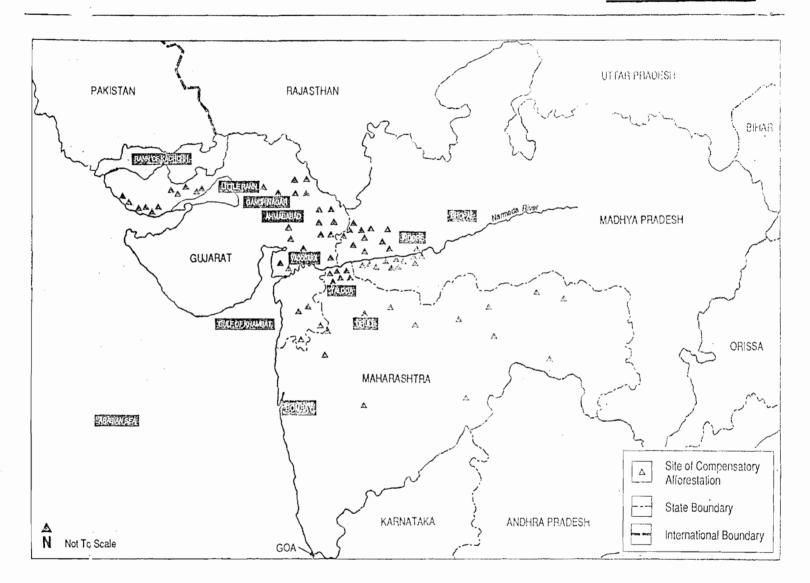
Anthropological Studies:

Efforts are being made for retrieval of bio-cultural material from the Narmada Basin. A lot of information is gathered from the field which generates immense data of Socio-Anthropological significance.

Rashtriya Manav Sanghralaya has constituted a working group for the retrieval of bio-cultural material in Narmada Basin. Survey of tribal art and handicraft entrusted to M.P. Adivasi Kala Parishad is completed and report is available. Besides Anthropological Survey of India has covered these studies under its own project called "people of India". NVDA has procurred six volumes of this report viz.Vol.I,II,III, VIII, X & XI & these are being studied for use in the R&R tribal PAFs. The report is in 61 volume out of which 7 volume are under final editing. A Narmada Salvage plan is also launched by Anthropological Survey of India recently and the entire area is scanned and some ancient tools have been found.

ANNEX-XXIX-(3).







नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

No. Env-4(4)/96/1265

September 17, 1996

BY FAX/POST

To

Shri A.S. Patel, Officer on Special Duty, Narmada Planning Group, 12, Narmada Block, 3rd Floor, New Sachivalaya Complex, GANDHINAGAR - 382 010.

Sub: Second Interim report on EIA of Valavadar Black Buck National Park located in the command area of SSP.

Ref: Your letter No. NPG/EIA/229/II/793 dated 20th Aug.1996.

·Sir,

In continuation to your letter under reference on the above subject. I have to inform you that the said interim report was reviewed in the office and our observation on the same are enclosed for further necessary action at your level.

Yours faithfully,

Encl: As above.

g/c

(DR.PAWAN KUMAR) Specialist (Env.)

113-BG, Scheme No. 74, Vijay Nagar, Indore - 452 010 (M.P.) ११३, बी जी, स्कीम क्र.. ७४-सी, विजय नगर, इन्दौर - ४५२ ०१० (म.प्र.)

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Gram: NARCONTROL Fax: 91-731-559888

OBSERVATIONS ON THE SECOND INTERIM REPORT ON RIA OF VELAVADAR BLACK BUCK NATIONAL PARK

Second interim report on EIA study of Velavadar National Park (VNP) is good a attempt on the studies related to the wildlife habitat of the VNP. However, the report in its present form does not look like an EIA report. A little change in the form of presentation may, however, make it an important EIA document for the VNP.

General Comments:

It is important to visualise that the project setting is likely to trigger alterations in the ecological setting & their function, changing the resources equation in terms of availability & use which will have an impact on the utilization pattern of the VNP by the wild animals and human population. Therefore, likely impacts of the project on the existing vegetational values & its impact on wildlife & humans is required to be incorporated in the final report.

In order to make the document a comprehensive one it is suggested that the final report should include a chapter in the beginning describing the project setting. It may also be made clear as to how much water at what time of the year shall be flowing through the canal network to generate impacts to help in identifying the source of impact on VNP.

This should be followed by the chapter describing areas of impacts due to SSP including, among others, low flow regime, flood regime, rise or fall in the water table, imbalances in the pests & weeds, animal diseases, aquatic weeds, animal population etc. Sanitation, health & nutrition may also be affected, water bodies may also undergo changes. Salinity, saline intrusion, saline drainage may affect habitat of the VNP. Activities of the people living in & around the park, who use the VNP areas may also be changed due to change in hydrological, faunal & floral regime. The chapter should include identification of the vital areas of human concerns like forests, wildlife habitat & other natural resources and also the areas in which human activities must be controlled. This would be possible by quantifying the dimension of change in the identified environment and other interacting variables of the ecological system with a view to suggest the alternatives that provide better environmental protection.

Specific comments:

1. The study group has rightly recognised vegetation of the VNP area as one of the most important component of wildlife habitat affecting qualitative & quantitative values of food & shelter for wild animal species. However, baseline information on vegetation, ecological structure & function and current level of the pressures on them are required to be presented in the final report along with rare and

threatened species & related anthropogenic pressure.

It is suggested that since the species are the products of their habitat, some dominant biotic component of the habitats or physical variables can be used to quantify the quality of a habitat. This may include slope, terrain, water availability, canopy cover, shrub cover, herb volume etc.

Wildlife habitat may be categorised into good, medium or poor and parameters for the same may be selected. The information on biotic pressure may be colated with the habitat type to determine status of a particular habitat within the VNP. This may be followed by quantification of the dimension of change in the selected parameters due to SSP.

- 2. the report includes phytosociological Although values interms of density, frequency & abundance of species association but the current level of anthropogenic pressure like population of human & cattle, agriculture, industry, domestic & municipal use, sewage disposal, status of health, information about the water related diseases & any other prevalent diseases, projected water availability & use, development plan for the area, growth rate, quality of water, agro chemicals etc. is not included in the interim In addition, information on salt crusts on the soil and areas under salt tolerant plants, expected long term changes in sodicity, water logged depressions, soil profile, of flow of surface & ground water, direction permeability, fuel wood, availability of fodder, farming, grazing, pests & weeds of the area may also be included. Area of the VNP which is affected by sea ingress & any possible changes in the ingress due to SSP may also be `the covered up. Outlines of the possible changes in agricultural pattern presented in the first report under chapter-VIII & page 44 may also be elaborated & quantified. agricultural
- 3. It is suggested in the report that most of the plant species would withstand the micro-climatic changes likely to be introduced by the SSP. This may be made more precise by indicating in the list of plants against the name of each species whether it is succeptible to change or hardy in nature & may withstand changes in the micro climate. This would help devicing a better management strategy.
- 4. Alongwith grasses, legumes & above ground biomass of the VNP, list of plant species is also given. It is suggested to indicate against each plant species the palatability by a particular animal & relative abundance of the particular plant.
- 5. Reasons for change in the data for the period 1987 & 1994 as given in table 2 on page 20 may be interpreted in view of the likely further changes due to SSP and related impacts on

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wildlife & human beings of the VNP.

- 6. Biotic pyramid & food chain is an important aspect in determining the carrying capacity of the VNP & therefore may be addressed properly.
- 7. Climate, substrate terrain & vegetation coupled with distribution of food, shelter, water & mobility of the animal determine the carrying capacity of the areas for a particular animal. In addition, group size, sex ratio, grazing, cultivation, poaching etc. also have an impact on the carrying capacity & may be considered while assessing the carrying capacity of VNP.
- 8. Eco-system zoning of the area from floral & faunal angles may be attempted. Effects for improving the tree cover may also be enlisted as suggested earlier.
- 9. There is a need for outlining the strategy for augmenting incomes from on-farm & off farm activities so that people of the VNP may have less economic dependence upon the resources of the VNP. Need for replacing scrub livestock with cattle of better breed may also be explored. Fuelwood substitutes, development of fishing in the ponds & lakes within the VNP may also be looked into for suggesting appropriate development plan for the VNP.
- 10. Recognising that passive protection is more important, the support of the people living in and around the VNP shall be required. Details on demographic profile, language, culture, literacy, occupation, family dwellings, agriculture, their economy, information on use of fuel, fodder, timber, minor forest produce, medicinal plants etc. may be incorporated.
- 11. Site specific, conservation friendly package of measures for rural development and use of bio-mass resources so as to be of help in bringing up the socio-economic condition of the people supporting simultaneously effective conservation of the VNP is called for. Possibility of involving local people in the conservation efforts may thus be suggested.

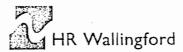
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Sardar Sarovar Projects Gujarat Command Area Hydrogeological Impact Assessment

Main Report

Report EX 3183 : Main Report

November 1995



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Executive Summary

Sardar Sarovar Projects Gujarat Command Area Hydrogeological Impact Assessment

Main Report

Report EX 3183: Main Report

November 1995

The Sardar Sarovar dam is part of a series of projects whereby water from the Narmada river is to be diverted for agricultural, domestic and industrial use and to generate hydropower. The Sardar Sarovar projects (SSP) form a major component in the planned integrated development of the whole Narmada river basin with important implications for development in the states of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan. The SSP is thus part of a broad and ambitious plan for the development of a large region of north-west India rather than an isolated project. The NWDT apportioned 11,100 million m³ of the waters of the Narmada river to the state of Gujarat. Of Gujarat's share, 1300 million m³ will be used for municipal and industrial water supply, the balance of 9800 million m³, augmented by local abstractions from groundwater, 3330 million m³, and by diversions from local minor rivers, 370 million m³, being used to provide irrigation over the Command Area.

HR Wallingford carried out an initial Command Area environmental impact assessment in early 1993 (HR Wallingford, 1993). The report identified the key hydrogeological environmental issues as rising groundwater levels, waterlogging, salinisation of soil and drainage. The principal objective of the study reported here is to assist the Narmada Planning Group in the environmental impact assessment they are carrying out to address these issues.

The right approach to the mathematical modelling of the Gujarat alluvial aquifer system is to select an area with natural hydrogeological boundaries. Such an area, bounded by the Aravalli Mountains in the north-east, the Gulf of Khambhat, the Rann of Kachchh and the topographic low between them in the south west, the Narmada River in the south-east and the Rajasthan border in the north-west, includes most though not all of the Narmada command and a considerable out of command tract is hereby taken as the model area. It includes groundwater recharge and discharge zones and other boundaries which can be validly represented as constant head and no flow boundaries. The aquifer system of the model area is typical of the alluvial / colluvial conditions, with the single unconfined aquifer of the outwash fan zone passing horizontally into multiple aquifers of sands and clays under the alluvial plain; this becomes increasingly clayey down gradient. The stratigraphy, and consequently hydraulic anisotropy, increases from south-east to north-west. It is considered that an appropriate method of modelling this is to treat the multiple aquifer as a two layer system, with phreatic and confined layers, with the hydraulic resistance between them increasing in the direction of increasing anisotropy. Recharge to the aquifer system is mainly by infiltration of rainfall, seepage from rivers and the drainable surplus from irrigation. Two pre-development natural discharge mechanisms are postulated. One, relevant to the phreatic zone, is seepage to the surface drainage channels during the dry season augmented to some extent by evapotranspiration by deep rooted vegetation. The second is upward seepage from the confined zone to higher aquifers and eventually to the surface at the

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coast, and in the topographic low, mentioned above, where it manifests itself as saline lakes or merely salt at the surface left behind by evaporation. At present the most important discharge component is pumpage from wells for irrigation.

For the purposes of this modelling study a sequence of annual recharges is required, for a period of say 10 years including the variation within single years of the sequence. A method was developed to compute these from actual rainfall and soil properties, ensuring that the results are compatible with the avorative estimate reported by Gujarat Water Resources Development Corporation (GWRDC, 1991).

Several estimates of groundwater abstractions are available for the area. The fullest treatments of the subject are those of the CGWB (1988) for 1984 and GWRDC for 1991 (GWRDC, 1991). On the basis of these, augmented by the UNDP (1976) work and some of the modelling reports (particularly those of ORG, 1993 and CES, 1992), a complete 10 year series of abstractions from the confined and unconfined aquifers separately for each taluka within the model area has been developed. Within a year 20% of the abstraction is assumed to occur in the Kharif with 40% in each of the Rabi and Hot seasons.

During the execution of this study inconsistencies between groundwater level maps became apparent. These inconsistencies are likely to be as a result of uncertainties as to the sources of the different groundwater level maps and the lack of information on reduced levels at well heads. It is essential that these inconsistencies are resolved at the earliest possible time.

The reasons for the different temporal variations in groundwater level and also the spatial distribution of the wells with different hydrograph shapes has yet to be established. It is extremely important that this is done in order to reach a complete understanding of the complex hydrogeological system and to predict with accuracy the impact of the proposed developments.

The distribution of groundwater quality in the Gujarat alluvial aquifer is extremely complex and distinctly three dimensional with marked areal and vertical variation. Because of the great variation in salinity and chemical composition of the groundwater of the region, credible groundwater quality modelling is not possible, in the region, except perhaps of lateral saline invasion near the discharge zone of the alluvial groundwater system. It follows that groundwater quality monitoring on a large scale is required, both to assist the farmers to make safe use of resources and to build up a data base for constructing and calibrating a useful groundwater quality model in the future.

Overall there is not a salinity problem in the Command Area. The irrigation scheme has to be operated to ensure that a salinity problem does not arise in the future. The recommendations for irrigation water use made by CORE (1982) to ensure this are justified. Most of the crops proposed for the Command Area, would not be affected by the salinities which are likely to result from the proposed irrigation development. Problems which do occur could be alleviated by an increase in the frequency of irrigation to maintain soil moisture as close as possible to field capacity. The salinity of the groundwater should be used as the criterion for groundwater use either directly or by appropriate mixing with canal water.

The highest required surface drainage rate will be about 4 l/s/ha in the south of the area although there may be scope for reducing this value depending on the soil type, cropping pattern and proportion of the area cultivated. In the north the

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value of the surface drainage rate is smaller and will be less than 2 Vs/ha. These values of the surface drainage rate should not be used for final design because they are general values which can be improved on for an individual area. This will take into account soil infiltration rates, proportion of the area cultivated and the cropping pattern.

The MODFLOW groundwater model together with the MODELCAD³⁸⁶ graphical user interface pre-processor and the MODFLOW utilities post-processor is most suitable software to simulate the key features of the hydrogeological system of the Gujarat Command Area. The best way to handle the large volumes of spatially varying data required for the groundwater modelling is by using a Geographical Information System linked to the modelling software. The IDRISI grid-based geographic and image processing system was the most appropriate for this purpose.

Sensitivity analysis indicates that changes in the aquifer properties and the river conditions can be used to fine tune model predictions, but, are unlikely to result in major changes in predicted groundwater levels. On the other hand changes in aquifer recharge and discharge is of great importance to the predicted groundwater levels.

Dynamic equilibrium conditions do not exist at the present time in the Command Area and no groundwater levels are available for the period when steady state conditions are likely to have been present. Given this situation it must be concluded that true steady state calibration against field observations is not possible. Successful steady state calibration against the pre-development conceptual model was achieved.

Despite extensive model testing successful transient model calibration has not been achieved. The main reason for this are inadequacies in the available groundwater level observations and lack of detailed understanding of the reasons for the observed groundwater level fluctuations.

Based on the latest development proposals and simulations carried out by previous consultants a programme of predictive simulations is proposed.

Because of their local knowledge and their involvement in previous hydrogeological studies in Gujarat HR Wallingford appointed a team of local consultants led by Dr C R Shah of Vadodara, Gujarat to carry out certain tasks. Subsequently, on the advice of Dr Shah, additional tasks were entrusted to other local consultants.

As part of the support given to the Narmada Planning Group computer hardware and software facilities were installed in their offices at Gandhinagar. Data in digital form and digitised maps suitable for use with the IDRISI GIS were also made available. All model data sets and results were made available to NPG. Training was provided to NPG staff in the use of the facilities. To gain the maximum benefits from the facilities provided it is recommended that the most appropriate individuals from NPG attend training courses to enhance their capabilities in the fields of GIS application and groundwater modelling.

The principal objective of this study has been to assist the Narmada Planning Group with their environmental impact assessment of the Gujarat Command Area. In order to do this the extensive studies described in this report have been carried out. It was hoped to develop and apply a groundwater model to predict the impact of the proposed developments on the hydrogeological system.

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Because of data inadequacies particularly with the groundwater level data this has not been possible. However a model has been developed, handed over to NPG and training has been given.

The proposals for implementation of a scheme such as the Sardar Sarovar Project will evolve with time. Similarly the understanding of the hydrogeological system is continually changing. In a large project of this kind, with sequential development over many years, the value of monitoring of progress and performance cannot be overestimated. Provided less ans are learned to mithis monitoring and the required modifications are made as Project implementation proceeds, the Command Area development should be entirely successful.

It is essential that the monitoring data is utilised. NIGAM should establish a Groundwater Cell which will have responsibility for hydrogeological analysis and groundwater modelling. When the SSP reaches the operational phase this Cell would have a major role to play in the water management of the Command Area.

The report of these studies consists of this main report together with thirteen Working Papers and a large volume of additional supporting documentation. A full list of all project documentation is given on the Contents page of this Main Report.

MINUTES OF THE 2ND MEETING OF FLORA, FAUNA AND CARRYING CAPACITY ASPECTS OF UPSTREAM ENVIRONMENT OF SARDAR SAROVAR AND NARMADA SAGAR PROJECT HELD ON 26.9.1996 IN THE COMMITTEE ROOM OF NCA'S LIAISON OFFICE AT NEW DELHI.

A meeting of the concerned officers of the state government and investigators of the study reports on various aspects of Flora, Fauna and Carrying Capacity was held in the Committee Room of NCA's Liaison Office at New Delhi on 26.9.1996. The meeting was co-ordinated by Shri R.S.Varadarajan, Member (E&R), NCA.

Shri R.S.Varadarajan, Member (E&R) welcomed the participants to the 2nd meeting and discussion on the agenda item was taken up thereafter. A list of the participants is enclosed as Ammexure-Min.II(1).

ITEM NO.11-(1):REVIEW OF THE CURRENT STATUS OF THE STUDIES AND PRESENTATION OF THE MAIN RECOMMENDATIONS.

Member (E&R), NCA briefed the members of the background for convening this IInd meeting. He pointed out that during the last 15 years or so a large number of studies have been conducted by the various investigating agencies on the aspect related to flora, fauna and carrying capacity of Sardar Sarovar and Narmada Sagar Project. He referred to the first study report by MS University, Vadodara carried in 1982 and the latest study on flora and fauna aspect being compiled by School of Environmental Sciences, Pune University in 1996. He drew the attention of the members to the fact that a lot of data has been generated through these studies and now the time has come for collating the information contained in these report and for putting it to productive use for ecological sustainability. Member (E&R) requested the investigators to present the main findings and recommendations of their study report.

Prof. V.R.Gunale, Project Director, SSP Research Scheme, Deptt. of Botany, University of Pune presented the report on the studies carried out by his team to highlight the important findings and recommendations. He informed that the report is presently under finalisation to incorporate the recommendations of the NCA and he assured that the final report would be available soon.

Shri D.P.S.Verma, CCF, Vadodara presented the report of MS University, Vadodara entitled "Eco-Environmental and Wildlife Management Studies in the Sardar Sarovar area in Gujarat, 1992", and report entitled "WildLife Management Studies in the submergence and catchment area of Narmada Project with "special reference to Shoolpaneshwar Wildlife Sanctuary", prepared by Dr.S.A.Chavan, Addl. Chief Conservator of Forests, Govt. of Gujarat. He elaborated the action plan prepared by expert multi disciplinary group on development of Shoolpaneshwar sanctuary in Gujarat.

Dr.R.K.Pandey, Sr.Scientist, SFRI, Jabalpur presented the report entitled "Impact Assessment of Madhya Pradesh Land to be submerged under SSP and adjoining Ecosystems prepared by the State Forest Research Institute (SFRI), Jabalpur 1994" on behalf of the research team of the SFRI. He highlighted the main recommendations contained in the report and also the salient features of the felling plan prepared by SFRI for migration of the wild animals from submergence area to the adjoining safer places.

Prof. K.S.Rao of Vikram University, Ujjain presented the report entitled "Pre and Post-Impoundment Limnological studies of Narmada Basin, prepared jointly by three universities coordinated by Barakatullah University", on behalf of his team members. He highlighted the important recommendations of the study group including long term hydrobiological monitoring for protecting aquatic ecosystem.

Mr.J.J.Dutta, Ex.PCCF, Madhya Pradesh on behalf of Friends of Nature Society, Bhopal presented a report entitled Wildlife Retrieval and Conservation Plan for Indira Sagar Project, prepared by Friends of Nature Society, Bhopal, 1994". He presented the retrieval and conservation plan prepared for protection of Flora and Fauna of the submergence area of Narmada Sagar Project.

Dr.Asha Rajvanshi, Sr.Scientist of Wildlife Institute of India on behalf of Wildlife Institute of India presented a report entitled Impact Assessment studies of Narmada Sagar and Omkareshwar Projects on Flora and Fauna with attendant Human Aspects prepared by Wildlife Institute of India, during 1994. She highlighted the important recommendations of the study group. She emphasised that the recommendations of the study group are based, in addition to field studies, on use of Remote Sensing Technology and Geographic information system.

Shri O.P.Mishra, Deputy Director, BSI presented the findings of his study on flora of Narmada valley carried out by him during 1986. He also presented publications by the BSI on the flora of Narmada valley placed at Annexure-Min.II(2). He, further informed that a detailed publication on flora of the entire Narmada valley was on the anvil.

Dr.Pawan Kumar, Specialist (Env.), NCA summing up the presentation of the report pointed out that the study reports are required to be reviewed for preparing joint action plan for achieving ecologically sustainability in the basin area.

ITEM NO.II-(2):ACTION PLAN ON FLORA & FAUNA : ISSUES TO BE COVERED UP.

Specialist (Env.), NCA drew the attention of the members to the objectives set forth in the agenda paper aimed at achieving ecological sustainability. He indicated that the time had come for putting these studies to the intended use with respect to the parameters listed in the agenda viz.

 Survey of flora and fauna in the region going to be affected due to implementation of the scheme;

All the investigators reported the presence of a large number of animal and plant species some off which were not reported from this region earlier. However, none of the species was found to be endemic.

Gene-pool, if any, likely to b affected;

Shri D.P.S Verma, CCF, Vadodara informed the members that although no endemic flora and fauna is present within the submergence area of SSP yet the germ plasma of a species considered rare by the study team was preserved through tissue culture. Shri O.P.Mishra,Dy.Director, BSI expressed the opinion that the plants and trees although present elsewhere but if found rarely in the Narmada valley area, may be included in the plantation programmes of the project authorities within the catchment.

As most of the species found in the region were cosmopolitan. The construction of the project was not likely to affect gene-pool of any animal or plant species.

- Details of wildlife habitats in the region;
- Measures proposed to rehabilitate endangered species of flora and fauna, if any;
- Assessment of the carrying capacity of the neighboring areas wherein the wildlife would disperse if the scheme is implemented'
- Plan for rehabilitation of endangered flora and fauna.

Specialist (Env.) requested the experts to review and discuss the findings of the investigators for the purpose of evolving common recommendations for implementation.

- Following points were emerged from the discussions that followed.
- All the study reports described the wildlife habitats within the area of their studies and measures proposed to rehabilitate the endangered species of flora and fauna.

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The important measures recommended as they relate to SSP by the study groups included enlargement of the Shoolpaneshwar sanctuary located in Gujarat. This sanctuary was earlier known as Dhumkhal Sloth Bear Sanctuary whose area was 153 Sq.Km. It was informed that the area of the sanctuary was enlarged initially upto the shore line of the reservoir to enable animals of the sanctuary to have access to the fresh water. Later the area of the sanctuary was further menlarged to mover up a total area of about 60% Sq.Km.

Dr.R.K.Pandey of SFRI, Jabalpur brought to the notice to the members of the recommendations made by the study team for creation of protected areas, one each on either bank to the Narmada in Madhya Pradesh. He pointed out that although the wildlife present the impact area of the SSP is very less and is confined only to whatever vegetative growth present along the river course. After discussions it emerged that creation of protected recommended by the SFRI within the impact zone of SSP is not the agenda of the state government of Madhya Pradesh. Mr.Sonakia, CF, Wildlife, GOMP informed that GOMP already selected certain areas for covering under protected areas, national parks or sanctuaries in accordance with the guidelines issued by Govt. of India and that the proposed by SFRI are not covered up in the state plans.

Dr.Asha Rajvanshi of Wild Life Institute pointed out that unless casual factors of the degradation of the area are removed, it would be difficult to preserve the integrity of the protected areas. Mr.Sonakia suggested that the situation where certain areas are first notified as reserved and later dereserved with public pressure, should be avoided. He referred to the denotification of the part of the sanctuary areas in Gujarat and expressed the opinion that such denotification are not in the interest of ecological sustainability and might only be resorted to rarely under exceptional circumstances.

Members were of the opinion that creation of any kind of protected areas in Madhya Pradesh in view of the report produced by SFRI is not desirable instead it would be better if carrying capacity of the adjoining areas is improved through adopting suitable measures and the wildlife is allowed to settle in these areas.

Shri Arjun Singh, Secretary (Narmada), Govt. of Gujarat suggested that Shoolpaneshwar sanctuary might be considered for accommodating the wildlife that may be moved out from the submergence area not only from Gujarat but also from the adjoining districts of Maharashtra and Madhya Pradesh.

Prof. V.R.Gunale of the Pune University stressed that the areas in Maharashtra were poor in wildlife and required no specific measure like creation of protected area or sanctuary. He pointed out that only part area of the forests of district Dhule were impacted by the submergence and that there were forest areas contiguous to the forest patches coming under submergence. He, however stressed the need for improving the carrying capacity of the adjoining areas for which his study team had made some suggestions for prantations under programme of catchment area treatment and compensatory afforestation in the vicinity of the submergence area.

Dr. Asha Rajvanshi from Wildlife Institute gave details of the recommendations as they relate to Narmada Sagar Project made by their study team for creation of Sormanya & Omkareshwar sanctuaries spread to 163.7 & 119.96 sq.km. area. Besides Narmada national park spread to 475.22 sq.km. within the impact zone of Narmada Sagar, Maheshwar and Omkareshwar project, all upstream of SSP, Shri Suresh Member (E&F), NVDA informed that Chandra, recommendations of the study group were already accepted by the NVDA and the proposal had been forwarded to the government for consideration. Mr. Sonakia informed that recommendations of the study group were being implemented in a phased manner.

ITHM MO.II-(3): ACTION PLAN FLORA AND FAUNA: BASIN WIDE APPROACH.

After detailed discussions on the need for bringing up action plan on flora and fauna on the basin wide approach, it was agreed that the action plan for protection of flora and fauna may be prepared on project to project basis. It was agreed that there would be one plan for SSP and capable: for NSP Complex.

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ITEM NO.II-(4): REVIEW OF THE STATUS OF THE IMPLEMENTATION WORKS.

SARDAR SAROVAR PROJECT

Govt. of Maharashtra

Prof. V.R..Gunale stated that in the interim reports of School of Environmental Science, Pune, Geomarphological features of the area where simulated using GIS technology and that he would examine if the data generated can be used for delineating the island which may form during and after filling of the reservoir. He suggested that, Specialist (Env.), NCA may like to visit the institute for having a detailed discussion with his team members on the subject. He agreed to include the above aspect, if found feasible, as final report was under process. He pointed out corridors for migration of wild animals from the submergence the adjoining forest areas were not required Maharashtra. It was informed that the felling of the forest trees from the submergence areas was already under progress and that the submergence area was contiguous to the forest area of district Dhule and most of the forest area within the directly draining subwatersheds had been treated up by Govt. of Maharashtra. Now only minor works for providing salt-lics and water holes may be considered in addition to planting up of the species recommended by the study group of the University of Pune.

Gowt. of Gujarat

Shri D.P.S.Verma, CCF, SSP informed that all the vegetative growth from the submergence area of SSP including the coppice growth had been removed and that wildlife had already moved from the submergence area. He, further informed that the entire catchment area of the river Narmada in Gujarat, of which 90% of the area was forest had been treated up with soil moisture conservation works and was already reforested. Besides the action plan had also been prepared for development of Shoolpaneshwar sanctuary. According to him there was no scope for further work within the catchment.

Gowt. of Madhya Pradesh

In Madhya Pradesh, it was informed that most of the forest area coming under submergence were heavily degraded and creation of protected area in this region was not on the agenda of the state government. Besides, it was also not felt necessary by the members. Steps for improving the carrying capacity of the adjoining forest areas to which wild life from the submergence area was expected to migrate may have to be considered by the state government while implementing the catchment area treatment plans for the forest areas.

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NARMADA SAGAR PROJECT

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Govt. of Madhya Pradesh

Regarding Narmada Sagar Project, it was informed that the recommendations of the study groups of Wildlife Institute had been accepted by the state government, and are under implementation.

Shri.J.J.Dutta, (Ex.PCCF, GOMP) Friends of Society, Bhopal informed the members that the plan prepared by the study team had considered the formation of island during the progressive filling of the reservoir and measures have been planned to protect the wildlife from getting trapped on the island to be formed in intermediate stages of the filling of the reservoir. He, stated that details of the island to be formed after the reservoir was filled up fully have also been worked out and recommendations for declaring these areas as protected have been made. informed that the study team had also made recommendations for the creation of certain wetland and that the plans prepared by the study groups had been accepted by the NVDA, however, implementation of the plan was awaiting submergence.

Meeting ended with a vote of thanks to the chair.

ANNEX - II - MIN. (1)

LIST OF PARTICIPANTS ATTENDING THE 2ND MEETING ON FLORA, FAUNA & CARRYING CAPACITY ASPECT OF SSP & NSP ON 26.9.96 AT NCA, NEW DELHI.

Narmada Control Authority

- 1. Shri R.S. Varadarajan, Member (E&R), NCA, Indore.
- 2. Dr. Pawan Kumar, Specialist Environment, NCA, Indore.

Government of Gujarat

- 1. Shri Arjun Singh, Secretary (R&R), GOG.
- 2. Dr. D.P.S. Verma, CCF, Vadodara.

Government of Maharashtra

- 1. Shri V.S. Dhongde, Director (Env.) GOM, Mumbai.
- 2. Dr. V.R. Gunale, Project Director, SSP Research Scheme, Deptt. of Botany, University of Poona, Pune.
- 3. Dr. D.R. Shirke, Principal Investigator, SSP. University of Poona, Pune.

Government of Madhya Pradesh

- 1. Shri Suresh Chandra, Member (E&F), NVDA, Bhopal.
- 2. Shri Ajit Sonakia, C.F (Wild Life), GOMP, Bhopal.
- 3. Shri R.K. Behre, Subject matter Specialist (Hydrology & Sediments), NVDA, Bhopal.
- 4. Shri O.P. Mishra, Deputy Director, Botanical Survey of India, Allahabad.
- 5. Dr. Asha Rajvanshi, Wildlife Institute of India, Dehradoon.
- 6. Dr. K.S. Rao, Vikram University, Ujjain.
- 7. Shri J.J. Dutta, IFS (Retd.), FONS, Bhopal.
- 8. Shri P.S. Mehta, IFS (Retd.), FONS, Bhopal.
- 9. Dr. R.K. Pandey, Senior Scientist, SFRI, Jabalpur.

TORATE OF HEALTH SER

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Date: T-3/23/D-7

. August, 17 1995

Member(E & R)

2nd floor, 27-Press Complex, Narmada Control Authority, A.B.Road,

Indore-452 CO8.

(Madnya Pradesh)

Subject: - Status Report on Environment Safeguard Measures for the quarter ending 31st March 1996.

Reference: - Your letter No.Env.4/(6)/95/902, dtd.9/10-7-1996.

Sir,

Please refer to your letter No.Env-3292)/96/553, dated the 22nd April 1996 addressed to the Secretary to Govt.of Maharashtra(Env), Environment Department, Bombay-32, on the subject mentioned above.

The following Health Schemes in Sardar Sarovar Project have been sanctioned by Government of Maharashtra, vide Bovt. Resolution, Public Health Department No.MISC-1095/5/CR-I/PH-4, Dated the 15th Wovember 1995. These are functioning properly. The position of staff is as under:

Sr.No. Wame of Scheme	schemes sanction	No.of post - sanct- ioned.	No.of post
l) Sanction of Laboratory facilities in Primary Health Centres of a catchment area.	One	16	14
2) Establishment of Sub-Centre Dispensaries	3 Disps.	18	15
3) Establishment of Floating Dispensary	One	5	4
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नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल
Environment Sub-Group

उनतीसवीं बैठक की कार्यवृत Minutes of the Twenty Ninth Meeting

> 15 नवम्बर, 1996 को पर्यावरण भवन नई दिल्ली में हुई

Held at
Paryavaran Bhawan
New Delhi

on 15th November, 1996

इन्दौर

दिसम्बर, 1996

INDORE

December, 1996

HINUTES FOR 29TH HEETING OF THE ENVIRONMENT SUB-GROUP NCA HELD ON 15.11.1996, AT PARYAVARAN BHAWAN, NEW DELHI.

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MINUTES OF 29TH MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 15TH NOVEMBER, 1996 AT PARYAVARAN BHAWAN, NEW DELHI

Additional Secretary, Min. of Environment & Forests, Govt. of India on behalf of the Chairman of the Sub-Group welcomed the participants to the 29th meeting as the Chairman joined the proceedings a little later. A list of participants is enclosed at Annexure-XXIX-Min.1

Item No.XXIX-1(138):

CONFIRMATION OF MINUTES OF THE 2879 MEETING.

Minutes of the 28th meeting of Environment Sub-group of Narmada Control Authority as circulated to all Members and invites vide letter No.Env-34(28)/96/1027-52 dated 19th June, 1996 were confirmed.

Item No.XXIX-2(139): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

- 1. Submission of Catchment Area Treatment (CAT plans for freely draining critically degraded sub-watersheds Altem No.XXII-2(112).
- a) SUBMISSION OF MICRO WATERSHED PLAN FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS BY GOVT.OF MAHARASHTRA AND MADHYA PRADESH.

GOVERNMENT OF MADHYA PRADESH

NARMADA SAGAR PROJECT

Member (E&F), NVDA informed that scheme for treatment of 73,328 ha of forest land from 40 sub-watersheds were prepared and sent to National Afforestation and Eco-Development Board (NAEB) during 1995-96. Sanction from NAEB is awaited.

Simultaneously, however, sanction was received from River Valley Projects (RVP) scheme for the schemes covering an area of 1,986 ha from 2 sub-watersheds submitted to RVP earlier.

SARDAR SAROVAR PROJECT

Member (E&F) of Narmada Valley Development Authority informed that schemes for treating an area of 15,539 ha from 12 sub-watersheds submitted by NVDA were under consideration under the RVP programme of GOI. A few other schemes covering an area of about 10,000 ha were being submitted for seeking funds under RVP programme.

Regarding progress of work, it was informed that out of 8,237 ha of forest and non-forest land being funded by Min. of Agriculture about 1,285 ha of forest and 2,107 of non-forest area was treated up.

The Sub-Group was informed that in pursuance of the suggestions made by the Sub-Group earlier. District Collectors were approached for granting of funds under schemes like Employment Assurance Scheme (EAS), Jawahar Rojgar Yojna (JRY) and Rajiv Gandhi Mission but the grant provided by the collectors were very meagre.

After a detailed review of the progress on the plans and their implementation for Phase-II areas in Madhya Pradesh, the Chairman directed that a copy of CAT plans of GOM & GOMP alongwith maps, should also be submitted concurrently to the Narmada Control Authority (NCA) eventhough submitted to the agency funding the programme. The NCA after reviewing these plans may forward them with their observations to the Ministry of Environment & Forests.

COVERNMENT OF MAHARASHTRA

Shri M.K. Jiwrajika, Officer on Special Duty, Govt. of Maharashtra informed that the five schemes covering forest areas from sub-watersheds Na 2n, Na 6k, Na 7a, Na 7c and Na 6f were approved by the Min. of Agriculture and that the work had already commenced. He, however, stated that the information about agricultural area which forms the major portion of the Phase-II programme were not available with him.

The Sub-Group noted the progress of forest areas furnished by OSD, GOM but expressed the concern as sub-group could not review the progress of works on non-forest areas due to the lack of information and absence of concerned officers of the Govt. of Maharashtra, during the meeting.

During the meeting it was noted that various agencies, funding the catchment area treatment programmes, normally provide the funds, for maintaining the works, mostly for a three years period which may not be adequate for sustaining the works over a longer period. After detailed discussion on the subject, it was suggested that the issue for raising funds for a duration of five years instead of three years as being practised now may be taken up in the appropriate fora by the concerned departments & also the NCA.

b) FUNDS FOR TREATING CRITICALLY DEGRADED, DIRECTLY DRAINING SUBWATERSHEDS IN MADHYA PRADESH.

Member (E&F), NVDA, GOMP informed that a proposal on the issue of waiving the limits imposed on funds required for GAT works related to SSP, had been sent to the State Government. A formal request from GOMP would be reaching the Chairman of the sub-group for taking up the issue with Planning Commission at the Govt. of India level very soon.

The Chairman agreed to help GOMP in getting a waiver on the limits imposed on CAT works but pointed out that raising the funds for treatment of directly draining sub-watersheds is the responsibility of the state government and they have to comply with the directives for treating these areas Pari-Passu with the construction work failing which they may have to face logical consequences.

c) SILT MONITORING POSTS:

On the issue of installing Silt Monitoring Stations for measuring the sediment outflows during pre and post impoundment phases of CAT programme, NVDA pointed out that the designs being followed in Gujarat for monitoring silt flow could not be replicated in Madhya Pradesh due to obvious reasons. ADC, ICAR informed that enough data on erosion in various soil type & terrain was available from various stations setup by the ICAR & might be used instead

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of collecting this data afresh unless otherwise specific data is required by the sub-group.

Member (E&F), NVDA further informed that the micro watersheds have already been identified and that topographic survey was going on. Submission of the detailed plans and results were promised by the next meeting of the sub-group.

After detailed discussion the sub-group observed that the conditions in Gujarat may be different from that of Madhya Pradesh requiring a different set of criteria for installation of these stations and considering that GOMP have already taken steps for monitoring the sediment outflows, it was suggested that the monitoring of silt outflows may be started expeditiously under the guidance of Central Soil and Water Research and Training Institute, Dehradun and or ADG/DDG, Soil Sciences of ICAR.

2. Cost Estimates for preparation of Action plan and implementation of environmental safeguard measures (Item No.XXII-2(112)(2)).

While reviewing the cost estimate and expenditure on environmental issues. Additional Director, Min. of Environment & Forests, GOI pointed out that during the earlier meetings of the sub-group, it was suggested that the studies being taken up by GOG on the Command Area Development works might be categorised on the basis of the issues addressed in each report and only those reports which directly relate to the environment or to issues suggested by the sub-group be included. Dr.S.A.Chavan informed that the suggestions given earlier are being taken care of by Executive Member, Narmada Planning Group and the cost estimate would be framed after completion of the needed studies.

Prof. S.Ramaseshan requested copies of the report related to the ground water modeling studies for his perusal and observations. Chairman desired that one copy each of the report may be made available to Prof. Ramaseshan by GOG to enable him to communicate his observations before the next meeting of the sub-group.

The information presented at Annexure-XXIX-2 of the agenda was updated on the basis of information supplied by GOG and Madhya Pradesh. However, information related to GOM was not available. The picture that emerged after updating by GOMP and GOG is placed at Annexure-XXIX-Min.2.

3. Establishing a separate authority for coordinating Environmental works in Maharashtra (XXVIII-3(136)(1)).

The Sub-group was informed that the issue of establishing a separate authority to address Environmental issues in Maharashtra was suggested for follow-up during the

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26th meeting. No information on the issue however was received from GOM.

The Chairman observed that in the absence of the needed information from GOM on various aspects it has not been possible for the sub-group to review the progress of works. Therefore, he directed that a letter in this regard may be addressed to the Chief Secretary of the GOM.

4. Publications on Environment

(XXVIII-3(136)ii/-3(136)v/3(136):

Regarding compilation of a scientific document on the works being done by the project authorities on environmental aspect of SSP and NSP, NVDA informed that GOMP had entrusted the task for the areas in MP to the publicity wing and the thrust areas were being identified. The GOG informed that scientific documentation in the areas of ornithology and bio-diversity was under compilation. Prof. Ramaseshan, however, suggested that, one single document for the project with active interaction of NCA on delineation of the implementation of the engineering aspects with environmental control may be useful. In this connection, he referred to the report of the sub-committee appointed by the sub-group, on the issue related with closure of construction sluices, for bringing environmental considerations under control during an important engineering operation.

During discussion it was agreed that the state government(s) should prepare the document as planned by them & then it could be presented to the sub-group for a review on the lines suggested by Prof.Ramaseshan, if considered necessary.

I tem No.XXIX-3(140): PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS.

1) PHASED CATCHMENT AREA TREATMENT

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11) COMPENSATORY AFFORESTATION

Sub-Group noted the information contained in the agenda and desired that the detailed, updated information on the progress of these works in relation to progress of works on the project may be submitted by the NCA for a review during the next meeting.

iii) COMMAND AREA DEVELOPMENT

Narmada Sagar Project

Covt. of Madhya Pradesh

The Sub-Group was informed that Terms of Reference for the Command Area of the NSP annexed with agenda papers of the 27th meeting were being modified. Member (E&F), NVDA, requested GOG to provide a copy of the TOR/studies prepared by GOG for the Command Area of the SSP.

Regarding progress on the studies related to contamination of surface and ground water by Agro Chemicals runn off from the fields, the sub-group was informed that the posting of staff and purchase of equipment and consultation of literature was under progress.

Sardar Sarovar Project

Govt. of Gujarat

Dr. S.A.Chavan, Additional Chief Conservator of Forests, GOG informed that Dr.Mahesh Pathak, Executive Member, NPC, after his return from abroad, would contact the concerned officers of the ICAR for their help in categorisation of the report on the basis of the issues addressed in each of them and report to the sub-group soon.

Referring to the EIA studies of the Black Buck National Park, located in the command area of the SSP. Chairman desired that Wild Life Institute of India may also like to look into the report for providing scientific inputs.

Prof.Ramaseshan referring to the studies on Hydro Geological Impact Assessment carried out by HR Wallingford, pointed out that there were inconsistencies in the report. For detailed observations he requested a copy of the main report. The Chairman desired that a copy of the report should be supplied to Prof.Ramaseshan at the earliest.

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Govt. of Rajasthan

Shri S.S. Mann, Chief Conservator of Forests and Additional Secretary (Env.), Govt. of Rajasthan informed the sub-group that final report of the WAPCOS might be available by the end of this month.

iv) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

Narmada Sagar Project

The Information contained in the agenda papers was noted by the sub-group. Member (E&F), NVDA informed that the issue of creation of protected areas in MP was under consideration of the government. Dr.Mathur of the Wild Life Institute of India informed that he had received a communication from Conservator of Forests, Wild Life, Govt. of M.P. regarding acceptance of the proposal contained in the report produced by Wild Life Institute of India.

The Chairman pointed out that creation of the protected area/national park is a long drawn process and requires spirited follow up. He desired to know the correct status regarding issuing of requisite notification. He directed that this issue should be monitored closely and he offered to write a letter to the state government for speedy implementation of the recommendations.

Sardar Sarovar Project

The GOG submitted a copy of the final action plan on development of Shoolpaneshwar sanctuary prepared by Dr.Sanat A.Chavan and published by Narmada Planning Group, GOG. A copy of the action plan is placed at Annexure-XXIX-Min.3.

v) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Narmada Sagar Project

Covt. of Madhya Pradesh

The Sub-group was informed that the report on the studies of Joga Fort in relation to the submergence by backwater effect was awaited from ASI.

Member (E&F), NVDA made available a sample copy of the booklet brought out by GOMP in accordance with the suggestions given by the sub-group which is placed at Annexure-XXIX-Min.4.

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Sardar Sarovar Project

Govt. of Madhya Pradesh

The Sub-Group was informed that delineation of reduced level(s) of some of the monuments was under progress and that detailed information might be supplied within a fortnight. Member (E&F), NVDA informed that in an effort to review the available report on archaeological aspects presently, a report produced by DECON College, Pune is being reviewed.

Govt. of Gujarat

Additional Chief Conservator of Forests, COG informed that construction of a new Shoolpaneshwar temple was completed in all respect and that an expenditure of Rs.54,91,665/- was incurred on the same. He further informed that construction of a new Hamfeshwar temple was in progress and about 50% of the work on this temple was already completed.

Regarding submission of 35 mm colour slides of old and new temple, he informed that as only one set was made available to SSNNL by the concerned dept., it was being duplicated for sending to NCA for official use.

ANTHROPOLOGY

Sardar SArovar & Narmada Sagar Projects

Covt. of Madhya Pradesh

The Sub-Group was informed that the issue of providing the benefits of reservations to the PAPs of MP in Gujarat (host state) on the lines these were available to them in their home state (M.P.) was under consideration of the Min. of Welfare.

OSD, GOM pointed out that similar benefits should also be extended by Gujarat to the PAPs from Maharashtra.

The Chairman suggested that restoring the benefits to the PAPs may require only a notification for revising the schedule of the constitution and suggested that the present position might be checked up and needed steps may be taken up accordingly, by the concerned officials at the earliest.

Regarding procurement of publication related to tribals of Narmada from AnSI by NVDA, sub-group was informed that as some of the volumes were out of print, these could not be procured and that these would be obtained as soon as these were available with An.S.I.

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vi) SEISMICITY AND RIM STABILITY OF RESERVOIR

Narmada Sagar Project

Govt. of Madhya Pradesh

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The Sub-Group was informed that Narmada Control Board, Govt. of Madhya Pradesh had cleared the proposal for procurement of the imported Seismic instrument and that the orders were being placed.

Sardar Sarovar Project

Shri R.S.Varadarajan, Member (E&R), NCA brought to the notice of the sub-group, the observations of GSI, CWPRS and Prof.Ramaseshan, on the suspected water loss from the river Narmada. Prof.Ramaseshan reiterated that he is of the view that further studies, though suggested by CWPRS, may not be necessary. Chairman directed that observations of Prof. S. Ramaseshan may be forwarded to the CWPRS for a consideration. He, further directed that till such time a decision for taking up further studies is arrived at by the sub-group no further studies on this aspect should be taken up.

vi) HEALTH ASPECTS

Narmada Sagar Project.

GOMP presented a detailed cost estimate for the facilities proposed for the residents of the impact area of the Narmada Sagar Project. Details are placed at Annexure-XXIX-Min.5.

Regarding Epidemeoligical surveillance studies, subgroup was informed that the survey has been completed by Gandhi Medical College, Bhopal and that 5th interim report of the college would be available soon.

Sardar Sarovar Project

Detailed cost estimates for the facilities proposed for the residents of the SSP impact areas submitted by NVDA is placed at Annexure-XXIX-Min.6.

Regarding report on surveillance in the SSP area Member (E&F), NVDA informed that the final report of the Gandhi Medical College would incorporate the recommendations for the SSP areas also.

Govt. of Gujarat

The Sub-Group was informed that action plan on health aspect was under finalisation. The GOG had already taken steps for providing needed facilities to the people at the project sites and also on the periphery of the reservoir.

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Copy of the report submitted by GOG is placed at Annexure-XXIX-Min.7.

Govt. of Maharashtra

The Information contained in the agenda papers was noted by the sub-group.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR

Member (E&F), NVDA informed that the plan on Fisheries Development and Conservation was already approved by NVDA and that it would be possible to submit this plan within $15\,$ days time.

Regarding preparation of the draft guideline by Shri Chatterjee, GOMP informed that the work was entrusted to Dr.Dubey by the expert group of the Narmada Control Authority and that Mr.Chatterjee had approached Fisheries Development Commissioner of Ministry of Agriculture for the needful.

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Item No. XXIX-5(141): ANY OTHER ITEM

1) CONSTRUCTION PROGRAMME OF SARDAR SAROVAR PROJECT.

The Sub-Group was informed of raising the height of the dam to 110 mt no brought out in certain newspapers. The issue was discussed & it was directed that the datailed progress on the status of construction vis-a-vis status of implementation of the Environmental Safeguard Measures may be presented to the sub-group during its next meeting.

2) CATCHMENT AREA TREATMENT OF BARGI RESERVOIR.

Shri V.P.Singh, CCF (C), Western Region, MOEF, COI, Bhopal brought to the notice of the sub-group the issue related to the treatment of catchment area upstream of Bargi reservoir. He was of the opinion that being a part of Narmada river basin this issue might also be discussed by the sub-group.

Vice-Chairman, NVDA expressed the opinion that as the issue raised relate to the project other than the Sardar Sarovar and Narmada Sagar, this was beyond the scope of the sub-group and therefore couldn't be discussed.

The Chairman, however, directed that the the point brought out by CCF, Bhopal might be examined, keeping in view the objections raised by Vice-Chairman, NVDA and should be presented for a review by the sub-group during its next meeting.

3) CAT WORKS IN MAHARASHTRA - COST ASPECTS.

Specialist (Env.), NCA brought to the notice of the sub-group that NCA in its 55th meeting held on 13th Nov.96 while reviewing the cost estimates of CAT works in Maharashtra desired that this aspects may be looked into by the Environment sub-group. It was pointed out that the cost of CAT varies with erodibility, land use pattern, slope condition, daily wages, ascessibility, terrain etc. and may require a detailed consideration during review of the estimates.

The Chairman suggested that the issue of cost estimates for the treatment of catchment in Gujarat. Maharashtra & M.P. may be examined by NCA officers. The concerned department(s) of the state & central Govt. may also be consulted.

The Chairman desired that detailed observation might be putup for a review by the sub-group during its next meeting.

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DATE & VENUE OF THE NEXT MEETING :

TENTATIVE DATE: FORENOON OF THE 27TH JANUARY, 1997.

ANNEXURES

ANNEX. XXXI.Min-(1).

LIST OF PARTICIPANTS OF THE 29TH MEETING OF ENVIRONMENT SUB-GROUP HELD ON 15TH NOVEMBER, 1996 AT NEW DELHI.

GOVERNMENT OF INDIA

Ministry of Environment & Forests

- Shri T.K.A. Nair, Secretary, Ministry of Environment & Forests, New Delhi.
- 2. Shri Vishwanath Anand, Addl. Secretary, MOE&F, New Delhi.
- Shri V.P. Singh, CCF (C), RO, MOE&F, Bhopal. 3.
- Dr. (Mrs.) Nalini Bhatt, Add. Director, MOEF, New Delhi.

Narmada Control Authority

- Shri A. Sekhar, Member (Civil), NCA, Indore.
- Shri R.S. Varadarajan, Member (E&R), NCA, Indore.
- Dr. Pawan Kumar, Specialist (Env.), NCA.

Sardar Sarovar Construction Advisory Committee

Shri Jhujhar Singh, Dy. Secretary, SSCAC, Vadodara.

Indian Council of Agricultural Research, New Delhi.

Dr. P.S. Pathak, ADG (Agroforestry), ICAR, New Delhi.

Archaeological Survey of India, New Delhi.
1. Shri R.S. Bisht, Director, ASI, New Delhi.

Wildlife Institute of India, Debradun

Dr. Vinod B. Mathur, Scientist, WLI, Dehradun.

Indian Institute of Communicable Diseases, New Delhi.

Dr. Gautam Biswas, Dy. Director, NICD, New Delhi.

COVERNMENT OF MADHYA PRADESH

- Shri Nanhey Singh, V.C., NVDA & Principal Secretary, GOMP. 1.
- Shri Suresh Chandra, Member (E&F), NVDA, Bhopal
- Shri R.K.Bahere, Specialist (Hyd. & Sedi.), NVDA, Bhopal. 3.

COVERNMENT OF CUJARAT

Dr. Sanat A.Chavan, Addl.CCF, GOG, \$SPA, Gandhinagar.

GOVERNMENT OF MAHARASHTRA

Shri M.K.Jiwrajika, O.S.D. (Projects), COM.

GOVERNMENT OF RAJASTHAN

Shri S.S.Mann, CCF & Addl.Secretary Env., GOR, Jaipur.

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EXPERT MEMBERS

- Dr. R.K. Katti, Prof., UNEECS, Bombay.
- 2. Dr. S. Ramasheshan, Prof. (Retd.), Chennai.
- 3. Dr. Shekhar Singh, IIPA, New Delhi.
- B.G. Verghese, CFPR, New Delhi.

ENVIRONMENTAL COST OF SSP

RELATED TO UNIT I & II DAM & POWER HOUSE :

A) Expenditure by project authorities:
i) Cost of Survey & Studies (in lacs.)

		E sti	mate/Actua	l Expenditu	ıre	
٥.	Component	GOG	GOM	GOMP	NCA/GOR	Total
G	ompensatory Affores-	4.52	<u>5.29</u>	2.44	-	12.25
	ation	4.52	5.29	2.44		12.25
_						
	atchment Area	8.77	7.00	3.28	-	19.05
T	reatment.	8.77	7.00	2.80	_	18.57
F	lora & Fauna	101.84	<u>38</u>	20.33	15.27	175.44
•		80.47	$\frac{30}{16}$	17.63	15.27	$\frac{129.37}{129.37}$
H	eal th	$\frac{2.5}{2.5}$	10	<u>29.63</u>		42.13
		2.5	2.5	27.84	-	32.84
٨	wahaaalaay/Anthwa	1 2	NÃ	50.00	-	60.3
	rchaeology/Anthro- ology.	$\frac{1.3}{0.60}$	NÀ	<u>59.00</u> 36.33		<u>60.3</u> 36.93
þ	orogy.	พ.อพ	•	30.33	_	30.33
S	eismicity & Rim	N.A.	NA	23.00	1.98	24.98
	tability.			12.50	1.98	14.48
C	ommand Area Development	11.25	-	-	N.A.	11.25
		11.25				11.25
			Ψo	tal - (i)		345.4
				(1)		255.69
	ost of Implementation (i					
	ompensatory Affo-	1809.10	2116	1800.000	~	5725.1
Г	estation.	1707.66	1650.27	828.58		4186.51
C	atchment Area	3509	2894.67	8835.05	_	_15238.72
	reatment.	2674.77	2218.26	2867.69		15238.72 7160.72
	lora & Fauna inclu-	<u>75.31</u>	NA	<u>NA</u>	-	<u>75.31</u>
	ing Shoolpaneshwar	64.42		Ni 1		64.42
٦r	isheri e s	-	<u>102.10</u>	-	-	<u>102.10</u>
Н	ealth (incremental	3800.0	546.60	1354.63	-	5701.23
	expenditure) for 10 yrs.	192.28	9.26	521.20	•	722.74
	rchaeology/Anthro-	156.00		700		856
P	ology.	95.55		44.93		140.48
c	olomiaity & Dim	1 20	_		_	120
	eismicity & Rim tability.	<u>129</u> 271	_			<u>129</u> 271
د	100111 67 1	~/ I				D/ .L
C	ommand Area Development.	N.A.	-	-	N.A.	-
			Tot	al - (ii)		27827.46
						<u>27827.46</u> 13145.8
			-	al: (i & i		_28172.86

1. Introduction:

The Sardar Sarovar Project seeks to integrate environmental parameters in the overall framework of holistic development of Narmada Basin. A detailed Environment Impact Assessment (EIA) of Shoolpaneshwar Sanctuary, which comprises a major watershed feeding the Sardar Sarovar and Karjan reservoir was undertaken as part of such ambitious project. The present report seeks to convert all such EIA studies undertaken in the past by M. S. University, Baroda, Sanat Chavan and others, into concrete action plan for the management of the Sanctuary.

2. Present status:

Shoolpaneshwar Wildlife Sanctuary encompasses an area of 607.708 sq. km. in Bharuch district, Gujarat State. It is in the Rajpipla (East) Forest Division, dominated by the Rajpipla hills.

The Forest of the area is fairly rich in pockets with varying degree of biotic interference. The honey combing effect of large number of forest villages over the forest is quite significant in bringing about the present status of the forest. Good forests are restricted to hills and hill slopes while flat areas have largely been covered with habitation or cultivation.

The forests of Shoolpaneshwar eco-system can be classified into five basic forest types

- (1) Moist Teak Forest
- (2) Southern Moist Mixed Deciduous Forest
- (3) Dry Deciduous scrub
- (4) Dry Bamboo breaks
- (5) Dry Tropical Riverain Forest. These represent remmants of semi evergreen to moist deciduous species, much of which is in retrogression stage that reflects heavy influence of biotic pressure and forestry operations.

Due to shrinking habitat, habitat deterioration, hunting and biotic pressure, the wildlife is highly compressed, threatened and below its carrying capacity. Fourhorned antelope, barking deer, sloth bear are in fairly good number, while rusty spotted cat, leopard cat, giant squirrel, primates and sambar are rare and threatened. Tiger, chital and wild dogs are recent to disappear from the area.

Shoolpaneshwar Sanctuary area supports good diversity of avian life These include common birds like kingfishers, parakeets etc., game birds like grey jungle fowl, peafowl, partridges, quails etc. and migratory birds like wagtail, harriers etc. Today, the sightings of grey hornbills, alexandraine parakeet, peafowl, red jungle fowl, red spur fowl, grey jungle fowl, rain quail and bustard quail are rare, indicating their endangered status. Raptor population has also declined in the last two decades. During 1990-92, Wildlife Study Group identified 198 species of birds, out of which 10 were new records for this area.

3. Limiting Factors and Threats:

Some limiting factors and threats evident in the development of Shoolpaneshwar sanctuary area are :

- (i) The presence of 38000 villagers in 104 villages in the sanctuary area. The population density has increased very fast from 20 persons/sq.km in 1961 to 42 persons/sq.km in 1981.
- (ii) Dependence of people's economy on Agriculture and large scale cattle grazing.
- (iii) Direct dependence of tribals on forests such as fuelwood for energy needs, bamboo and timber for household work, hunting of animals and birds for food and fishing in streams and use of other minor forest products.
- (vi) Indirect dependence of forest eg. clearing forest for agriculture, cattle which graze on forest and illegal trade of wildlife.

(v) Shoolpaneshwar Sanctuary is under tremendous pressure of overgrazing. About 26,672 cattle in the sanctuary (1981 census) have deteriorated the forest cover.

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Overall, the forest cover, the wildlife presence alongwith the naturalness of the wildnerness has deteriorated due to intense biotic pressure on the sanctuary and other external factors like forest fires and forestry operations.

4. Restoration plan:

The primary objective of the restoration plan is to halt the degradation of Shoolpaneshwar Sanctuary, reestablish viable stock of the endangered wildlife species, conserve them as gene pools and channelize its benefits for the socioeconomic upliftment of the forest tribals. Above all, the objective is also to safeguard the catchment area of Sardar Sarovar and Karjan reservoirs.

To ensure the above objectives and long term sustenance of ecosystem of the Shoolpaneshwar Sanctuary, people's participation in wildlife conservation forms the core philosphy, without which any action plan would be a failure. The Action Plan is based on the following principles:

- (a) These forests, which are the last of the best forests in the state, should be developed, conserved and managed in accordance with the ecological principles of land use.
- (b) Optimum utilization of forests in a sustainable manner for the maximum benefits of the local population.
- (c) The tribals must be given the opportunity for full social development in terms of the modern world and in accordance with the principles of human rights without adversly affecting the forests and its wildlife.

A step down outline has been envisaged as part of restoration plan which includes the following:

- 1. Maintaining the existing habitat and its wildlife. It was strongly felt that as the Bamboo (forest) breaks in the sanctuary area are inhabited by some unique animal and bird species, these areas should be preserved at any cost.
- 2. Habitat protection and management, so that the quality of habitat is maintained and, if needed, restored, through continous monitoring.
- 3. Specific measures for wildlife conservations and management.
- 4. Nature education and awarness programme for the public and information on maintenance efforts.
- 5. Core and buffer area planning in Shoolpaneshwar Sanctuary. Buffer zone here should be compact. In addition, microcores are also identified to protect the existing honeycombed habitat and meet with immediate management of habitats.
- 6. Corridors migration routes and receiving areas have been planned to facilitate genetic exchange and movement of animals, both ways.
- 7. Carrying capacity has been estimated for most of the major wild animals of the sacntuary. In future, if biotic pressures are reduced and status of central core portion improved, carrying capcity of sanctuary area can be increased.
- 8. An important measure suggested is the captive breeding programme for reintroduction of wildlife which has either disappeared in recent past or is on the point of disappearance.
- 9. Eco-development of villages coming in the sanctuary area is the most important strategy enunciated in the action plan for sustenable development of Shoolpaneshwar Sanctuary and for reducing the pressure on the wildlife pockets.

10. Tourism development is suggested in the Buffer zone to promote interest and awarness in wildlife conservation.

The plantation of fuelwood, timber, minor forest produce, bamboos and fruit species is recommended in degraded forest areas and in cultivated fields of tribals as well as for migration purposes and animal corridors. SMC works like check dams, gully plugging and development of Vantalavadi is also suggested.

The Eco-development programme includes development of water facilities, SMC in human habitations, construction of school buildings, provision of mobile store, mobile medical units, upgrading livestock and veterinary facilities etc and nature education and awareness programme for local villagers.

Protection measures like wireless networks will go a long way with wildlife management and research programme, habitat improvement, captive breeding, research stations, bird ringing etc.

Tourism measures envisaged include development of orientation centre, bird observation huts, publicity and other measures for attracting tourists.

A detailed break up of each programme and its financial implications for a five year period is given in the Restoration Plan.

The implementing agency will be mostly the Forest Department. It will network with other Government and Non Government agencies in order to implement the various programmes suggested in the Restoration Plan.

It is hoped that the Action Plan suggested by the Expert Group will provide the necessary guidelines for the sanctuary management that will ensure sustainable development of the Shoolpaneshwasr Sanctuary.

Valley of the Andrews Washing

ANNEX-XXIX-Min. (4

HERITAGE FLOURSHING IN NARMADA VALLEY



HERITAGE FLOURSHING IN NARMADA VALLEY

(N.V.D.A. Project)

ARCHAEOLOGY, ARCHIVES & MUSEUMS
GOVERNMENT OF MADHYA PRADESH
1996

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Published, Oct. 1996

Cover page

Front :- Shiva Temple at Roligaon, Jhabua, C12-13 cent. A.D.

Back :- Tripad Shiva, Fipldagdhi, Dhar, C10th cent. A.D.

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1996

Published by the Commissioner, Archaeology, Archives & Museums, Govt. of M.P. Banganga Road, Bhopal.

(N.V.D.A. Project)

6

INTRODUCTION

The river Narmada, passing through the heart of Madhya Pradesh is one of the most sacred rivers of India. In fact, she figures in the list of the 7 most important and sacred rivers of India.

" Gange cha Yamune chaiva Godavari Sarasvati Narmade Sindhu Kaveri jalesmin Sannidhim kuru"

Rising from Amarkantak in the Mekal Mountain range in Shahdol district, Narmada flows through the Vindhyas and the Satpuras to the plains of Bharoch in Gujrat and merges herself into the Arabian Sea. In this long journey of 1312 kms. from Amarkantak to the Arabian Sea, she actually touches 1077 kms. in Madhya Pradesh, covering the districts of Shahdol, Mandla, Jabalpur, Narsinghpur, Hoshangabad, Dewas, Khandwa, Dhar and Khargone.

Narmada, like all other major river systems of the world, as well as that of India, too, had witnessed activities of life that flourished on her either sides in antiquity. That she is a mute witness of human activities in those early days of the dawn of human civilization is amply corroborated by the finds of lithic cultures. Even today, she provides sustenance to innumerable tribal population of the state like the Gonds, the Baigas, the Bhila, the Bhilalas, the Kols etc. etc.

It is no wonder then, that the Narmada would so frequently be mentioned in the vast literary treasure of India. The two great Epics, the Puranas and the early Sanskrit texts: all are eloquent of the life giving power of the Narmada.

ऐ वर्यदावी जनदुःख हन्त्री पापान्विहन्त्री विमलार्च्चित श्रीः

भवानी तंत्र

It is evident that the river Narmada along with her two banks and the adjoining regions had seen the earlymen bustled with activities. Indeed the entire region bears traces of Lithic, Iron, Copper and Chalcolithic cultures. In the words of Prof. K.D. Bajpai "The recent studies have shown that it was on the banks of three rivers eg. Chambal, Betwa and Narmada that the village life flourished.. Some of the villages in course of time assumed the forms of towns". S. G. Darien observes: "In Gujrat and eastwards along the lower reaches of the Narmada river, the Indus pottery blends gradually into several other ceramic traditions. The total picture reveals a transplanting of Indus technology and culture to the region of Saurashtra and Gujrat, where it is absorbed by people of several traditions and eventually brought into contact with the Ganges Valley by groups following the Chambal river north east towards the Yamuna and by others along the Narmada in to southern Bihar"².

The Narmada basins besides providing shelter to the Pre and Protohistoric man had also been the home of many early Indian dynasties. Thus flourished the Mauryas, the Shungas, the Guptas, the Pushyabhutis, the Gurjara Pratiharas, the Rashtrakutas, the Kalachuris and Paramaras etc.. The artefacts left by them made the entire region a treasure house of antiquities, a repository of different cultures: a fact that always attracted the attention of the scholars. Surveys, explorations and excavations were carried out. Much was done by them but more remains to be done yet!

The Dam Project has necessitated a fresh look at the archaeological and cultural heritage available in the Narmada Valley in Madhya Pradesh. Hence a scheme for salvaging/relocating the heritage was drawn up. Broadly, this would involve:

- 1. Survey of antiquities to be salvaged.
- 2. Shifting/relocation of the sculptures and artefacts for which suitable sites and buildings would have to be located.
- 3. Documentation for the purposes of record.
- 4. Setting up and display of the cultural and heritage artefacts thus retrieved.

^{1.} Prof. K.D. Bajpai, Cultural History of India, Vol. I, M.P., page 50.

^{2.} S. G. Darien, The Ganges in Myth and History, Calcutta. 1948

The construction of six proposed dams, "The temples of Modern India" in the words of Jawaharlal Nehru, over the river Narmada would affect some 566 villages of the state. In order to safeguard the archaeological treasures located in these villages, the staff and officials of this department of Archaeology and Museums had already undertaken survey work in the concerned regions and identified the sites and monuments. Thus the first task of identifying the sites as well as the artefacts to be relocated is already done.

In continuation of the process of collection of sculptures, our survey teams had made extensive tours in all the villages of the respective districts going to be submerged by the dam water but while collecting the artefacts the team sometimes had to face stiff resistence of the villagers who quite understandably attach much value to these objects of worship. A religious sentiment is connected with them which they do not wish to part with. Hence several times we had to send our teams to make them convinced that we are indeed going to procure them for their protection and preservation for the posterity. In this way however our process of collection work got delayed.

Section Vistalian

Collection of sculptures

Collection of sculptures from the areas going to be submerged by the 5 proposed dam waters was one of our prime objectives. Hence the department had sent various groups several times in the concerned areas for this purpose. As collection of sculptures was already proposed in the Action Plan, the survey teams had earlier marked/selected the artefacts to be collected. Thus a team under the guidance of the Archaeologist, Hoshangabad, had collected all the specified sculptures from the different villages of Hoshangabad District which were coming under Indira Sagar Dam Project. Thus 25 sculptures were collected from the following villages. They are: Uba, Vichaula, Uthal, Khedinema and Handia. Sculptures thus gathered are housed for the moment in the departmental archaeological museum at Hoshangabad. Sculptures collected from the district of Hoshangabad are as follows:

1.	Uban-	Uma Maheshwara	11th c. A.D.
		Pratima Parikar Vishnu	12 c. A.D.
		Ananta shesha sayin vishnu	11th c. A.D.
		Vishnu	13th c. A.D.
		Uma-Maheshwara	11th c. A.D.
		Bhairava	11th c. A.D.
		Chamunda	11th c. A.D.
		Pratima Parikara (Surya)	11th c. A.D.
		Vishnu head	12th c. A.D.
		Shriva head	12th c. A.D.
		Goddess head	12th c. A.D.
		Architectural Fragment (3)	12th c; A.D.
2.	Bichhola	Ganesha	12th c. A.D.
		Vishnu (2)	12th c. A.D.
3.	Udhal	.Uma Maheshwara	11th c. A.D.
4.	Khedinema.	Uma Maheshwara	12th c. A.D.
		Nandi head	12th c. A.D.

5. Handiya	Ganesha	13th c. A.D.
	Kichaka (2)	13th c.A.C.
	Kirtimukha	13th c. A.D.
	Devi Sculpture	13th c. A.D.
6. Ajnal.	Inscribed lowerpart of the	
· .	Sculpture	12th c. A.D.

As the district of Dewas also comes under the Indira Sagar Project zone, sculptures were also collected from this district by a team under the direction of the Archaeologist, Indore. 49 icons were thus retrieved from the villages of Rajore, Nemawar, Khategaon, Nawara, Nimanpur, Daiyat, Karodamaphi and Turmal Khurd. The following is the detailed list of sculptures thus collected from the district:

1. Rajor	Lakshmi- Narayan	11-12th c. A.D.
	Stele (2)	12-13th c. A.D.
	Pillar fragehments (3)	12-13th c. A.D.
	Bhairava	13th c. A.D.
	Brahma	13th c. A.D.
	Ganesha	13th c. A.D.
	Fragments of a sculpture	12-13th c. A.D.
	Sthanaka Vishnu	11-12th c. A.D.
	Nrisimha	12-13th c. A.D.
	Door-jamb (on 6 pieces)	12-13th c. A.D.
	Broken Sculpture	13th c. A.D.
2. Nemawar .	Ganesha	12-13th c. A.D.
	Uma-Maheshwara (2)	12-13th c. A.D.
	Surya	12-13th c. A.D.
	Trimurti	12-13th c. A.D.
	Padapitha (in Two pieces)	12-13th c. A.D.
	Mahisasuramardini	12-13th c. A.D.

		Vishnu	12-13th c. A.D.
	,	Lakshmi Narayan	12-13th c. A.D.
		Gomeda Ambika	12-13th c. A.D.
		Brahma	10-11th c. A.D.
	•	Dikpala	10-11th c. A.D.
		Vishnu	13th c. A.D.
		Jaina Tirthankara	13th c. A.D.
3.	Khategaon	Brahma Savitri	12-13th c. A.D.
4.	Nawada	Parvati	11th c. A.D.
5.	Nimanpur	Surya	12-13th c. A.D.
6.	Daiyyat	Brahma	11-12th c. A.D.
		Vayu	13th c. A.D.
		Nataraja (in two pieces)	12-13th c. A.D.
		Indrani	11-12th c. A.D.
		Unidentified Sculpture of (god)	13th c. A.D.
7.	Karandmafi	Goddess	13th c. A.D.
8.	Turnal	Pillar (2)	12-13th c. A.D.
		Sculptural fragment	13th c. A.D.
		Lakshmi Narayana (3 pieces)	12-13th c. A.D.
9.	Kundagaon Khurd	Kubera	13th c. A.D.
		Pillars(4)	13th c. A.D.
		Elephant figure	13th c. A.D.
		Uma-Maheshwara	12-13th c. A.D.

At present they are being kept in the departmental museum at Dewas.

77 sculptures were also collected from 8 villages of the district of Khandwa. They are: Panthia from where 21 sculptures were collected, Godarpura - 12, Richhphal-1, Chandel-11, Sailani-17, Dharikotla-9, Punasa-4 and Pipri-2.

The detailed list of these sculptures is appended here with:

	7 0 - 111		
1.	Panthiya	Ganesha (3)	12th c. A.D.
		Hanumana (3)	12th c. A.D.
		Uma-Maheshwara	12th c. A.D.
		Nandi (2)	12th c. A.D.
		Andhakasur-Samhara	12th c. A.D.
		Bhairava	11-12th c. A.D.
		Shiva	11-12th c. A.D.
		Door-Jamb (2)	11-12th c. A.D.
		Sculpture	11-12th c. A.D.
		Nandi	11-12th c. A.D.
		Kalasha	11-12th c. A.D.
		Human (indistinct)	12th c. A.D.
		Worshipper	14th c. A.D.
		Unidentified (Visnu?)	12th c. A.D.
		Nandi	18th c. A.D.
2.	Godarpura	Varaha head	14th c. A.D.
		Gandharva couple	12th c. A.D.
		Nayika (in 4 pieces)	13th c. A.D.
		Door-Jamb	12th c. A.D.
		Vishnu (Padapitha)	12th c. A.D.
		Uma-Maheshwara (2)	12th c. A.D.
		Nandi	11-12th c. A.D.
		Yonipitha	13-14th c. A.D.
		Ganesha	12-13th c. A.D.
		Natesha	12-13th c. A.D.
3.	Richhphal	Nandi (in two pieces)	12-13th c. A.D.
4.	Chandel	Uma- Maheshwara (2nos)	10th c. A.D.
		Lakshmi Narayana	10th c. A.D.
		Natesha	10th c. A.D.

		Brahma -Savitri	10th c. A.D.
		Sesasayin- Vishnu	10th c. A.D.
		Ganesha	10th c. A.D.
		Male figure	10th c. A.D.
	,	Architectural fragment (3)	10-11th c. A.D.
		Door jamb (in two parts)	10th c. A.D.
		Nandi (3)	10th c. A.D.
		Kalasa (2)	10th c. A.D.
	•	Worshipper	11th c. A.D.
		Female	10-11th c. A.D.
		Nandi in (two pieces)	11-12th c. A.D.
		Lion	11-12th c. A.D.
		Kalash	11-12th c. A.D.
		Uma-Maheshwara	10-11th c. A.D.
		Nandi .	10-11th c. A.D.
		Parikara	10-11th c. A.D.
		Broken Sculpture	10-11th c. A.D.
		Vyala	10-11th c. A.D.
		Broken Sculpture	10-11th c. A.D.
5.	Dhari Kotla	Uma Maheshwara	12th c. A.D.
		Sati Stambha (with Ganesha figure) Chauri beare Sati Pillar Nandi (two) Architectural fragment Decorated Pillar (3) Yonipitha	14th c. A.D. 14th c. A.D. 14th c. A.D. 12th c. A.D. 13th c. A.D. 13th c. A.D. 13th c. A.D.
6.	Punasa	Female figure Attendant Nrisimha Nagdevi	11-12th c. A.D. 11-12th c. A.D. 11-12th c. A.D. 11-12th c. A.D.
7.	Pipri	Broken Sculpture (2)	11-12th c. A.D.

Major part of the collection of sculptures from the district of Khandwa has already been completed. Images thus collected are now housed in the newly constructed district archaeological museum at Khandwa for display.

Artefacts coming under the submergence zone of the Sardar Sarovar project too were collected by our team. Villages to be affected by the inundation are Khujawa, Nageshwar (Dharmapuri), Pipaldagarhi, Lunhera, Neembola, Sulgaon, Gogaon etc. Hence the team had visited the villages as specified in the Survey report and collected 15 sculptures from the village of Khujawa, district Dhar and 10 sculptures from Nageshwar Dharampuri, district Dhar.

The artefacts gathered from Khujawa include 3 carved broken pillars, originally belonged to the temple entrance, 2 Bhairav sculptures, 5 Vishnu icons, 2 Nrivaraha murti, 2 Gauri Kamada sculpture and 1 icon of a devote all are11the - 12th c. A.D. work.

Icons collected from Nageshwar/Dharampuri include a sculpture of combatting fighters in red sand stone - 18th cent. A.D., 4 Nandi sculptures - one 15 th c. A.D. the rest -18 c. A.D., 3 Yonipithas - 15th cent. A.D., and 2 Ganesha sculptures - 14th cent. A.D.

Sculptures collected from Pipaldagarhi are 13 in numbers. They include Six handed Ganesha-1, 13th A.D., Nandi-1, 13 c. A.D., Uma maheshwara-2, one 13th c. A.D., the other 14th c. A.D., Agni Yama-1, 13th A.D., Fragment of a sculpture-13th c. A.D., Nataraja-1, 12th c. A.D. Yama (Chatushtika) -1, 13 c. A.D. Nrivaraha in Chatustika-1, 14 c. A.D., Brahma - 13 c. A.D., Brahma Savitri-12 c. A.D. and Deva Pratima-2, 12 c. A.D.

Presently they are kept in the departmental district museum at Dhar. Earlier, 14 more sculptures were collected from the village of Pipaldagarhi, district Dhar and are housed in the Dhar fort and would be displayed in the museum of Dhar.

As stated earlier, our team had to visit several times the villages going to be submerged by the dam water, trying to convince the villagers about the safeguard of the icons they value so much!

Recently a team was sent once again to these villages of the dt. of Dhar with a view to collect the rest of the sculptures. They had collected some 76 artefacts ec. from the villages. They are:

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1.	Gangli-8	(Surya] Gauri)	10 c. A.D.
		(Yonipitha, 3 Nandi, Ganesha,	All belong to
		Vyala fingure)	the 13 c. A.D.
2.	Pairkhar-5	Ganesh,	13 c. A.D.
	•	Nandi in pieces	13 c. A.D.
		Nandi -2 Nos.	13 c. A.D.
		Sati pillar	18 c. A.D.
3.	Ekalwara-1	Nandi	14 c. A.D.
4.	Mahapura-15	Stone piece being carved with flowers	12-13 c. A.D.
			10 12 - A D
		Fragment of a pillar	12-13 c. A.D.
		Nataraj Chamunda	12-13 c. A.D.
		,	12-13 c. A.D.
		Scene showing slaying of	12-13 c. A.D.
	•	Gajasura	10.12 4.5
		Yonipitha	12-13 c. A.D.
		Yonipitha	12-13 c. A.D.
5.	Sulgaon-6	Vishnu	12-13 c. A.D.
		Surya in two pieces	12-13 c. A.D.
		Vishnu	12-13 c. A.D.
		Abdominal part of a Vishnu image	12-13 c. A.D.
		Broken piece of a sculpture (god)	12-13 c. A.D.
	,	Upper part of a Vishnu	12-13 c. A.D.
		sculpture	,
6.	Barda-4	Garuda Narayana	12 c. A.D.
	•	Gauri	14 c. A.D.
		Nandi (Broken)	12-13 A.D.
	*.	Ganesha	14 A.D.

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7. Lunkerkhurd-3	Bust of Ganesha	18 c. A.D.
	Umamaheshwara	18 c. A.D.
•	A fragmented pillar	18 c. A.D.
8. Balwara-5	Bust of Ganesha	12-13 c. A.D.
	Sculpture of a female deity	12-13 c. A.D.
	Lower part of a Female deity	12-13 c. A.D.
	Upper part of a female divinity	12-13 c. A.D.
	Bust of a broken sculpture	12-13 c. A.D.
9. Malwara-1	Nandi Figure with broken head	12-13 c. A.D.
10. Bodhwara-5	Image of Vishnu (in two part)	12-13 c. A.D.
	feet broken	
	Ganesha	12-13 c. A.D.
	Bust of Sadashiva	12-13 c. A.D.
	Vyala figure	12-13 c. A.D.
	Stone bearing flower	12-13 c. A.D.
11. Bhanwaria-22	Figure of Hanuman	All belong to
	Durga	12-13 c. A.D.
	Broken piece of a pillar	
	Nandi	
	Nayika	
	Chauribearer	
	Fragmented Vishnu sculpture	
	Head of a Jain sculpture	
	Broken piece of a male deity	
	Fragmented Vishnu Sculpture	
	Borken piece of Ayudha Purusha	a
	of Vishnu	
•	Vishnu (Broken Piece)	
	Nandi (mouth broken)	
·	Broken piece of a male deity	
	Nayaka sculpture	

Nayaka sculpture Broken male deity

Vishnu sculpture (legs broken)

Broken piece of a pillar

A sculpted stelae

Nandi

11. Katnera-7

Two feet of a broken vishnu

All belong to 13th c. A.D.

devi

Image of Vishnu

Head of a female Goddess

Lower part of a fragmented deity.

Sculpture of Ganesha in two parts.

Lower part of a female deity

Broken head of a goddess

Besides the aforesaid retrieval of icons based on survey reports, the other villages too (also mentioned in the survey report) were approached by us. These villages are: Kakrana, Roligaon, Jhandana, Kukriya, Bulawat etc. in the district of Jhabua. But due to stiff resistence of the villagers only 2 sculptures could be collected from the villages of Mahalgaon and Adikukriya, both in district Jhabua. Thus the goal of collection of sculptures from the Indira Sagar and Omkareshwar Dam areas has already been achieved.

The collection work under the Sardar Sarovar Dam area is almost complete save the shifting of the rock cut sculptures from Pipaldagarhi and a few stray sculptures not being possible to collect for reasons specified earlier.

The rock cut sculptures at Pipaldagarhi are not loose sculptures lying around the ground. On the contrary, they are carved out in the rocks. Hence they require a special technic for shifting. The shifting work is in process, would be done once the rainy season is over.

Relocation of Monuments:

The Shiva temple at Roligaon, district Jhabua, c.11th-12th A.D.; The Shankar Temple at Bara Barada, district Dhar, c.15th cent. A.D.; The Kalanjeshwar temple, Semalda, district Dhar, c.15th cent. A.D. The Jalaleshwar Temple, Khujawa, district Dhar, c.17th cent. A.D. The Bhawani Mata temple at Khujawa, district Dhar, c.13th cent. A.D.; and the Rock cut caves at Khujawa, district Dhar, c.17th-18th cent. A.D. are the five monuments coming under Sardar Sarovar Submergence area and their relocation was proposed in the Action plan whereas two other monuments eg., the Shiva temple, Panthia, district Khandwa, c.12th cent A.D. and the Satmata temple Sailani, district Khandwa c.18th cent. A.D.; too are coming under the catchment area of the Omkareshwar Project. Hence their shifting was also proposed in the Action Plan.

The Shiva Temple at Roligaon (Jhabua): is a magnificent 11th-12th cent. A.D. temple standing in the outskirts of the village of Roligaon in Alirajpur sub division of district Jhabua.

The Shankar Temple, Bara Barada: is situated in the Manawar sub division of district Dhar. This temple is an example of diminishing temple architectural form which consists of porch and sanctum.

The Kalanjeshwar Temple, Semalda, district Dhar: is dedicated to lord Shiva. The temple was constructed on a simple plan of porch and sanctum. This is another example of diminishing Indian temple architecture.

Jalaleshwar Temple, Khujawa, district Dhar: The temple of Jalaleshwar is a 16-17th cent. A.D. construction having the main entrance in muslim architectural design. The images of Mahishasuramardini and Ganesha are placed in the niches while the main deity is a Shivalingam.

Bhawani Mata temple, Khujawa district Dhar: The temple was designed in pancha ratha fashion of Bhumija style of temple architecture consisting of a porch, assembly hall and sanctum. This temple was built over the debris of a Paramara temple.

The rock-cut caves, Khujawa, district Dhar: The decorated facades have been proposed for shifting and the rest of the shrine would be prepared in model at the Narmada valley culture park at Lal Bag, Indore.

Shiva temple, Panthia, district Khandwa: This Shiva temple stands on the slope of a shallow hill near the village whereas the Satmata temple, Sailani, district Khandwa is situated at the southern bank of the river Narmada at a distance of about 5 km. to the south east of Omkareshwar.

As regards the relocation of these priceless heritage, the process has already begun. As it is known to all, transplantation work is a massive and challenging task that requires proper photography, drawing of the plans, numbering part by part, dismentling one by one, and replanting with equal care. Hence it is a long process. The plans and drawings of the related architectural remains have already been prepared. Our modellers have visited the sites, taken measurements etc. for preparing the models.

Besides, we have already written to the district collectors of Dhar and Jhabua for finding us suitable land for this purpose. Presently, three plots for safe shifting/relocation of the monuments were made available to us by the district collector of Dhar. But through his letter no 40121, dt.22.3.96 the collector had informed the department that the shifting of the Kalanjeshwar temple, Semalda(SSP) was not possible due to vehement resistence of the villagers. They prefer to have the temple in its original place rather than relocated to some other areas. After the rainy season is over, we will start the actual relocation work of the monuments.

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Excavation of archaeological Mounds:

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In the course of archaeological explorations and surveys conducted in the villages of the district of Khargone which are coming under submergence of the dam project (undertaken by the department of Archaeology and Museums, Govt. of Madhya Pradesh), a good number of mounds with much archaeological importance have been indentified. While most of them have yielded Chalcolithic potteries, a few mounds, show the remains of early historic settlements. After a close examination of the survey reports, a few of these important sites have been selected for excavation. These sites under the Sardar Sarovar Projects are as follows:

- 1. Brahmangaon, district Khargone- Chalcolithic mound.
- 2. Utawad, district Khargone- Chalcolithic mound
- 3. Kirmohi, district Khargone-Historical mound

While surveying all the villages of the district of Dhar which are coming under the Sardar Sarovar Dam catchment area five Chalcolithic, two early Historic and one Historic mounds have been discovered. Considering the importance of these findings, it was thought that excavation in the following two sites could be undertaken. (1) Khaparkheda, district Dhar and (2) Khera, district Dhar. Thus altogether 5 mounds were to be excavated from the Sardar Sarovar submergence area.

Mound to be excavated from the Indira Sagar dam area is an early Historic mound at Khedinema in Hoshangabad district. Out of these six sites, proposed to be excavated in the Action Plan, this department has already undertaken and completed the excavation work of the mound at Khedinema in Hoshangabad district, Khaparkhera in district Dhar and Brahmangaon in district Khargone. The mound of Utawad in district Khargone was, already been excavated by the Archaeological Survey of India, Nagpur. Recently after a second look of the mound at Kirmohi, it was found not fit for excavation. Hence the proposal for the dig at Kirmohi has been cancelled.

Excavation at Khedinema: The mound in the Indira Sagar Dam area - The mound of Khedinema in Hoshangabad district is situated on the bank of the Narmada. It has

15 ft. high deposition extending over about 100 sq. mt.. The pottery picked up by the survey team earlier from the site belongs to the period between early Historical to Gupta period. They are of Black and Red ware, Black burnished ware, Northern Black polished ware and Red washed and coarse ware. Besides pottery fragments, were also noticed pieces of other artefacts. This mound is coming under submergence area. Hence the mound was excavated by a team of officials and staff of the department of Archaeology and Museums, Govt. of Madhya Pradesh.

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During excavation two trenches were dug up. They were termed as KDN1 and KDN2. From the layer 2 of the trench 1 were found burnt terracotta beads, terracotta human head, iron nails, iron rings etc. The same layer also yielded copper coins with Ujjain symbol, besides exposing the foundation of an Islamic period building with a mud wall.

Layer 3 - yields around 25 pieces of iron artefacts, 3 cowries, 14 beads and a good number of lac and glass bangle pieces besides copper coins. Traces of mud wall noticed in previous layer is traceable here too. Artefacts found were burnt terracotta beads, terracotta bust of a human being.

Layer 4-uncovers terracotta lamps, terracotta figurines (of human being), iron ring and knife and other antiquities on bronze; one crystal bead, glass bead, glass bangles and 5 copper coins.

Layer 5 had less number of antiquities only two burnt terracotta stoppers, 6 cowrie shells, one copper coin and some fragments of bangles.

Layer 6 - produced a terracotta human figure, burnt clay stoppers, terracotta beads, dise, stone ball, 6 iron artefacts, 2 crystal beads, glass bangles and a copper coin. Also found from this layer was a stone earstud where as from layer 7 five burnt terracotta stoppers, chert beads, fragments of bangles, shell bangles and copper coins were found. Layer 8 of the dig was very important from archaeological point of view. It yielded 3 burnt terracotta stoppers, fragments of 3 terracotta artefacts, 2 discs, one bead, 13 cowrie shells, copper coins and bangles of lac. Also found was an iron spear head. But most important finds were the foundation of a house, a mud wall, a mud floor and a pot burial, the pot being kept in a pit. Around the pot were found pieces of bones as well. In the same layer, towards the

western section of the northern corner was found the remains of a hearth and 15 cowries around it. Since this layer belonged to the Maurya period, the finds of the layers are of extreme importance to us.

Layer 9 uncovered stone balls, 3 stoppers, terracotta discs, stone objects, iron chisel and iron spear etc.. In fact,, 12 iron artefacts were found from this layer. Other objects included beads made out of clay, glass and bone, as well as fragments of terracotta bangles.

Layer 10 yielded very few artefacts. Two terracotta objects, 4 discs and beads, copper and iron artefacts some stone and glass beads and coins. Potteries found are thick kiln burnt ones. They include Painted black and red ware, Pink and red ware, Black and Red ware and Black ware which tend to point to a date between Historical to Chalcolithic period.

In trench KDN2- during clearing of the top soil Muslim period coins were found.

From layer 2, besides fragments of potteries 14 other antiquities were found. They include glass bangles, glass beads, carnelian beads, crystal beads, terracotta beads and copper and brass rings.

Layer 2 yields fragments of potteries, terracotta stoppers, pieces of bangles, iron piece, iron nail and a vase for drinking wine.

Artefacts found from layer 3 include fragments of terracotta vases, bowls, Black and Red ware vases, Black slipped ware vases etc. Also found were discs, terracotta stoppers, bangle pieces and some scattered around bones.

Layer 4 has a good number of terracotta bowl pieces besides 3 terracotta stoppers, terracotta balls, iron nails, other iron objects, copper ring, brass ring and pieces of bangles. Another important find is the fragments of bricks measuring 28X32 cm.

From the find of huge quantity of terracotta bowls and other vase fragments it is surmised that it is a potter's residence.

In layer 5 one notices brick fragments, 140 cm. in length wise extending from east to west and 120 cm. in width. It indicates the existence of a platform in antiquity, the brick floor

of which still exists. Huge quantity of fragmented terracotta vases with Black slipped ware and Black and red ware are some of the important finds besides terracotta earstud, iron nail, and other iron objects. Here one notices some 50 big sized lamps which led the archaeologists to believe that it was a potter's workshop.

In layer 6, from the brick platform, (which must have helped the potter in carrying out his daily transactions) were found bricks, 40X20 cm. in size. The mud floor bears traces of lime coverings after clearance of which a burnt floor was noticed. Artefacts included are terracotta disc, terracotta Mother Goddess, iron objects, iron nails, copper objects, bangles etc.

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7th layer - has a mud wall. One also notices remains of burnt clay and a hearth. Antiquities found are terracotta disc, stone objects, an iron piece, iron objects, crystal bead and bangle pieces.

Layer 8 too, like the previous layer has the remains of a hearth, burnt clay and burnt charcoal which led the archeaologists to surmise that it was a potter's workshop. Artefacts uncovered are terrocotta beads, terracotta stoppers, othere terracotta objects, stone objects, iron ring, steatite bead, glass bead, ivory and crystal bead etc.

The remains of terracotta vases and chalcedony blades from this layer point to a pre Maurya period.

A clue to the dating of the layers:

Layers 1-3 = Muslim period

Layers 4-6 = Shaka, Kushana and Shunga period'

Layer 7 = Definitely Shunga period

Layer 8 = Maurya period

Layer 9 & 10 = Pre Maurya period

Last year a special exhibition was organised in the State Museum, Bhopal. Of the

antiquities obtained from different excavated sites of Madhya Pradesh in which a selected few items of antiquities (around 40 of them) from Khedinema too were included for exhibition. These artefacts, after the exhibition was over, were returned back to the museum of Hoshangabad where they are housed at the moment.

Mounds coming under the submergence zone of the Sardar Sarovar dam area:

1. Khaparkhera-district Dhar:

Situated in the Kukshi tehsil of district Dhar, the mound of Khaparkhera is located in the nothern side of the Narmada. As this mound too, is coming in the submergence area of the Sardar Sarovar dam, the site was excavated by a team from the department.

Its surface finds were quite rich yielding microliths of chert and chalcedony, janapada coin and fragments of N.B.P. vases. But unfortunately the actual dig, contrary to our high expectations did not produce much of such artefacts. Only the remains of Maurya, Shunga and Satavahana period ranging from 4th/3rd centuries B.C. to 1st cent. A.D. have come to light.

Stratigraphically it has exposed 7 layers.

Layer-1- yields fragments of well made Red ware vases.

Layer-2-also contains a good number of broken pieces of Red ware as well as Glazed Red ware vases. The shapes include bowls, dishes, cooking vessels, water jars, storage jars etc.

Layer-3-exposes well made Black and red ware vases, Glazed black ware vases and Red ware vases etc.. They were the fragments of cooking vessels, dishes, bowls, water jars, storage jars, lids of the vases etc.

In layer-4-the same vase tradition continues. But here the Black and red ware vases are more numerous than the previous layer. Vases include bowls, dishes and small vases.

Layer-5-yields a huge number of broken pieces of vases.

Layer 6 and 7 contain a concentration of earth brought in by Narmada flood water. They do not possess any traces of human habitation.

As stated earlier, the above stratigraphical arrangement refers to the existence of two periods eg. Maurya nad Shunga period extending from 300 B.C. to 100 B.C. and Kushana Satavahana period from 100 B.C. to 100 A.D.

The finds uncovered from the layers 3 and 4 suggest a Maurya Shunga date. The layer 3 had a storage jar whereas layer 4 contains a floor made out of pebble stones and brick powder. Just above it one notices burnt ashes, burnt clay and a number of other burnt objects. These all tend to show that people of this age were using pebbles for making the floors, firstly by placing the pebbles on the surface then filling it up with burnt brick and vessel crushes. Later on, it used to be covered up by layers of mud. From the finds of the burnt objects one can assume that this settlement was destroyed by fire. The house plan is not evident here. Here was found a storage jar which contains remains of burnt food grains and other objects.

The second phase eg. Kushana Satavahana period extends from c.100 B.C. to 100 A.D. Layers 1 and 2 on the basis of the finds, particularly with that of the fragmented vases have been equated with Kushana Satavahana period.

2. Mound of Brahmangaon, district Khargone:

The village of Brahmangaon in the Thikari tehsil of Khargone district is located 5 kms. to the north of village Dabana on Indore Barwani highway. The archaeological mound is on the lower bank of the Narmada covering an area of 9000 sq. mtrs. and rising up to a height of 15 ft., at a distance of about 1 km. north of the village. The mound contains several rain gullies and trace of a large erosion due to flood water. In the preliminary survey, the potsherds were picked up. They are Painted black and red ware, Painted black on red ware (black figures pertaining to the Malwa culture), Kayatha ware, Red Incised ware, Lustrous red ware and Corrugated grey ware.

The potteries are kiln burnt, having zig zag, oblique line designs. The pot-sherds of Painted black and red ware are important in view of their association with Harappan potteries

at Lothal, Malwa Chalcolithic potteries at Maheshwar and Navdatoli and in isolation at Manoti. The decoration on the potteries are mostly both geometrical and non geometrical. Among the pot shapes bowls, dishes and mugs are prominent.

The situation of the village of Brahmangaon is near Gujrat and Maharashtra and at a short distance from Maheshwar and Navdatoli. Since it is coming under the submergence area of Sardar Sarovar dam the excavation of this mound was proposed in the Action Plan and was carried out by this department with a view to throw light on the pattern of cultural migration and the relation of Malwa Chalcolithic culture with the Harappan culture of Gujrat and Chalcolithic culture of Maharashtra.

A trial trench was firstly dug up in the south eastern slope of the mound. It was 1.10 mt. deep but the dig shows that the first 15 cm. was cultivated land soil. This first layer yielded only some pot sherds. Below this, the two other layers eg. layers 2 and 3 are particularly marked by the absence of any pot sherds. Since this part of the mound was once used for cultivation, it is extremely, difficult to ascertain the stratigraphy. Hence in the north western slope of the mound another trench of 1.15 m. was dug up.

Trench-2- First 15 cm. of this trench too, uncovered traces of cultivated soil though most of the antiquities and potsherds come from this layer only. As stated earlier during preliminary survey, fragments of Painted black and red ware, Painded black on red ware, Lustrous red ware and Corrugated grey ware vases were picked up from the surface. In actual excavation pot sherds of Black and redware and Black on red ware are obtained. Also found are some fine microliths: blades, core, chips, lunates, etc., from layer 2 of this dig (in between 19-30 cm.). A few pot sherds too were found in this layer. They mostly include fragments of black jars. Again in layers 3 and 4 were noticed light yellow coloured earth which was the natural soil of the mound. In fact they contain nothing. It is now evident that all the archaeological treasures from the mound were destroyed both by natural erosion and man made cultivation. Since the layers have absolutely been destroyed our only clue for dating the aretefacts are the presence of microliths and Black and red ware vases, Black on red ware vases etc. which tend to point to a Chalcolithic date. This mound presumably had witnessed activities of the Chalcolithic men.

The other Chalcolithic mound at Utawad, district Khargone was already been excavated by the officials and staff of the Nagpur branch of the Archaeological Survey of India.

Marie Carlos Maries Salt, Salting Maries

Chemical treatment of the antiquities:

Antiquities obtained from excavation:

The excavation at Khedinema has uncovered a good number of antiquities that belonged to the early days of Indian history. It covered a long span of human history ranging from the pre Mauryan days to the Maurya, Shunga Satavahana period extending upto the relatively recent times of the days of the Islam domination. The finds include 120 iron objects, 19 copper coins, 19 other related copper objects and some objects in different other metals. These metal objects, since were lying buried for centuries together had gathered weathering effect on them and are found in a much deteriorated condition. Hence chemical preservation and conservation of the objects is a most urgent task: the challenge which was successfully faced by our chemist working in the Narmada Project. Besides cleaning them with necessary solutions, preservative coating treatment was also done to save the artefacts from redeposition and deterioration.

The non metal antiquities obtained from the dig too were cleaned by the chemist.

Like wise, other artefacts, gathered from Khaparkhera too, were cleaned and treated by the chemist.

Treatment of loose sculptures:

A good number of sculptures were collected from the regions coming under the submergence area of the Sardar Sarovar dam. Thus sculptures were obtained from Pipaldagarhi, Khujawa, Dharmapuri and different other villages.

Since these sculptures were lying open for a very long time they bear traces of weathering effect on them like salt formation, redoxcide deposition, besides accumulating dust, dirt and fungus on them.

They were cleaned by our chemist using necessary chemicals like Amonia, Sodium hydroxide, Benzine P.V.A. etc. After the cleaning work was over, the sculptures were coated with preservative for saving them from future deterioration.

From the villages of Panthia, Godarpura and Richhphal in district Khandwa 34 sculptures were collected whereas from Satmata, Ghoghalgaon and Chandel were collected 36 sculptures. All these sculptures collected were supposed to be housed and displayed in the district Archaeological museum Khandwa. In fact, a new museum building has already been constructed for this purpose.

Thus after the collection work was over, the artefacts were properly cleaned and treated by the chemist, working in the project and they are now being put up for display in the newly constructed Archaeological museum in Khandwa.

Chemical treatment to be undertaken:

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The Bhawanimata temple, situated in the village of Khujawa, district Dhar would be relocated to a safer zone. But it has got a lime deposition of 2 to 3 cms. thick. The shifting work is in the process. Before shifting, the lime deposition would be removed chemically by our chemist once the rainy season is over. The recently collected 76 sculptures too remain untreated which will be done in due course of time.

Steps taken for display of artefacts:

As stated above, the antiquities collected from the district of Khandwa, coming under submergence area of the Sardar Sarovar Project were already put up for display in a new Archaeological museum building specially built for this purpose.

The construction work of a Narmada Gallery in the Capital city of Bhopal has already begun in the premises of the State Archaeological Museum and the work is in half way through. In fact, the major bulk of the work is over. Once completed, we would put up an exhibition with the help of drawings, charts, photographs, models of sculptures and other artefacts, excavated mounds and other architectural treasures. The common people still are very unaware of the richness of culture that once flourished on the banks of the Narmada and about all our efforts to save this heritage, which faced a threat of extinction by the dam waters and preserve them for posterity. Thus, this gallery would be a prelude to Narmada Project aiming at sharing our knowledge with the visitors. And 'sharing the knowledge' is the key word in a museum profession these days.

Construction of museum buildings will also been undertaken in Kasrawad, Barwani and extension work at Maheshwar- all situated in the district of Khargone.

Besides, we are also going to develope a Narmada Park in the Lalbag palace complex in Indore. As well known to all, Indore is one of the most important cities of India and also of the state. It is also a place of tourist attraction. In Lalbag, we would be developping a Narmada park with models of life size sculptures, architectural remains and original sculptures and would try to create an original environment for them- work is in the process but yet to be done. Once completed, it is expected that it would attract the tourists in large number.

Documentation work:

Line drawings, sketches, maps and photographs of the archaeological sites have already been prepared by the staff working in the Project but vedio documentation work is under process. We have already entrusted this task to the Madhya Pradesh Madhyam who would be doing this work on our behalf.

Burney C. H. S. Frankling

ANNEX-XXIX-Min. (50

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परिशिष्ट-11-प

	इंटिस सागर परियाजना पर होने	गली अनुमार्ग	नत व्यय	राशि	•		
				 १ राशि	लालों में		
ਭ ਂ∩	मद	अनुमानित व्यय राशि					
		 अवर्ती	अनावर्ती	पूंजीगत	योग		
1.	पुनासा में 30 शैयायुवत अस्तपताल की स्थापना भवन, अवासगृह, स्वाफ व टवाइग्रों आदि पर व्ययं	16.70	5•30	118.00	140•00		
2•	एव मोटाईल यूनिट की स्थापना•	2 • 0 2	3 • 1 0	-	5 • 1 2		
3•	तीन प्रायमिक स्वास्थ्य बेन्द्र, बलाड़ी, हरसूद शिजला खंडवा तथा हिन्डिया? होशंगाबाद में भवन व आवासगृह निर्माण श्रेपति बेन्द्र पर स्पये 0.20 लाखों की दर सेश.	٠ _	<u>-</u>	60.00	60.00		
4 •	उक्त प्राथमिय, स्वास्थ्य वेन्द्रों में रोगी बाहन का प्रदाय १प्रीत बाहन रूप्ये २००० लाल की दर से ^१	-	6 • 0 0	-	6 • 00		
5•	तिन प्रायमिक स्वास्थ्य केन्द्र यथा बलाही हरसूद, जिला खंडवा तथा हिंडिया जिला- होशगाबाद में णॅच-पॉच शैया युक्त कुल 15 उपलब्ध कराना प्रस्तावित है प्रति शैया 0.50 लाग की दर से ।	3•75	0•75	-	4 • 5 0		
6•	उपरोक्त प्रायमिक स्वास्थ्य केन्द्रों में एव्लिक हैत्य लेबोरेटरी सुव्धा उपलब्ध कराना १ प्रति। ईवाई रूपये 0 • 10 लाल की दर से १	-	0.30	-	0•30		

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 F0	 मद		 अनुमानित	• व्यय ग्रीश	- ,	Alare days), ten
		अवर्ती	अनावर्ती	पूँजीगत	 योग •	
7•	सि॰डिस्पे॰मांधाता एवं जामकोटा जिला संडवा के भवन एवं स्टाफ़, अवासगृह निर्माण प्रति झ्काई २० २०००० की दर से व्यय ।	<u>-</u>		40-00	. 40•00	
8 •	उपरोक्त दोनो सि•िंड•में एक-एक कुल- दो वाहन उपलब्ध कराना•	. · · -	4 • 0 0	-	4 • 0 0	
	उपरोक्त दोनों सि•िड•में पॉच-पॉच शैया युक्त उपलब्ध कराना श्रेप्रीत शैया रूपये 0•30 लाखश्र	2•50	0 0•50	-	3 • 0 0	
0•	उपरोक्त दोनों सि•िंड• में प्रयोगशाला सुक्था उपलब्ध कराना	-	0 • 20	-	0 • 20	
1•	24 उप स्वा•केन्द्र के भवन एवं अवास- गृहों का निर्माण श्रेप्रति केन्द्र रूपयेश 1•50 लाखों की दर से•	· -	-	36•00	36.00	
2•	24 उप स्टा•केन्द्रों को फर्नीचर एवं उपकरणों का प्रदाय प्रांत केन्द्र 0•20 लाल के दर से•	-	4•80	-	4 • 8 O	•
	योग :-	2 + 97	278.4	254 co 3	.53-92	

परिशिष्ट-II-बी

सरटार सरोवर परियोजना पर होने वाली अनुमानित व्यय राशि

		The second secon	on the second of	१ राशि	लाखों मेंं≬
इं 0	मद		अनुमानित	व्यय गोंश	
	·	अवर्ती	अनावर्ती	पूंजीगत	योग
1.	निसरपुर में 30 शैयायुवत अस्पताल की स्थापना, गृह, स्वष्म व दवाईयों पर व्यय	16•70	5•30	118.00	140•60
2•	दो र्चातत स्वाईयों की स्थापना•	0 .	6•20	·	10.07
2		4 • 0 4	6-20	-	10•24
3•	मॉगनर्टारंग एवं इटेल्युशन सेल की स्यापना	2 • 4 4	2 • 4 0	-	4•94
4 •	इंक्ट्युशन एवं फोरक्रॉस्टंग सेल की स्यापना	5•00	-		5 • 00
5•	चार प्रार्थामक स्वास्थ्य केन्द्र निसरपुर, धरमपुर, खलघाट त्था वरदा जिला धार में भदन व अवासगृह का निर्माण	-	-	. 80-00	80.00
	१ प्रति वेन्द्र पर रू० २० लाख की दर से १०			•	
6•	उक्त प्रायामिक स्वास्थ्य केन्द्रों में रोगी वाहन का प्रदाय १प्रांत वाहन रूपये २・०० लाल की दर से१	-	8 • 0 0	-	8 • 00

0	मद		अनुमानित	व्यय र्गाश	-1
		3ग्वर्त्ती	अनावर्ती	पूंजीगतः	योग
	प्रत्येक प्राथमिक स्वास्थ्य केन्द्र यथा निसरपुर, धरमपुर, खलघाट एवं वरदा में 5-5 हेकुल 20 शेया उपलब्ध कराना प्रस्तावित है। प्रति शेया उपलब्ध कराना प्रस्तावित है। प्रांत शेया २०००३० लाख की दर सेह	5.00	1.00	. -	6.00
•	उपरोवत चार प्रार्थामक स्टास्थ्य केन्द्र में पहिलक हैल्य लेको•सुविधा उपलब्ध कराना १प्रीत डकाई २००१० लाख की दर से१	-	0 • 40	-	0 • 4 0
•	सामुर्गायक स्वास्थ्य केन्द्र, धरमपुरी जिला धार के भवन त्था स्वफ आवास- गृह का निर्माण•	-	-	20•60	20.00
n •	रगमुद्यायक स्वास्थ्य केन्द्र, ध्रमपुरी जिला धार हेतु मेडिकल अफिसर प्रथम थ्रेण का बेतन एवं भत्ता•	0.63		-	0•63
1.	सिंग्ल हिरपेसंरी चोली जिला खरगैन के भवन एवं स्वाफ, अग्वासगृह निर्माण हेतु पूंजीगल व्यय।	-	-	20.00	20.00
2•	उपरोवत सिव्लि डिस्पेंसरी में एक बाहन उपलब्ध करना•	-	2 • 0 0	-	2 • 0 0

इं 0	मद		अनुमानित •	व्ययः राशि	
	· ·	<u>अवर्त्ती</u>	अनावर्ती	पूँजीगत	योग
13•	उपरोक्त स्थित हिस्पेंसरी में पाँच शैया सुविधा उपलब्ध करना १प्रति शैया रूपये 0•30 लाख१	1 • 25	0•25	-	1.50
14•	उपरोक्त सिव्लि डिस्पेंसरी में प्रयोगशाला सुव्धि उपलब्ध करना	-	0 • 1 0		0-10
15•	50 उप स्वास्थ्य केन्द्रों के भवन एवं आवासगृहों का निर्माण। १ प्रीत केन्द्र रूपये 1 • 50 लाख की दर से १	-		75•00	75.00
16.	50 उप स्वास्थ्य केन्द्रों को फर्नीचर एवं उपकरणों का प्रदाय ४ प्रीत केन्द्र रूपये 0 · 20 लास की दर से १	-	10.00	-	10.00
	योग :-	 35.00	35•75	313.00	383.81

ANNEX-XXIX-Min. (7)

Facilities exisiting for Health care in S.S.P. Area at Present

In Kevadia colony SSP has got Main Hospital with bed strength of 50. The main Aim of PHO is to control Malaria and Water born Disaceased To control severe form of Malaria i.e. cerebral Malaria, Hospitalisation is a must Hospital is headed by Superintendent and two Modical officers with well equiped Laboratory Xray facilities and Adaquate drug stocks It is open round the clock for treating Emergency patients and also has Ambulance for shifting of Patients.

Antimalarial Drugs are given free of charge and patients are made to swallow in presence of Health worker to ensure totake. Peripheraal simears are modered and examined. S.S.P. area being labelled as Risk area by Govt.of India NMEP directorate all care is excercised to give modified treatment. Patients are followed up by Malaria Survelance workers and are completely treated. Hospital is continuously monitored by Sr.Health officer.

55P has dispensary at Dam site run Lai Prakash Associates Company. It has regular medical officer and other staff to diagnose and treat all malaria patient. Generally Labourers staff at dam site and their families take benefit of this dispensary. Dispensary is continously monitored and time to time advise is given by 5.H.O.

31 affected villages and Rehabilitation sites of Bharuch Barca, and Kheda District are Looked after by respective District Panchayat Health staff for Malaria and Water born diseases. Helath worker and A.N.M. vists these sites regularly. Sr. Health officeris visiting these villages and Rahabilitation sites and cordinating functions of Health Department.

Insectiside Spraying

Government of India recommends selective use of Effective insetticide where malariogenic potential is at the maximum. Insecticide spray is the most effective intervention measure in rural areas.

Kevadia colony is under control of S.S.Nigam and through Medical Superintendent regular insecticide spray is done through Sanitary Inspector and his spray start.

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31 affected villages and rehabilitation sites of Bharuch Baroda & Kheda Districts As per national Malaria Eradication polices spraying is decided by Joint Director Malaria Çandhinagar, 100 percent coverage is ensured by constant monitoring by SHO and Disrict Malaria officers of respective Districts. This year Cynamid India has taken up Fennadona spray in S.S.P. area.

With these facilities it has been possible to reduce Malaria

केवल सरकारी प्रयोग के लिए FOR OFFICIAL USE ONLY



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल Environment Sub-Group

तीसवीं बैठक की कार्यसूची

AGENDA FOR THE 30TH MEETING

स्थान : पर्यावरण भवन, नई दिल्ली

तारीङ 27.1.1997 11 बर्ज

Venue: Paryavaran Bhavan,

Date 27.1.1997 11.00 A.M.

New Delhi

इन्दोर

जनवरी, 1997

INDORE

January, 1997

AGENDA FOR THE 30TH MEETING OF THE ENVIRONMENT SUB-GROUP OF THE NARMADA CONTROL AUTHORITY

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Item No. XXX-1(142): CONFIRMATION OF MINUTES OF THE 29TH MEETING.

Minutes of the 29th meeting of Environment sub-group of Narmada Control Authority were circulated to all Members and invitees vide letter No.Env-34(30)/96/1893-1926 dated 16th Dec. 1996.

Comments received from Dr. Shekhar Singh vide his letter no. nil dated 2/1/97 are placed at annexure XXX - 9 at page no. 56.

The minutes are put up for confirmation.

Item No.XXX-2(143): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

- 1) Submission of Catchment Area Treatment (CAT plans for freely draining critically degraded sub-watersheds (Item No.XXII-2(112).
- A) SUBMISSION OF MICRO WATERSHED PLAN FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS BY GOVT. OF MAHARASHTRA AND MADHYA PRADESH.

During the 25th meeting, Govt. Of Madhya Pradesh (GOMP) and Govt. Of Maharashtra (GOM) were directed to recast their plans keeping in view the guidelines for the schemes of National Afforestation Eco-development Board & River Valley Projects. Representatives of GOM & GOMP agreed to submit the plans within a month's time. Subsequently during the 26th meeting, NVDA expressed difficulty in preparing Phase-2 catchment area treatment plan for SSP & NSP due to the short time available for a detailed survey. However an yearly plan an year in advance of its implementation was promised. Annual plan for the year 1996-97 is yet awaited from GOMP & GOM.

Details of plan & availability of the funds may please be reported by GOMP. Progress on treatment works for both forest & non-forest area may please be reported.

During the last meeting, the Chairman suggested that a copy of the CAT plans of GOM & GOMP alongwith maps, even though submitted earlier to the agencies funding the programmes, should be submitted concurrently to the NCA.. Progress may please be reported.

It was suggested during the last meeting that the concerned Dept. of the State Govt. & NCA would approach various dept. for considering the issue of funding CAT programmes for a duration of 5 years instead of 3 years. Progress may please be reported.

During the 28th meeting, Secretary (Environment), GOM had agreed to coordinate the Phase-2 CAT plan & works related to Agriculture Dept. In the absence of needed information from GOM sub-group could not review the status of the plans/implementation during its last meeting. Progress may please be reported.

B) FUNDS FOR TREATING CRITICALLY DEGRADED, DIRECTLY DRAINING SUB-WATERSHEDS IN MADHYA PRADESH.

Member (E&F), NVDA, GOMP informed that a proposal on the issue of waiving the limits imposed on funds required for CAT works related to SSP, had been sent to the State Government. A formal request from GOMP would be reaching the Chairman of the sub-group for taking up the issue with Planning Commission at the Govt. Of India level very soon. The Chairman while agreeing to help in getting a waiver, had clarified that arranging the funds for treating catchment area chargeable to the project was the responsibility of the project authorities. Progress may please be reported.

c) SILT MONITORING POSTS:

During the last meeting it was suggested that the monitoring of silt outflows may be started expeditiously under the guidance of Central Soil and Water Research and Training Institute, Dehradun and or ADG/DDG, Soil Sciences of ICAR. Progress may please be reported by NVDA

Presentation of the results of silt monitoring exercises being carried out in Gujarat is yet awaited.

2) Cost Estimates for preparation of Action plan and implementation of environmental safeguard measures (Item No.XXII-2(112)(2)]

While reviewing the cost estimate and expenditure on environmental issues, Additional Director, Min. Of Environment & Forests, GOI pointed out that during the earlier meeting of the sub-group, it was suggested that the studies being taken up by GOG on the Command Area Development works might be categorised on the basis of the issues addressed in each report and only those reports which directly relate to the environment or to issue suggested by the sub-group be included. Progress may please be reported.

The information presented at Annexure-XXIX-2 of the agenda of 29th meeting was updated on the basis of information supplied by GOG and Madhya Pradesh. However, information related to GOM was not available. The picture that emerged after updating by GOMP and GOG is placed at Annexure-XXX-(1).

3 Establishing a separate authority for coordinating Environmental works in Maharashtra XXVIII-3(136)(1).

Environment sub-group during the 28th meeting discussed the need for having a separate agency for coordination and monitoring of the survey, studies & implementation of the action plans on Environment & requested Govt. Of Maharashtra for consideration

However during the last meeting sub-group could not review the progress. Progress now may please be reported by GOM.

4. Publication on Environment (XXVIII-3(136)ii.

Chairman during the earlier meeting had suggested that the works being done on environmental aspect of the Sardar Sarovar Narmada Project might go a long way in guiding similar works on other projects. However, there was a need for scientific documentation of the good works being done. This was to be supported with suitable maps, charts and photographs. He desired that a suitable agency for compilation of such documents may be identified and it would be useful if this could be done at the earliest.

During the last meeting it was agreed that the state government(s) should prepare the document as planned by them & then it could be presented to the subgroup for a review on the lines suggested by Prof. Ramaseshan that such publications should address the environmental control exercised by project authorities during

important Engineering operations like the one applied at the time of closing of construction sluices of the SSP, if considered necessary. Progress may please be reported by GOM, GOMP & GOG.

5. Construction Program of Sardar Sarovar and Narmada Sagar Projects.

During the 29th meeting the sub-group was informed of the proposal for raising the height of the Sardar Sarovar dam to 110 mt. The issue was discussed & it was directed that the detailed progress on the status of construction vis-à-vis status of implementation of the Environmental Safeguard Measures may be presented to the sub-group during its next meeting for approval. Accordingly construction programme of the SSP & NSP in relation to progress of work on catchment area treatment & compensatory afforestation is presented under item-XXX-3(148).

6. Catchment Area Treatment of Bargi Reservoir.

Shri V.P. Singh, CCF (C), Western Region, MOEF, GOI, Bhopal brought to the notice of the sub-group the issue related to the treatment of catchment area upstream of Bargi reservoir. He was of the opinion that being a part of Narmada river basin this issue might also be discussed by the sub-group.

Vice-Chairman, NVDA expressed the opinion that as the issue raised relate to the project other than the Sardar Sarovar and Narmada Sagar, this was beyond the scope of the sub-group and therefore couldn't be discussed.

The Chairman, however, directed that the point brought out by CCF, Bhopal might be examined, keeping in view the objections raised by the Vice-Chairman, NVDA and should be presented for a review by the sub-group during its next meeting.

The issue was examined & the present position is indicated as follows for a review by the sub-group.

- As per Narmada Water Schemes (Ministry of Irrigation notification as amended up to December, 1990) under para -9 (Powers, functions and duties of the authority), clause-5: All the concerned States shall submit to the Authority all the relevant information called for by the Authority in connection with Narmada Valley Development expeditiously.
- Under functions of the environment sub-group the need for working out the environmental safeguard measures on a basin wide approach was stressed under point (b) functions: I) To work out the environmental safeguard measures to be planned and implemented for the entire Narmada Basin so that environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar & Sardar Sarovar Projects.

Members may like to discuss.

7. CAT works in Maharashtra - Cost Aspects.

Specialist (Env.), NCA brought to the notice of the sub-group during its 29th meeting that while reviewing the cost estimates of CAT works in Maharashtra , NCA in its 55th meeting held on 13th Nov.96 desired that this aspects may be looked into by the Environment sub-group. It was pointed out that the cost of CAT varies with erodibility, land use pattern, slope condition, daily wages, accessibility, terrain etc.

The Chairman had desired that detailed observation might be put-up for a review by the sub-group during its next meeting. Accordingly detailed cost estimates for the areas in Maharashtra are presented in Annex-XXX-(2) for a review by the sub-group.

Item No.XXX-3(144): PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS.

A copy of the status report of Narmada Sagar & Sardar Sarovar Projects for the quarter ending September, 1996 is enclosed and placed at Annex-XXX-(3).

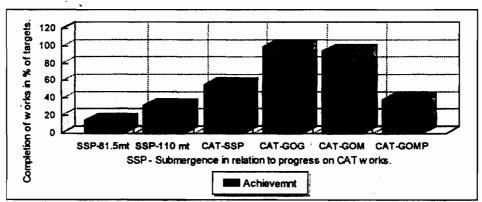
The present status of implementation of environment safeguard measures in relation to construction schedule of SSP at EL 110 Mt. & programme of construction of NSP at levels in relation to progress of works on CAT & CAF is presented below for a review by the sub-group. The sub-group may approve the construction programme of SSP up to EL 110 mt.

1) PHASED CATCHMENT AREA TREATMENT

A). Sardar Sarovar Project:

1

A map showing directly draining sub-watersheds under treatment is placed at Annex-XXX-4. Construction programme of the Sardar Sarovar Project is placed at Annex-XXX-5.

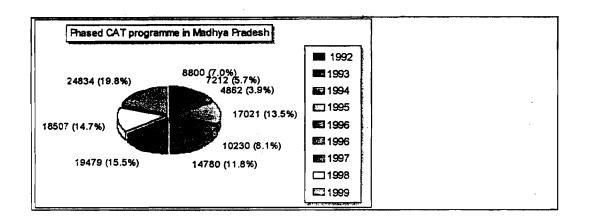


Against a submergence of 31% at EL 110 Mt. the cumulative progress of catchment area treatment is reported to be 55.5% of the total targets.

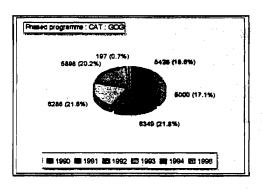
Phased Programme of CAT works

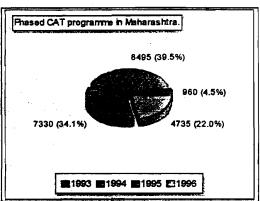
Year	1992	1993	1994	1995	1996	1997	1998	1999	Total
GOMP	8800	7112	4862	17021	25010	19479	18507	24834	125725
GOG	16775	6286	5898	35	162	-	-	-	29156
GOM	-	960	8495	7330	4735	1248	-	-	22768

Govt. of Madhya Pradesh had planned to treat 125725 ha area, out of which an area of 48130 ha has been treated by the end of Dec.96. The cumulative progress reported so far is 38.28%. During the year 1996-97, against a target of 27000 ha of treatment works the progress reported so far is 10230 ha.



Govt. Of Gujarat had taken up the entire catchment area upstream of the Sardar Sarovar Project in Gujarat for treatment. By the end of Dec. 1996 an area of 28995 ha had been treated up against a target of 29156 ha. The cumulative progress reported so far is 99.44% of the total targets





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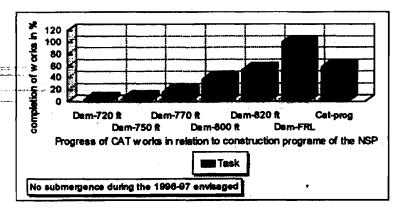
3

Govt. Of Maharashtra had planned to treat 22768 ha of catchment area covering forest and non-forest areas. By the end of Dec.96 works on an area of 21510 ha had been completed. The cumulative progress reported so far is 93.75% of the total targets.

B). Narmada Sagar Project:

According to the progress reported by NVDA by the end of Dec.96 an area of 36739 ha was treated up against a target of 62975 ha. Out of the 36739 ha treated so for an area of 1074 ha was treated up during the year 1996-97.

Progress of works on catchment area treatment in relation to schedule of submergence is placed below for a review by the sub-group. Detailed programme of construction for Unit-I & Unit-II is placed at Annex-XXX-(6).

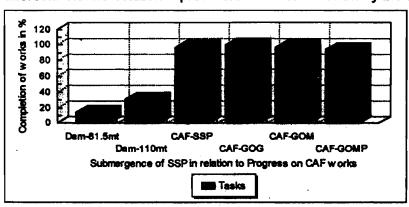


ii) COMPENSATORY AFFORESTATION

A) Sardar Sarovar Project

A map showing the compensatory afforestation sites is placed at Annex-XXX-7. Against a submergence of 31% at EL 110 mt the cumulative progress reported so far is 98.39%.

Progress of works on the project in relation to the works on afforestation/reforestation is presented below for a review by the sub-group.



Govt. Of Madhya Pradesh

By the end of December, 1996, Govt. Of M.P. had completed plantation works over an area of 8225 ha against the final target of 8740 ha.

Govt. Of Gujarat

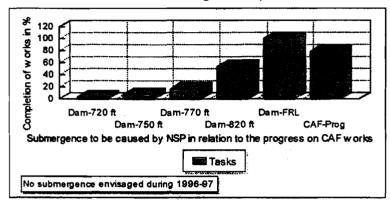
By the end of December, 1996, Govt. Of Gujarat had completed plantation works in the entire planned area of 13950 (including non forest and degraded forest areas).

Govt. Of Maharashtra

Out of total target of 19468 ha planned for treatment in lieu of the areas undergoing submergence, an area of 19293 ha had been planted by the end of December, 1996.

B). Narmada Sagar Project:

By the end of Dec.96 compensatory afforestation works over an area of 63828 ha against a target of 80975 ha were completed by the NVDA. Progress of works in relation to schedule of submergence is placed below for a review by the sub-group.



iii) COMMAND AREA DEVELOPMENT

A) Narmada Sagar Project

Outlines of the TOR for the command area of NSP annexed with agenda papers of the 27th meeting were reviewed by the Sub-Group during the 28th meeting and it was suggested that detailed terms of reference may be drafted by the NVDA on the lines of TOR framed by GOG for the command area of SSP. During the 29th meeting NVDA had requested copies of the TOR's framed by GOG for studies on command area of SSP. Progress may please be reported.

During the earlier meetings it was informed that allocation of Rs.24.5 lakhs had been made by NVDA for the work on collection of data for study on use of insecticides, pesticides in the command of NSP and that recruitment of staff, consultation of literature and purchase of equipment was under progress. Further progress may please be reported.

B) Sardar Sarovar Project

Govt. Of Gujarat

During the earlier meetings, Sub-Group noted that a number of studies were commissioned by the Govt. Of Gujarat on the Command Area Development. These reports were required to be categorised on the basis of issues addressed in each report in consultation with Dr.Abrol of ICAR. Dr.Abrol was requested by the Sub-Group to refer to these studies from the agriculturist point of view and to suggest whether studies were sufficient or there was something more required to be studied. Besides, on the issue of irrigated Agroforestry in SSP it was agreed by NPG to refer the issues to ICAR for needful guidance.

Subsequently one meeting was held with Dr.Abrol at New Delhi where it was suggested that the Planning Commission had prepared certain maps which may be helpful in preparing an integrated Command Area Development Plan. Govt. Of Gujarat was requested to get in touch with him with copies of the needed reports to expedite the issue. During the 28th meeting it was suggested that NPG may get in touch with DDG, ICAR, who succeeded Dr.Abrol in ICAR and expedite all the related issues referred to above.

During the 28th meeting GOG informed hat Dr. Mahesh Pathak would contact the concerned officers of ICAR and would report back to the sub-group soon. Progress may please be reported.

Observations of NCA on the interim report of the studies entitled EIA of Nalsarovar Bird Sanctuary located in the command area of SSP are placed at Annexure-XXX- (8) for observation of the members.

During the 28th meeting Chairman desired that the interim report entitled EIA of Black Buck National Park located within the command of the Sardar Sarovar Project may be looked into by the Wild Life Institute for suggesting further improvements, if any. Progress may please be reported by the WLI.

During the 29th meeting Prof.S.Ramaseshan requested a copy of the report entitled Hydrogeological Impact Assessment for the SSP carried out by HR Wallingford. A copy of the report was supplied to him. Prof.Ramaseshan may like to brief the members of his observation.

Govt. Of Rajasthan

1

Final report on EIA of the SSP command in Rajasthan was promised by GOR by December, 1996. GOR may please present the report.

iv) Survey of Flora, Fauna & Carrying Capacity Studies

A) Narmada Sagar Project

Regarding creation of National Park in NSP areas, Chairman during the 29th meeting stressed the need for spirited follow up of the process leading to declaration of National Park. He desired that current status of notification may please be placed before the sub-group. GOMP may please report the progress.

B) Sardar Sarovar Project

Final Report of the studies on Flora & Fauna for the areas in Maharashtra is yet awaited from the Investigators of the School of Environmental Sciences, University of Pune. Progress may please be reported by the GOM.

v) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY ARCHAEOLOGY

A) Narmada Sagar Project

Govt. Of Madhya Pradesh

With regard to status of Joga fort in relation to the submergence to be caused by the back water effect, during the earlier meetings, NVDA informed that Superintending Archaeologist of ASI, Bhopal had been requested to study this aspect and that all the information needed was made available to him. Progress may please be reported.

B) Sardar Sarovar Project

Govt. Of Madhya Pradesh

A number of agencies have developed interest in archaeological and anthropological history of the Narmada Basin. NVDA is coordinating the organisation engaged by them. In addition, the agencies not engaged by NVDA but working in the Narmada valley are also being addressed for better coordination by NVDA. During the 29th meeting NVDA informed that a report produced by Decan College, Pune was being reviewed. A comprehensive review of the overall progress may please be presented by the GOMP.

Regarding delineation of the reduced level of the monuments being affected by the submergence of SSP, NVDA during the 29th meeting agreed to supply the detailed information within a fortnight. This is yet awaited.

Govt. Of Gujarat

Govt. Of Gujarat may like to submit a detailed report on completion of the works undertaken by it on the development of Shoolpaneshwar temple.

Progress may also be reported on developments related to shifting of Hamfeshwar temple.

A few colour 35 mm. slides of old and new temple(s), requested during the 28th meeting are yet awaited.

Govt. Of Maharashtra

No works were required to be done in Maharashtra in this regard.

ANTHROPOLOGY

Sardar Sarovar & Narmada Sagar Projects

Govt. Of Madhya Pradesh

During the 29th meeting, Chairman desired that the amendments in schedule required for giving the benefits and privileges to the PAPs of the SC/ST categories to be resettled in Gujarat on the lines these benefits were available to them in their parent states may be speeded up. Progress may please be reported by GOG, GOM and GOMP.

Regarding procurement of publication related to the tribals of Narmada from Anthropological Survey of India by NVDA. The sub-group was informed that most of the publications were already obtained & that the balance publications would also be obtained soon. Further progress may please be reported.

vi) SEISMICITY AND RIM STABILITY OF RESERVOIR

A) Narmada Sagar Project

Govt. Of Madhya Pradesh

During the 29th meeting sub-group was informed that the Narmada Control Board, GOMP had cleared the proposal for procurement of the seismic instruments. Progress regarding placing the order may please be reported.

B) Sardar Sarovar Project

Regarding the studies being conducted by CWPRS on the suspected loss of water from the river Narmada and the observations of Prof.Ramaseshan thereon, the Chairman had directed that, till such time a decision for taking up further studies is arrived at by the sub-group, no further studies on this aspect should be taken up. Views of Prof.Ramaseshan have been conveyed to CWPRS. Response from CWPRS is yet awaited. NVDA may please report further developments in this regard, if any.

vii) HEALTH ASPECTS

A) Narmada Sagar Project

Govt. Of Madhya Pradesh

Epidemiological Surveillance studies on Narmada Sagar Project are being pursued by Gandhi Medical College, Bhopal. Four interim reports were received earlier. These reports were examined by the experts of ICMR and their observations were communicated to the investigators. Fifth interim report is long overdue. During the 29th meeting, NVDA communicated that the report would be available soon. Further progress may please be reported.

B) Sardar Sarovar Project

Govt. Of Madhya Pradesh

Regarding Epidemiological Surveillance studies for the SSP area, NVDA earlier informed that the final report of the Gandhi Medical College, Pune would incorporate the recommendations for the SSP area also. Current status of the studies by Gandhi Medical College, Bhopal for monitoring of the SSP areas may please be presented.

Govt. Of Gujarat

GOG may like to report the updated progress on the health facilities provided at the project site, rehabilitation site as well as the facilities planned for the people in the command area of the Sardar Saovar Project.

Govt. Of Maharashtra

Govt. Of Maharashtra may like to inform further progress on the studies and implementation of the health action plan, for the people on the periphery of the reservoir as well as at the new relocation sites.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR

During the earlier meetings, NVDA agreed to submit the approved plan on Fisheries Development and Conservation for the Narmada Sagar as well as Sardar Sarovar Project within a fortnight. This is however, yet awaited.

Updated plan of Fisheries Development for the areas in Maharashtra and Gujarat is also awaited

Govt. Of Maharashtra may like to inform the progress on the observations of NCA vis-à-vis the studies entrusted to Dr.S.N.Singh of CICFRI earlier.

Item No. XXX - 4(145) : ANY OTHER ITEM

DATE & VENUE OF THE NEXT MEETING

ANNEXURES

AGENDA FOR THE 30TH MEETING OF THE ENVIRONMENT SUB-GROUP OF THE NARMADA CONTROL AUTHORITY

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ANNEXURE-XXX-(1)

RELATED TO UNIT I & II DAM & POWER HOUSE :

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A) Expenditure by project authorities:
i) Cost of Survey & Studies (in lacs.)

s.n	o. Component	Esti GOG	mate/Actua GOM	1 Expendit	ure NCA/GOR	Total	
1.	Compensatory Affores- tation	4.52 4.52	<u>5.29</u> 5.29	2.44 2.44	_	12.25 12.25	
2.	Catchment Area Treatment.	8.77 8.77	7.00 7.00	3.28 2.80	···	19.05 18.57	
3.	Flora & Fauna	101.84 80.47	<u>38</u> 16	20.33 17.63	15.27 15.27	175.44 129.37	
4.	Health	2.5	10 2.5	29.63 27.84	-	42.13 32.84	
5.	Archaeology/Anthro-pology.	$\frac{1.3}{0.60}$	NA	59.00 36.33	_	60.3 36.93	
6.	Seismicity & Rim Stability.	N.A.	NA -	23.00 12.50	1.98 1.98		
7.	Command Area Development	11.25 11.25	-	.	N.A.	$\frac{11.25}{11.25}$	
	•		То	tal - (i)		345.4 255.69	
	Cost of Implementation (i	a lacs)					
1.	Compensatory Afforestation.	1809.10 1707.66	$\frac{2116}{1650.27}$	1800.000 828.58	-	5725.1 4186.51	
2.	Catchment Area Treatment.	3509 2674.77	2894.67 2218.26	8835.05 2867.69	· _	15238.72 7160.72	•
3.	Flora & Fauna including Shoolpaneshwar	75.31 64.42	NA	<u>NA</u> Ni 1	-	75.31 64.42	
3.1)Fisheries	-	102.10	_	-	102.10 -	
4.	Health (incremental expenditure) for 10 yrs.	3800.0 192.28	546.60 9.26	1354.63 521.20		5701.23 722.74	
5.	Archaeology/Anthro-pology.	156.00 95.55	•	700 44.93	-	856 140.48	
6.	Seismicity & Rim Stability.	<u>129</u> 271	-		_	<u>129</u> 271	
7.	Command Area Development.	N.A.	-	-	N.A.		
	this Michigan particle of the contract to make an executive and the contract to the contract t	*********************	Tot	al - (ii)		27827.46 13145.87	;
			Tot	al: (i & i	i)	28172.86 13401.56	12

(For Internal use only)

'IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD MEASURES
COST ESTIMATES AND EXPENDITURE

SSP: CATCHCHMENT AREA TREATMENT
- MAHARASHTRA

ENVIRONMENT WING NARMADA CONTROL AUTHORITY BG-69,8ch.74-C, VIJay Nagar, Indore.

PROGRESS AS DN 30.9.96

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BARMADA CONTROL AUTHORITY ESTIMATES AND EXPENDITURE ON CAT WORKS : FOREST AREAS IN MANARASHTRA

				Rs./ ha	ſ	992-93	Gross	Expend			1994-9	95		ditur Rs./h
					Phy.	Financ	ial	Phy.	Financ	ial	Phy.	Finan	cial	
						Field	Estab.	- :	Field	Estab.	•	Field	Estab.	
					i	2	3	4	5	6	7	8	9	10
ΑT	NODET-1													•••••
)	P.Y.D/P.P.0	:		7,173/-										
i)	FY.0	:	·	591/-										
i)	S.Y.0	•		478/										
		Tekal	D.c.	8,834/-										
	•	10121	KS.	8,834/-										
,)	TYO to Xth Y:0 -	:		3,769/-										
•														
		Total	Rs.	12,594/-							·	-		
	HODEL TT						•							
	MODEL - II				•						•			
	P.Y.O. + P.P.O	!		7,819.00										
	F.Y.0	:		5,630.00										
	S.Y.0	;		2,245.00										
	T.Y.0	: ·		812.00					4					
ı	IVth year operation:	;		421.00										
)	Vith year Vith year	:		421.00 421. 0 0										
)	VIIth year	•		421.00										
	VIIIth year			421.80								•		
)	IXth year	:		421.00										
)	Xth year	:		421.60										
		7-1-1	•	10 /53 00	•									
		10031	K5.	18,653.00										
T	MODEL - III													
	P.Y.O and P.F.O. '			4,227.00	•		-							
)	F.Y.0	:		1,123.00										
)	S.Y.0 T.Y.0			511.80							•			
	IVth year operation:	•		459.00 489.88		, • ·						,		
	Vth year		٦, ١,	409.00				٠,٠.٠٠						
	VIth year :			409.80				····						
	VIIth year	•		469.00										
	VIIIth year :			469.99										
)	IXth year			489.00	•									

CAT MODEL - I

Detailed care - recture for CAT Model-I areas having density more than 40%

Item No.	Particulars	Mandays	Wages Rs./ha	Material & supplies	Total Rs./ha
	.1	2	3	4	5
1.	Survey & Demonstration of the areas	0.50	13.50	2.00	15.50
2.	Preparation of treatment map including digging of trial pits of size 0.20 M X 0.20 x 0.60 at an espacement of 100M x 50m.		10.80	4.00	14.80
3.	Demarcation of zone boundary by digging a trench of C.S. size 0.45m x 0.10m @ 100 Rm/ha.	2.25	60.75	- -	60.75
4.	Providing small cross section bunds with earth work 0.60m x 625 Rm/ha with loose bolders pitching including collection and transport of loose boulders to the site.	196.66	5309.82		5309.82
5.	Fencing/Excavation of T.C.M. of C.S. size 1.90m X 0.60m X 1.00m	41.58	1122.66	-	1122.66
	Depth @ 54Rm/ha (Actual length of T.C.M. be assessed and provision be made in the estimate accordingly) @ 77 mandays/100 Rm.				
6.	Preparation of inspection path/ approach road	5.00	135.00	_	135.00
7.	Nursery cost	0.60	16.20	22.00	38.20
	i) Agave suckers for T.C.M.200 suckers/ha				
	ii) Bamboo polypots 278+47=325 plants @1.50 per plant	18.00	486.00	82.00	568.00
	•	264.99	7154.73	110.00	7264.73
	30% Addl. material & supplies + contingencies.		-	217.94	217.94
	4% Labour Welfare	_	_	145.29	290.58
•	Total Rounded to Rs.		7300.02 7300.00	473.23 473.00	7773.25 7773.00

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FIRST YEAR (OPERAT	IONS	Andrew Street,	and the second s	April 10 april 1
1 Library and the second secon	2 .	3	4	5	3
Planting agave suckers on T.C.M.	0780	21.60	r de julije bulaska.	21.60	Many 1
uckers/ha 0.4 mandays/100 suckers.		and the second of the second o	rid of the Marian Car		_
Planting Bamboo Plants at 6m x 6m specing i.e. 278 polypot.	5.28	142.56		142.56	
Cost of seed for sowing on T.C.M.				amend N	
N.A.T. etc. (Seed of species like Neem, Prossopis etc) @ 2 kg./ha	. <u>.</u>		10.00	10.00	
Rs.5/- per kg.					
Natch and Ward: including sowing		: OBSERV			.!
seed on T.C.M. & W.A.At. etc. weeking					
cleaning cutting back and other operations as required for	10.80	291.60	-	291.60	
naintainance of the plantation @1 vatchman per 25 ha for 9 months.		. ,			;
Fire tracing; cutting fire0line 3m	٠.				
wide and burning @ 1 mandays/100 .m.; 54 R.M./ha.	0.54	14.50		14.58	
	17.42	470.34	10.00	480.34	
tage:					
3% Addl. Material and supply + contingencies	-		14.41	14.41	
9% Labour Welfare 9% Addl. Material & supply +	-	9.60	9.61	19.21	
	_	479.94	34.02	513.96	
•	. -				
Rounded to Rs		480.00	34.00	513.00	
Addl. 15% for very difficult terrain and inaccessible areas				77.00	
	_	F.Y.O.		591.00	
·					
, SECONI	SEAR:	OPERATIONS			
11		2	3	4	5
Watch and Ward: including cleaning, cutting, back and other operations					
required for maintainance of the plantation @ 1 Watchman per 25ha. for 12 months.	·	14.60	394.20	-	394.20
 fire tracing; cutting fire line 3 m. wide and burning @1 mandays/100 R.M.; 54 R.M./ha. 		0.54	14.58		14.58
		15.14	408.78		408.78
Rounded Rs				1	409.00
Addl. 15% for very difficult		_			61.00

Detailed rate structure for CAT Model-II areas having density less than 0.4

Item No.	Particulars	Mandays	Wages Rs./ha	Material & supplies	Total Rs./ha
	1	2	3	4	5
	Preparatory year of operation and tree plan	nting year operation:			
1.	Survey and demarcation of the areas	0.50	13.50	· · · · · ·	13.50
2.	Preparation of treatment map				
	including digging of trial pits of				
	size 0.20m x 0.20m x 0.20m at an	0.40	10.00	-	10.00
	espacement of 100 m x 50m.				
3.	Demarcation of some boundary by				
	digging of trench of C.S. size	2.25	60.75	-	60.75
	0.45m x 0.10m at the rate of 100				
	rmt/ha.				
4.	Soil conservation works including				
	nallha bund and gully plugging.	39.00	1053.00	-	1053.00
5.	Excavation of T/ C.M. of size				
.	11.90m x 0.60m x 1.00m	69.30	1071.10	-	1071.10
	2	45.55	1071.10		1071110
6	alianment of 2500 aits		04.50		04.50
6. -	alignment of 2500 pits	3.50	94.50	•	94.50
7.	Digging of 2500 pits of size 0.30m x 0.30m.	65.00	1755.00	-	1755.00
8.	Burning of rabs.	11.50	310.50	-	310.50
9.	Inspection path	5.00	135.00	-	135.00
10.	Nursery cost :			1	
	a) Agave suckers 300 for planting	0.90	24.30	13.50	37.50
	on TOM (Part cost upto October to				
	March			.•	
	b) Foly bags of size 12.5x25x200	14.8	401.76	240,54	€42.30
	gauge (for 1000+200 bags)	•			
	(Part cost upto October to March.	chivan			
	(Part cost upto October to March. c) 1830 teak stumps (including)	12.00	324.00	252.00	576.00
	casualty replacement)				
	(part cost upto October to March):				
		224.23	6054.21	505.74	6559.95
	3% additional material and contingencies	•			196.79
	4% labour welfare				162.39
	Say F	₹S.			7019.00

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	m attailed late			\sim	111000		

Item		Mandays	Wages	Material &	Total
No.	Particulars	· Wandays ,,	Rs./ha	supplies	- Rs./ha
	. 1 .	2	3	4	5
	First year operation:				:
1.	Part nursery cost:	**			•
	a) Expenditure of 1200 plants (1000+200) from April to June. ವರ್ಗ್ನ	10.00	270.00	10.00	200.00
	b) Expenditure of 1800 teak stumps (1500+300).5.55 mandays per 1000 teak stumps	10.00	270.00	-	270.00
	c) 20% casualty replacement for second year plantation 200 plants per ha. part expenditure for October to March.	2.50	67.50	47.50	115.00
	d) 450 teak stumps	10.00	270.00	-	270.00
2.	Refilling of pits 1.20 mandays per 100 pits.	30.00	810.00	-	810.00
3.	Reburning of rabs	2.00	54.00	-	54.00
4.	Sowing of chillar, Prosopis etc. seed along TGM/zonal boundary trench icluding cost of seeds.	2.00	54.00	50.00	104.00
5.	Planting of agave on TCM including transportation.	1.20	32.40	-	32.40
6.	Transport cost of plants:			•	
	a) Transport of poly pot seedlings from nursery to planting site for planting @ Rs.0.30 per poly pot. (1250 plants).	· -	-	360.00	360.00
	b) Transport of 1000 teak stumps.		·	90.00	90.00
7.	Planting of 2500 poly bag seedlings/ らっていかり in pits including transportation within plantation area.	18.90	510.30		510.30
8.	20% replacement of casualties including transportation within plantation areas 2 mandays for 100 plants.	8.40	226.80	-	226.00

	1	2	3	4	5
9.	Weeding:	ergens			
	a) First weeding and application of manure. One manday per 100	62.50	1687.50	·	1687.50
* £	plant 25 mandays.		• • • • • • • • • • • • • • • • • • • •		
b)	Second weeding and soil working manday per 100 plants		jaka jernjali se sanggar falla aya	interes in the	
	25 mandays			.•	
c)	Third weeding and mulching 0.50 mandays per 100 plants 10.50 mandays		. 		
10.	Purchase of manure/fertilizer (2.5 gm per plant 52.5 kg. for 2500 plants.)	-	. ·	116.00	116.00
11.	Watch and ward for 9 months one watchman for 25 ha. (he will be resewing of seeds and carry out porks cutting and protection works).	. 10.00	291.60	-	291.60
12.	Cost of insecticides and application.	0.46	12.42	5.00	17.42
13.	Fire tracing (3 metre wide) cutting and burning.	1.00	27.00	-	27.00
		169.76	4583.52	678.50	5262.02
	3% Addil. material and contingencies 4% Labour Welfare		., •	*	157.86 210.36
	Say F				5630.36 5630.00

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item No.	Particulars	Mandays	Wages Rs./ha	Material & supplies	Total Rs./ha
	1	2	3	4	5
	3: Second year operation:				
1.	Nursery cost. 20% casualty replacement poly bag seedlings. part expenditure from April to June for 500 seedlings.	3.00	81.00	4.00	85.00
2.	Casualty replacement from nursery to planting site including transport loading and unloading for 500 seedlings.	0.96	25.92	54.03	79.95
3.	Casualty replacement including transportation 500 plants per ha.	6.00	162.00		162.00
4.	Second weeding and soil working etc. works.	50.00	1250.00	-	1350.00
5.	Watch and ward. One watchman for 25 ha. for 12 months (he will do the work of proning and protection and maintenance of plantations)	14.60	394.20	-	394.20
6.	Fire tracing (3m. wide) cutting and burning. One manday per 100 running metre.	1.00	27.00	٠.	27.00
		75.56	2040.12	58.03	2098.15
	3% additional material and contingencies 4% labour welfare.				62.94 83.92
					2245.01
	Say Rs				2245.00
	4: Third year operation:				
1.	Weeding and soil working 2500 plants 0.50 manday per ha for 100 plants.	12.50	337.50	-	337.50
2.	Watch and ward. One watchman for 25 ha. for 12 months for one ha. he will do the work of seed sowing C.B.O. and protection)	14.60	394.20	- 	394.20

	1	93(5)52	3	4	5
3.	Fire tracing (3m wide) cutting and burning.	1.00	27.0		758.70
		20.10	758.70	-	758.7 0
	3% additinal material and contingencies 4% labour welfare.			.•	22.75 30.35
•	Say Rs				811.80 812.00
	5: Fourth year operation:		-		
1.	Watch and ward one watchmen for 25 ha. for 12 months (He will do the work of seed sowing, debudding and protection and maintenance of plantation).	14.60	394.20	-	394.20
2.	Fire tracing (3m. wide) cutting and burning.	1.00	27.0	-	27.00
	Say. Rs.	15.60	421.20	•	421.20 421.00
	6. Fifth year operation to 10th year operation p	oer year.		. ,	421.00

CATMODELIII

			•	** * *	
Item No.	Particulars	Mandays	Wages Rs./ha	Material & supplies	TotalRs./ha
	<u>. </u>	2	3	4	5
	A) Preparatory year operation:				
1.	Survey and demarcation	0.50	13.50		13.50
2.	Preparation of treatment map including of trial pits size 0.20m x 0.60m an espacement of 100m x 50m.	0.40	10.00	. -	10.00
3.	Excavation of T.G.M. of C.S. size 1.90m x 0.60m x 1.00m approximate 2 length 54m.	41.50	1122.66		1122.66
	B) Preplanting year operation:				
1.	Soil conservation work including Nala bunds and gully pluging	40.00	1080.00	-	1080.00
2.	Digging of trenches of size 2m x 0.60m x 0.30m. 50 trenches/ha. 18 mandays per 100 trenches.	9.00	243.00		243.00
3.	Preparation of grass beds of size 8m x 1.75m x 1.15m. 100 grass beds/ha. 30 mandays per 100 beds.	30.00	810.00	· -	810.00
4.	Purchase of seed sowing on grass beds 200gm per bed. 20Kg seed @ Rs.25/-per Kg. for 100 beds.	- .	-	500.00	500.00
5.	Inspection path	1.00	, -	27.00	27.0
6.	Nursery cost :				
	 a) Agave suckers for planting on T.C.M. 200 suckers. 	0.60	16.20	22.00	38.20
	 Poly bags seedlings for planting on trenches. 	2.23	60.21	45.09	105.30
,	Poly bags size: 12.5 x 25 x 200 guage 100 plants - 20% casualities. Part expen- diture from Oct. to March for per 1000 plants/12.40 mandays + 250.45 material.	•			
		125.31	3383.37	567.09	3950.46

		A STATE OF THE STA	The second secon			
				<u> </u>		
	1		2	3	4	5
	3% Addl. materiai and contingencies 4% Labour welfare.			79.00	118.51 79.00	118.5 158.0
	ر شراری رواد افزای و میرد در این در این از این از شراری رواد افزای این از	Total	1904.63	3462.37	764.60	4226.9
	Say Rs	And the second of the second	1905.00	3462.00	765.00	4227.0
		CATI	MODELIII	Torrible on Let 3.	<u>.</u>	
	2. First year operation:		,			
1.	Nursery cost:					
	Cost of polythene bag seedlings and agave suckers from Apr. to June. 100 polythene seedlings+200 agave suckers - 380 8.525 mandays per 1000 plants.	· .	3.24	87.48		87.4
2.	Refilling of trenches 10 mandays per 100 trenches/for 50 trenches.		5.00	135.00	· -	135.0
3.	Transport of plants from nursery to plantation site including loading and unloading poly pot seedlings including casualty replacement +200 agave suckers - 380 @ Rs.15/- per 100 plants	· ·	-	-	57.00	57.0
4.	Planting of seedlings including transportation 0.90 mandays per 100 plants/150 plants.		1.35	36.45		36.4
5.	Planting of agave suckers on TCM. 0.4 mandays, per 100 suckers/200 suckers		0.80	21.60		21.6
€. '	Seed sowing on grass bed 0.105 mandays per bed/100 beds per ha.		10.50	283.50	-	283.5
7.	Casualty replacement 20% plants-30 plants planting including transportation 2 mandays per 100 plants.		0.60	16.20	- '	16.2
8.	Weeding					
	Weeding of plants on trenches 1. Ist weeding and application of manuar 1 manday.	•				

n Were		garaina ar , a mada magamada ilikuwa a		10 mg	
					newson for the second s
	· 1	. 2	3	4	5
2.	IInd weeding one manday. 3. Soil mulching 0.5 mandays				
	Total mandays 2.5/100 plants	الله المنافعة	A S - TE CONTROL OF MAN CONTROL	What was a single one will be used in a con-	
	150 plants/ha	3.75	101.25		101.
9.	Furchase of fertilisers and insecticides @ Rs.3/- per 100 plants/150 plants.	· · · · · · · · · · · · · · · · · · ·	• •	4.50	4.
١٥.	Watch and ward. One watchman for 25 ha. for 9 months	10.80	291.60	·	291.
11.	Fire tracing (3 mt. wide cutting and burning).	0.54	14.58	• -	14.
		36.58	987.66	61.50	1049.
	3% Addl. material and contingencies 4% labour welfare		20.98	31.47 20.98	31. 41.
			1008.64	113.95	1122.
	Say Rs		1009.00	114.00	1123.
3.	IInd year operation:				
۱.	Weeding: Ist weeding @ Rs.1.20 mandays/ 100 plants.		•		
	Soil mulching 0.50 mandays/ 100 plants. Mandays 1.70 per 100 plants for 150 plants.	2.55	60.85		68.
2.	Watch and ward - One Watchman for 25 ha. for 12 months for one ha.	14.60	393.20		294.
3.	Fire tracing	0.54	14.58	-	14.
		17.96	477.63	-	477.
	3% additional material and contingencies.	-	-	14.32	14.
	4% labour welfare	-	9.55	9.55	19.
,	Total Say Rs	-	487.18 487.00	23.87 24.00	511. ⁴ 511.

	and the first of	4.4 Table 1.5				
	orani 🚅 🐧 😁 💎 tem tigiliya		2	3	4	5
4.	IIIrd year operation		•			
1.	Weeding and soil mulching 0.9 mandays per 100 plants for 150 plants	•	0.75	20.25		20.25
2.	Watch and ward tending and maintenance operation. One Watch for 25 ha. for 12 months.	thman	14.60	39 4.20	-	394.20
3.	Fire tracing		0.54	14.58	- '	14.58
•		•	15.89	429.03	•	429.03
	3% Addl. meterial & contingencies 4% Labour welfare.			8.58	12.87 8.55	12.87 17.16
		Total	-	437.61	21.45	459.06
		Say Rs	-	438.00	21.00	459.00
	5. IV and Vth year operation					· · · · · · · · · · · · · · · · · · ·
1. 2.	Watch and ward and tending and maintenance operation. Fire tracing		14.60 0.54	39420 14.58		394.20 14.58
	The hading					
	····	Total	15.14	408.78	-	408.78
	•	Say Rs		409.00	-	409.00

STATUS REPORT SARDAR SAROVAR PROJECT (SSP) ENVIRONMENTAL ASPECTS SEPTEMBER. 1996

The action plans and status of studies and implementation of Environmental Safeguard Measures upto quarter ending September, 1996 are as indicated below:

Environmental Safeguard Studies/Measures

- 1) Phased Catchment Area Treatment,
- 2) Compensatory Afforestation,
- 3) Command Area Development,
- 4) Flora, Fauna & Carrying Capacity,
- 5) Seismicity,
- 6) Health Aspects,
- 7) Archaeological & Anthropological, Studies,
- 8) Fisheries,
- 9) Rim Stability Analysis.

I. CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

- more detailed surveys for prioritisation of the subcatchments in the SSP area should be undertaken;
- a phased CAT programme should be prepared and implemented ahead of reservoir filling.

GOI issued a Directive in June 1992 that, for the SSP, the project would bear the costs of the treatment of all critically degraded sub-watersheds draining directly into the reservoir. These watersheds were identified amongst those classified as either very high or high-priority categories by the All India Soil and Land Use Survey (AISLUS). The project would also be responsible for the treatment of those areas of the catchment which are directly damaged by the project activities.

In addition, plans are required to be prepared for the treatment of the balance of the critically-degraded watersheds but the cost of this will be met from other ongoing schemes and in a timeframe to be determined.

Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the SSP catchment.

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), 1985.
- Report on Prioritisation of Sub-watersheds in sub-catchments of Narmada Catchment, 1991 by ATS & LUSO, New Delhi.

I. DIRECTLY DRAINING SUB-WATERSHEDS:

Table 1.01 The total catchment area of SSP below NSP is 2442440 ha.

	GOMP	GOG	GOM	Total for the Basin
Total Catchment	248688	30230	163610	2442440 ha
Very High & High	546702	30230	116355	688410
Directly draining Very High & High	121330	29537	2 8226	175565
Areas directly dama- ged by project acti- vities.	-	500	-	500
Planned to treat	125725.	29157	22768	177.65

Table 1.02 Summary of Status of CAT Planning

	GOG	GOM	GOMP
Preliminary Surveys			
Prioritisation of sub-watersheds			
Development of Management Options		plete for a	
Annual Action Plan	¥11. «	all States	•
Effective monitoring			
Phased Programme			

Table 1.03 Principal Elements of Action Plans for CAT

GOG	GOM	GOMP
•		item
Complete	Complete	Complete
"Yes" for	all item	for
all Stat	tes	
		•
•	"Complete & all Sta Complete "Yes" for	"Complete" for all & all States. Complete Complete "Yes" for all item all States

	92-93	93-94	94-95 95	-96 96-97	97-98 98	-99 99-20	000 Total Task
GOG F				- 162 35			
	16775	6286	5898	35 162	~_		
GOM F NF	<u>-</u>	960	65 14. 5 ₆₅₄ 1980 7	1.97 4735 88 -	- Com	pleted - pleted -	·
-	-	960	8494.5 ₇₃₂	9.97 4735	- Com	pleted -	
GOMP F			4268 * 594 *				
	8800	7142	4862 170	21 2501	0 19479 1	8507 2483	34 =12572
	A 1	Gujar: (29157		Maharash (22768)= 177.65	12.82%		
		Forest	Non- Forest	Forest.	Non- Forestö		Non- Forest
Monsoon	<u>year</u>						
1 990-91		4528	898	-	-	-	-
		4528 4770	898 230	-	-	- · _	-
1991-92				- - - -	- - -	- - -	- - 8800
1 991-9 2 1992-93		4770	230	- - 960	- - -	- - - 966	- - 88 00 6246
1 991-9 2 1992-93 1993-94		4770 6013	23 0 336 286	- - 960 6514.50	1980		
1 990 - 91 1 991 - 92 1992-93 1993-94 1994-95 1995-96		4770 6013	23 0 336 286			4268	6246
1 991 - 92 1992 - 93 1993 - 94 1994 - 95 1995 - 96		4770 6013 6000 5730	230 336 286 168	6514.50		4268 (a)	6246 594 (17021-a)
1991-92 1992-93 1993-94 1994-95 1995-96 1996-97		4770 6013 6000 5730 NTL 162	230 336 286 168 35	6514.50 6541.97 4735	788 - <u>,47 2768</u>	4268 (a) (b)	6246 594

II. FREELY DRAINING SUBWATERSHEDS: (Excluding directly draining Subwatersheds).

Table 1.06 Summary of Status of CAT Planning:

	GOMP	GOM	GOG
			र्वेद्वीक्षक्षक्रम्भ एकामा अस्ति। दु
- Preliminary Survey	Yes	Yes	Already
- Prioritization of Sub-watersheds	Yes	Yes	under
 Development of Management options monitoring 	Yes	Yes	implemen- tation.
- Phased programme	Yes	Yes	

Table 1.07 Principal Elements of Action Plan for CAT:

	GOMP	GOM	GOG
- Survey work	Yes	Yes	
- Preparation of development map	Yes	Yes	Already
- Micro watershed map	Awaited	awaited	under
- Work responsibility	Yes	Yes	impleme-
- Menu of treatment	Yes	Yes	ntation
- Time Table	Yes	Yes	
- Proposal for monitoring	Yes	Yes	
- Budget	Yes	Yes	
- Availability of funds	*	*	

^{*} Agreed by Planning Commission for inclusion in River Valley Project" Scheme and funds are also promised by MOE&F from National Afforestation & Eco-Development Board. Work commenced on 6 schemes in Maharashtra & a few others in Madhya Pradesh.

A. Govt. of Madhya Pradesh:

Table 1.07 Total Area of freely draining critically degraded subwatersheds below NSP is 54.6702 ha.

1	Phase J Area (Directly draining)	Phase-II (Balance Area)	Total Area
SSP	121330	356484	477814
Jobat	-	-	28211
Man	-	<u>-</u>	12720
Maheshwar	· -	- '	13209
Omkareshwar .	-	-	14748
			546702

Table 1.09

PHASE - II (356484 ha.)

Forest Area Non Forest Area

Gross Area Net Working Area Gross Area Net working Area

1,11,479 78,368 2,66,388 2,39,750

Table 1.9 Schedule of Implementation (Madhya Pradesh): (318118 ha)

Year	Target (in ha.)		Planned as on 30.09.1996		Progress (in ha.)			
	FA	NFA	Tota 1	Submitted RVP	Approved	FA	NFA	Total
1997-98 1998-199 1999-200 2001-02 2002-03 2003-04 2004-05 2005-06 2006-07 2007-08 2009-10	0 8000 8000 8000 8000 8000 8000 6368 -	16000 16000 16000 16000 16000 16000 16000 16000	24000 24000 24000 24000 24000 24000 24000 24000 24000 16000 16000	155319	8237	1285	2107	7 3392
2010-11 2011-12	- - 79269	16000 16000 		 3 155319	8237	1285)7 3392

B. Govt. of Maharashtra:

PHASE-II

Table 1.10 Schedule of Implementation of freely draining Sub-watersheds.*

Year	Forest Area	Non Forest Area
•	Phy. in ha.	Phy. in ha.
 1994-95	5600	3145.66
1995-96	5600	4186.97
1996-97	5600	4511.86
1997-98	5600	5044.1
1998-99	5600	4993.48
1999-2000	5600	5453.93
2000-2021	6400	-
•	40,000	27,336

^{*} Six schemes sanctioned. Works commenced.

Approval for the diversion of forest land for the SSP was granted by the MOEF in 1987, 1990 & in 1993 (including for R&R works) but several conditions were attached relating to the planning and conduct of CAF. Principal amongst these are the following stipulations.

- For every hectare of forest land submerged or diverted for construction of the project there should be Compensatory Afforestation on one hectare of non-forest land plus reforestation on two hectares of degraded forest. This represents a two fold increase of the usual requirement.
- For the 4,200 hectares of forest land in Maharashtra which is to be used for R&R, an equal area of non-forest land or double the area of degraded forest should be planted.
- The governments of the three states involved should prepare plans detailing their proposals for Compensatory Afforestation and submit these to the MOEF before work in the forest area is due to commence.
- The project should supply firewood to its construction workers, at its own cost, to prevent them from having to meet their fuel needs from the surrounding forests.

Studies

These have been a number of studies in three states aimed at assessing the extent and significance of the loss of forest land attributable to the SSP.

- Sardar Sarovar (Narmada) Project Development Plan, Volume-II.
 prepared by the Narmada Planning Group (NPG) in 1983.
- Studies on Ecology and Environment by M.S. University of Baroda (MSU) in 1983.
- Sardar Sarovar Project: Preparation of Environmental Work Plan by the Forest Department of Maharashtra in 1988.
- Eco-Environmental and Wildlife Management Studies on the Sardar Sarovar Submergence Area in Gujarat 1992 by MSU.
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems by State Forest Research Institute, Jabalpur (1989-92).
- Draft report on Flora and Fauna in and Around Sardar Sarovar Project. Maharashtra by the University of Pune 1994.

The Action Plans

In compliance with the conditions set by the MOE&F, each state has prepared an action plan for the CAF of areas within its boundaries. The relevant documents are:

- Government of Gujarat Work Plan for Management of Environmental Effects, Section on Forests and Wildlife: The Compensatory Afforestation Plan for the Rann of Kutch, 1986.
- Project for Afforestation in Sardar Sarovar Project Impact Areas due to Diversion of Forest Lands for Sardar Sarovar Project (GOG), 1991.
- Compensatory Afforestation Scheme in Lieu of Sardar Sarovar Project in Dhule District, Maharashtra State (1989).
- Government of Madhya Pradesh Forest Department Action Plan of Compensatory Afforestation for Sardar Sarovar multipurpose river-valley project (1989).

These plans were submitted in varying stages of completeness but each has now been revised and updated to take account of the comments of the MOEF and the NCA. Action plans of 3 State Govts. contained following components:

- Identification of areas for CAF;
- 2. Description of selected areas,
- 3. Justification of Selection of Areas,
- 4. Identification of responsible agency,
- 5. Description of staffing requirements,
- 6. Description of material requirements,
- 7. Estimate of costs,
- 8. Identification of tree species,
- 9. Description of preparatory work needed,
- 10. Description of planting techniques,
- 11. Provision for aftercare,
- 12. Yearly planting target,
- 13. Yearly budget,

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14. Provision made for monitoring implementation

Table 2.1 Areas for Compensatory Afforestation

		Area of Forest diverted for SSP	Area of De- graded for- est to be Replanted	Area of Non- Forest Land to be Affo- rested	Total area for CAF
GOG		4,523	9,300	4,650	13,950
GOM	(a)Submer.	6,488*	12,980	6,488	19,468
	(b)R&R *	4,200	_	4,200	4,200
GOMP		2,732	6,550	2,190	8,740
TOTAL	 L :	17,943	28,830	17,528	46,358

^{*} This includes 2700 ha released in 1990 & 1500 in 1993 for R&R works in Maharashtra for which only equal non forest area is being raised as stipulated.

Table 2.2a Schedules for Implementation of CAF (Against Submergence) 42155/(41,478) = 98.39%

	Gujara 13950/(1395		Maharash 9630 (19478		Madhya Pradesh 8740/8225=94.1%	
	Degraded Forest	Non- Forest	Degraded Forest	Non- Forest	Degraded Forest	Non- Forest
Target:	9,300	4,650	12,977	6,488	6550	2190
Monsoon)	ear	2150	·		132	716
1991	2,834	350	8383		1200	373
1992	2450	847	4552	2276	2400	-
1993	2,500	455	20	1,156	2215	-
1994	1,516	848		2894	а	1189-a
1995	Completed	Completed	Completed	NIL	NIL	NTL
1996	Progress -	-	-	NTL.	NIL	NIL
1996	Target -	- ,	-	0.162	ь	515-b
Achieveme		4650	12977	6326	822	25
state tar	gets 100% ntage.	100%	100%	97.5%	94.	1%

z h code c c

Table 2.2b Schedule for Implementation of CAF in lieu of Forest Land released for R&R works.

State		Land released	T	arget &	Progress	
	Year	Area in ha.	1993-94	94-95	95-96	96-97
Maharashtra	1990	2700	2192 2192.37	311 307	184.50 197	12.5
	1993	1500	_	-	<u>896</u> 1500	694
4200=85.32% (3583)	Total Targe		2192	307	1697	616.5
	Achie	vement	2192	311	1080.	50

Other Additional Afforestation Activities:

Plantation along Canal Banks:

The total potential of canal bank plantations is estimated to be 18000 ha. A project report prepared for this purpose by forest Deptt. is under scrutiny of SSNNL. The plantation programme is likely to be launched effectively from the year 1996. However to give a start to the work of canal bank plantations, plantations on 425 ha have already been established till rains of 1995. There is a target of 200 ha. canal bank plantation for 1996-97.

Additional Plantation Activities

(a) Dam Vicinity Plantation (235 ha)

An area of 240 ha. in the vicinity of the dam has also been planted. This work was completed in 1992.

(b) Ravine Land Afforestation (200 ha.)

On the left bank of the river Sabarmati an area of 200 ha. in two villages i.e. Ratanpur (120 ha.) and Pirojpur (80 ha.) has also planned for plantation. An area of 200 ha. is planted till 1994 rains.

(c) Project area plantations: (255 ha)

An area of 300 ha, has been planted in the project area as per the target and the work completed in the rain of 1992.

III. COMMAND AREA DEVELOPMENT: (Including Drainage Studies)

(A) Government of Gujarat:

Government of Gujarat have undertaken several studies related to the Command area development. Some of which have been completed and the remaining are in progress. Their position is as

follows:

S1.	No. Name of Study	Name of Agency	Year of completion
Ι.	Completed Studies:	4 4 - -	
1.	Pre-Feasibility study for Low Level Canal.	Jyoti Consultants Ltd. Vadodara.	1981
2.	Mathematical Modelling of Ground Water for system single layer model-Narmada Mahi-Doab.	Operation Research Group, Vadodara.	1982
3.	Pre-Feasibility level Drainage study of Narmada Mahi Doab of SSP Command.		1982
4.	Some Aspects of Role of Panchyats and Institutional Arrangements for canal irrigation in Two Talukas of Ahmedabad District.	ral and Urban Anth-	1982
5.	A study of settlement Pattern (6 Talukhas in the Narmada Command Area of Mahesana District of Gujarat).	Department of Geography, Gujarat University, Ahmedabad.	- 1982
6.	Regionalisation of Narmada Command.	Operations Research Group, Vadodara.	1982
7.	Marginal cost study of two Typical Distributeries and Two Typical Branches.	Dr. C.R.Shah, Vadodara.	1983
8.	Socio-Economic Bench Mark survey of 62 Talukas (Sub- districts) of Narmada Command Area.	Fourteen Different Agencies Including Universities,Resear- ch Institutions etc	Between 1982 & 1983
9.	Population Projection and Migration study for Narmada Command Area.	Operations Research Group, Vadodara.	1983
10.		Gujarat Water Supply and Sewerage Board, Gandhinagar.	1983
11.	Consumer Expenditure, Assets and Indebtedness of Rural Households of the Command Areas of Sardar Sarovar (Narmada) Project,19	Directorate of Economics & Statistics, Gandhinagar. 82.	- 1983

12.	Wasteland Development Project for command Area of Narmada Canal (Region 11 and 12).	Gujarat State Rural Development Corpora- tion Ltd.,Gandhinagar.	1984
13.	Mathematical Modelling of Ground Water System Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
14.	Additional work on Mathe- matical Modelling of Ground Water System-Single Layer Model Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
15.	Rate of Adoption of Imp- roved Technology in Narmada Command and Rest of Gujarat State (Based on Analysis of Crop cutting Experiments Data).	Operations Research Group, Vadodara.	1985
16.	Computer aided Planning of conveyance and delivery Network.	Indian Institute of Management, Ahmedabad.	1986
17.	Land Use and Cropping Pattern Survey and Mapping of Narmada Command Area Zone 4A & 4B.	Department of Geogra- phy, M.S.University, Vadodara.	1986
18.	Survey and Investigation work of Ground Water Resources in Narmada-Mahi\$	Gujarat Water Resour- ces Development Cor- poration Ltd.Gandhi- Nagar.	1987
19.	Cropping Pattern and Water Demand Study in Narmada Command Area.	Operations Research Group, Vadodara.	1987
20.	Inter-Regional Water allo- cation and Determination of Branch Canal capacity.	Operations Research Group, Vadodara.	1989
21.	Extended study on Inter Regional Water Alloca- tion and determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1989
22.	Growth of Agro-Process- ing Industries in Phase-I of the Sardar Sarovar Project.	Gujarat Industrial & Technical Consultancy Organisation Ltd. Ahmedabad.	1990

		, uniq Nobered State Spagners A. A.			
	23.	Consultancy work for Cont- rol, Telemetry and Communi- cation Net Work on Narmada Canal System for SSP.	Gujarat Communication & Electronics Ltd., Vadodara.	1991	·
	24.	Techno-Economic Study for utilising Village Tanks as Borrow Area for Construction of Canal Net Work.	Operations Research Group, Vadodara.	1992	
	25.	Area Development Strate- gies for selected Regions Adjacent to Narmada Main Canal (Vadodara, Surendra- nagar & Banas Khatha Dist.)	Operations Research Group, Vadodara.	1992	
	26.	Studies in Water Rates Policy in 3 parts.	•		
		i) Pricing of a public Utility Survey of Literature	Department of Econo- mics, South Gujarat University, Surat.	1992	
		ii)Financial working of Irrigation Projects - A case of four projects in Gujarat.	Department of Econo- mics, Sardar Patel University, Vallabh Vidyanagar	1992	
		iii)Some policy issue for Canal Water Rates in Gujarat.	Department of Econo- mics, Sardar Patel University, Vallabh Vidyanagar.	1992	
	27.	Mathematical Modelling of Ground Water System for SSP Command between Rivers Shedhi and Sabarmati.	Consultancy Engineering Services, New Delhi.	1993	
•	28.	Mathematical Modelling of Ground Water System for SSP Command between Rivers Sabarmati and Banas.	Operation Research Group, Vadodara.	1993	
	29.	Mathematical Modelling of Groundwater System for SSP Command beyond Banas upto Rajasthan Border.	Dalal Consultants, Ahmedabad.	1993	
	30.	Prefeasibility level Drai- nage study for SSP Command beyond Mahi.	Consultancy Enginee- ring Service, New Delhi.	1993	
		•			

31.	Study on preparation of a detailed Integrated Command Area Development Plan for SSP.	M/s Wamana Consultant Pvt.Ltd.,Hyderabad.	
32.	Environmental Impact Assessment Studies on Inland and Marine Fisheries relevant to the Command Area of Sardar Sarovar (Narmada) Project.	M.S. University, Vadodara.	Nov. 1994
33.	Environmental Impact Assessment (EIA) Studies on Water Related Diseases in Sardar Sarovar Project (SSP) Command Area including the Area Down Stream of the SSP Dam.	Commissionerate of Health, Medical Services & Medical Education, Govt. of Gujarat, Gandhinagar.	Oct. 1995
34.	Study of Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project : Lying between the Narmada & Sabarmati Rivers.(EIA Studie	Sardar Patel University, Valalabh Vidyanagar. es).	Nov. 1995
35.	EIA on downstream of Sardar Sarovar Dam upto Gulf of Combay.	H.R.Wallingford.	April'95
36:	Economic Dimension of the Sardar Sarovar Project.	S.P.Institute of Social & Economic Research,Ahmedabad.	May,1995
37.	Study on Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project Lying in Saurashtra and Kachchh Area (Environmental Impact Assessment Studies).	Saurashtra University Rajkot.	, Jan.1996
38.	Review of ground water drainage study.	H.R.Wallingford	Feb.1996
	Agro Pollution aspect of Command Area.	-do-	Feb.1996
TT.	ON GOING STUDIES:	•	·
1.*	Development of Aliabet Island in the Estuary of River Narmada.	Multi Disciplinary Expert Group.	Sept.'92
_	Environmental Impact Assessment (EIA) studies on Aliabet Island.	Chief Engineer, (CAD SSP) Expert Multidisciplinary Gro	Dec.,93

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Agricultural Research Gujarat Agricultural 1987
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- 3. Survey and Investigation Gujarat Water Resour- 1989 Work of Ground Water Resour- ces Development Corpoces beyond River Mahi in ration Ltd., Gandhinagar. SSP Command.
- 4. Action Research on People's Gandhi Labour Institu- 1991 Participation in Water te, Ahmedabad.

 Management in SSP.
- 5.* Study on Flora and Fauna of Gujarat University, March,1993 the Command Area of Sardar Ahmedabad.

 Sarovar (Narmada) Project:
 Lying between Sabarmati
 River and Rajasthan Border
 (Environmental Impact
 Assessment Studies).
- 6.* Ecological study of Wild Guj.Ecological Dec.,93
 Ass Sanctuary and surrounding area using remote sensing Foundation (GEER
 technology for Environmental Foundation), GandhiImpact Assessment.
- 7.* Environmental Impact GEER Foundation Dec.,93
 Assessment of Nal Sarovar
 Bird, Sanctuary.
- 8.* Environmental Impact Assess- GEER Foundation Dec., 33
 ment of Velavadar National
 Park located in the command
 area of SSP.
- * Draft/interim reports received in NCA.

Govt. of Gujarat has formed an expert multidisciplinary group to coordinate the studies & for drawingup the needed plans.

(B) Government of Rajasthan

The Government of Rajasthan had submitted a report on Environmental & Ecological aspects and remedial measures for Narmada Canal Project, Copy of the report was submitted to Ministry of Environment and Forests. Govt. of Rajasthan have assigned studies on EIA of Command area in Rajasthan portion to WAPCOS. Field studies on soil profile is completed. Report on drainage design is being drafted by WAPCOS.

IV. FLORA. FAUNA. WILDLIFE AND CARRYING CAPACITY

The guidelines of the MOEF require that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present can

be assessed, listed (rare and endangered) species can be detected, if present, and appropriate conservation measures devised.

On the basis of relevent details supplied by the various states, MOEF issued clea-rance for the SSP in 1987. A condition of this clearance, as far as it related specifically to the Flora & Fauna, was that Narmada Control Authority would ensure indepth studies on flora & fauna needed for implementation of Environmental Safeguard measures.

Studies/Surveys :

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- Important survey work has included the following:
- The Environmental Impact Study of 1983 prepared by (MSU).
- Preliminary Report on First Botanical Exploration and Plant Collection from Narmada Valley by the Botanical Survey of India in 1986.
- Report on the Survey of the Narmada Sagar Area by Zoological Survey of India, 1988.
- Note on Sardar Sarovar Project Preparation of Environmental Work Plan for Forest and Wildlife by the State Forest Department, GOM, 1988.
- Status of Flora and Fauna in and Around Sardar Sarovar Project, Maharashtra is studied by the University of Pune (1992-94). Interim report is received in NCA.
- Eco-Environmental and Wildlife Management Studies in the Sardar Sarovar Area in Gujarat, 1992, by MSU.
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems. The study was conducted by the State Forest Research Institute (SFRI) in Jabalpur and financed by the NVDA. This study is completed & report is submitted in 1994.
- Workshop on Approaches to Integrated Wildlife Management in Gujarat: A Report by the SSNNL, October 1990.
- People's Involvement in Wildlife Management, by VIKSAT in 1991.
- Wildlife Management Studies in the Submergence and Catchment Area of Narmada Project: With Special Reference to Shoolpaneshwar Wildlife Sanctuary, by the SSNNL, 1992.
- Narmada Basin Water Development Plan: Development of Fisheries, 1987, was prepared by the Narmada Planning Agency, GOMP.
- Rapid Reconnaissance Survey of Limnological Aspects Part I, II and III, 1987, were undertaken by the Universities of Bhopal, Vikram and Rani Durgavati for GOMP.

- Water quality data has been collected by the Central Pollution Control Board, Central Water Commission, the State Pollution Control Boards and the National Institute of Oceanography.
- Narmada River Basin Development Project: Fisheries Component, 1991 by the German Consultants to the World Bank, GOPA.
- Sociological Survey of the Fishing Families of the Narmada River by CICFRI, 1991.
- Aquatic Fauna (Fish) Studies in Indira Sagar Submergence Area, prepared by the Friends of Nature Society in 1991 on behalf on the NVDA reported on the fish fauna of the Narmada.
- Pre-and Post-Impoundment Limnological Studies of Narmada Basin, by three universities coordinated by Barkatullah University for the NVDA. (1989-92) Study report was available in 1994.
- Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream is a desk review sponsored by the NCA and undertaken by CICFRI, 1993.
- Ecology and Fisheries of the Narmada Estuarine System with Special Reference to Proposed Impoundment (Sardar Sarovar Dam), is an ongoing study begun in 1988 by CICFRI.

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The Action Plans

To ensure that the wildlife conservation measures are implemented effectively, action plans for the three states were prepared as follows:

 felling plans for the forest area coming under submergence in Maharashtra and Madhya Pradesh which will avoid the possibility of animals being trapped in the submer-gence area;

plans for improvement works in the wildlife sanctuaries of Gujarat. Shoolpaneshwar sanctuary development action plan prepared by GOG in 1996.

Fisheries Component:

Three state Govts, submitted the fisheries development plans which are as follows:

- The Narmada Basin Water Development Plan: The Development of Fisheries, 1984. This comprehensive plan for GOMP addressed the development of fisheries in the NSP, Omkareshwar, Maheshwar and SSP areas. Phasing and programming with respect to pre and post-impoundment, clearance of the forests, training of fishermen, cooperative societies and post-impoundment management were proposed.

- Environmental Work Plan: Sector Fish and Fisheries, GOG, 1986. This work plan, prepared in compliance with the agreement With the World Bank included the establishment of fish hatcheries and fish farms, training of fishermen, establishing primary cooperatives, and establishing an Inter State Fisheries Board. In addition, it included proposals for conducting hydrobiological studies, studies on the morphology of the river, investigations into the physical and chemical characteristic of the water and soil, and studies on flora, fauna, fish yield, plankton, and productivity in the reservoir.
- A Note on SSP: Preparation of Environmental Work Plan for Fisheries Development in Maharashtra, 1987. This plan included proposals for the felling in the reservoir submergence zone, fish seed, hatcheries, stocking, fishing, manpower requirements, and training and management through the Inter-State Board. Some more studies have proposed by GOM through CICFRI.

Subsequently, the state governments revised their plans with a view to address to issues as they arose. The revised plan for GOM included proposals for the fishing population to be resettled on the periphery of the reservoir or in R&R sites in Maharashtra. In addition, the establishment of low-cost hatcheries and irrigation tanks, the development of pen cage culture fisheries, and intensive fish farming were proposed. GOG also revised their plan by end 1994. The plan contained four volumes covering upstream, downstream & command areas. In view of the progressive impoundment which commenced in March, 1994. NCA has constituted an expert group to lay down the guidelines for conservation & development of fisheries & its ecosystem. The plan submitted by state Govts. are under scruitny of this expert group.

Table 4.1 Summary of Status of Environmental Planning:

A) .Wildlife

	Gujarat	Maharashtra	Madhya Pradesh
Preliminary Surveys	Complete	Complete	Complete
In-Depth Studies	Complete,Final report available	Completed, Draft final report available.	Complete Final report available.
Development of Manage- ment Options	Complete for Shoolpaneshwar sanctuary	Awaiting results of study report from SES, Pune.	Some work comple- ted but awaiting deliberations of the expert group.

Action Plan

Migratory corridors	Not needed	Not needed	Plan ready.
Sanctuary development	Shoolpaneshwar Sanctuary Management plan prepared	Not needed.	Not needed.
Wildlife conservation measures in adjoining forest(s).	Massive affor- estation in catchment of SSP,	Awaits, report of SES, Pune.	Await final out- come of the expert group.
Implementa- tion	Shoolpaneshwar development complete, CAT work (increasing carrying capacity) nearing completion	Awaiting out- come of the study. CAF & CAT nearly completed.	Arrangements complete, awaiting final outcome of study. Substantial CAT works in the catchment completed.

Progress in Shoolpaneshwar Sanctuary Development

·	Target	Achieved to	% Complete
Fencing	100km	107	100
Firelines	60km	251 km	100
Barricades	2km	2.8 km	100
Check Dams	14	14	100
Construction of Quarters	21	21	100
Construction of Rest House	1 3	1	100
<pre>Improvement c Communication</pre>		70.5 km	100

The SSP will also provide an opportunity to enhance nature conservation outside the immediate catchment area of the Narmada. In particular three wildlife sanctuaries located in the command area of the project will benefit from the increased freshwater availability resulting from the project and there are plans by the GOG to further develop these. They comprise:

- Nal Sarovar, Bird Sanctuary;
- Wild Ass Sanctuary in the Rann of Kutch.
- Velvadar Black Buch National Park.

Summary of Status of Environmental Planning:

B) Fisheries

	GOG	GOM	GOMP
Preliminary surveys work plan.	Yes	Yes	Yes
Updating of Detailed surveys/studies of fish fauna	Yes	. 	Yes
Updated Action plans	Yes	Yes	Underformu-
Implementation			lation
1.Plan for clear felling	Completed	Yes to synchronise with submer-gence about 479.91 ha he felled.	Yes to synchronise with submergence work commenced.
2.Development of fish farms	Under imple- mentation	Proposal under re-vision.	Proposal under re-
3.Establishment of IFDB for future R&D management	Agreed	Agreed	Yet to agree
4.Expert group to lay down guide-: lines for conser-: vation & Development		the states & o hree meetings the anvil.	

Progress of Implementation

CICFRI have already established one hatchery in Gujarat for augmenting the numbers of the Hilsa fish in the reservoir. This currently produce around 250,00 spawn per year. CICFRI have also been commissioned to monitor the whole of the estuary and their study has been extended to examine pollution and to undertake modelling studies in the downstream environment.

A draft plan for the creation of an Interstate Fisheries Development Board (IFDB) has been prepared by the NCA and agreed, in principle, by the governments of Gujarat and Maharashtra. However GOMP has disagreed & suggest an alternative proposal. Reaction from GOG & GOM are awaited. The organisation is expected to be set up and fully functioning prior to reservoir filling. An expert group has been constituted by NCA to lay down the guidelines for fish conservation & development during progressive

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filling of the reservoir to advise the state executive agencies for followup action. Guidelines are on the anvil.

GOG has already provided 16 hectares of land to the project for the development of fish farms. In addition, the State Fisheries Department is exploring the development of riverine fisheries and the development of the reservoir for commercial and game fisheries.

In Gujarat reservoir bowl is already cleared of all vegetative growth. Execution of felling in M.P. & GOM as perfelling plans prepared awaits the commencement of impounding.

V. SEISMICITY

Studies

Studies of reservoir-induced seismicity (RIS) and rim stability have been carried out by the Geological Survey of India (GSI), Central Water and Power Research Station (CWPRS), University of Roorkee and World Bank Consultants. The principal studies are described below:

- University of Roorkee. 1980. Geological and Seismological Investigations of the Environs of Narmada Valley around Navagam Dam site in Gujarat.
- GSI. 1981-82 and 1982-83. A Geotechnical Report on the Reservoir Competency Investigations in Parts of Sardar Sarovar Area, Bharuch & Vadodara Districts. Volumes I&II.
- Shenoi et al. 1982. Shenoi et al presented at the New Delhi conference on the significance of seismotectonic aspects on reservoir development.
- Balasundaram, M.S. 1982 Sardar Sarovar Project: A Geotechnical Report Compiled and Edited for the Government of Gujarat.
- MSU. 1983. The Sardar Sarovar Narmada Project Studies on Ecology and Environment.
- NVDA published a Position Paper on Seismic Studies in January 1986.
- Krishna, Dr. J. 1989. Dams and Seismicity.
- GRI. 1998. Study of the Rim Stability of the SSP.
- GOI.1993. Sardar Sarovar Project Seismicity and Sardar Sarovar Dam.

Progress of Implementation

The various recommendations for modification of the dam design which have all been implemented are summarised as:

- adoption of horizontal design coefficient of 0.125g on the recommendation of the Dam Review Panel;
- installation of stress monitors in the main body of the dam:
- increase of the depth of the foundation to 18m below the lowest river bed.

The Government of Gujarat has identified 9 locations for the installation of seismic monitoring stations, 4 each on either side and one at the downstream of the Sardar Sarovar reservoir out of a total of 9 stations there are 3 in M.P., 1 in Maharashtra & 5 in Gujarat. By Dec. 1994, 8 stations was had been installed. Construction of building for the 9th station in progress.

The progress of implementation is illustrated in Table below:

Implementation of Actions

Action	Status
Dam design modifications	Complete
Installation of monitoring stations	8 stations installed by June, 1994, 1 more awaited
GSI (Nagpur Division) rim stability studies	Completed
Tracer Studies by CWPRS	Reports submitted.

VI. HEALTH ASPECTS

Studies

A large number of studies have been carried out on the health profile of villages in the three affected states. The key studies are "summarised below:"

- Narmada Programme Schistosomiasis Back-to-Office Report,
 1986 assessment was carried out by Goodland, consultant to the World Bank, the National Institute of Communicable Diseases (NICD) and the World Health Organisation (WHO).
- Proceedings and Recommendations of the Meeting on Schistosomiasis Research and Surveillance held at NICD on 22nd November 1985.

- Disease Profile of Command Area by the State Commissariat of Health, Medical Services and Medical Education (SCHMS), 1986.
- Health Statistics, GOM, 1987. The state department of health produced a report on the health profile of 33 projectaffected villages in Dhule District, Maharashtra.
- Health Statistic 1982-84, GOMP. This study, published by GOMP in 1985 & updated is 1994.
- The Sardar Sarovar Narmada Project Studies on Ecology and Environment by MSU in 1982 considered public health in Chapter-3.
- Numerous studies have been conducted on the incidence of malaria in India by, amongst others, by the Malaria Research Centre (MRC) and Dr. Kalra.
- Revised health plan by GOM, 1995.
- Revised health plan by GOG, 1996.
- Epidemiological Survelliance studies by GOM, 1996.

Status of Implementation of Actions for Public Health

Action	Gujarat	Maharashtra	Madhya Pradesh
Baseline studies	Complete and updated'95.	Complete being updated.	Complete being updated.
Preparation of state action plan	Submitted and modified in 1986; Urban Malaria Scheme proposed	Original sub- mitted in 1987, revised in 1991 and 1992 & 1993	Original submitte in 1986, revised in 1988 and final plan submitted in 1991.
Survey of existing facilities	Complete	Complete	Complete
Establishment of new facilities	Hospital at Kevadia for workers; labo- ratory and mobile unit complete, drug dispensaries	Somawal village hospital; health centres and health units sanctioned.	Hospital, mobile unit and civil dispensaries for labour; detailed scheme for resettled population
Vector control measures in place	NMEP; SSNNL work- shop on malaria control; labora- tory establish- ed; studies on health completed	NMEP; adoption malaria control guidelines of irrigation Department	NMEP; state malaria control organisations strengthened

Appointment of specialist staff

One senior health Yes one PHC, 3 Needs identified officer is posted dispensaries &

at Kevadia.

one floating dispensaries established & 33 posts

filledup.

Disease Monitoring and responsibility

Entrusted to SCHMS EIA report regular health submitted.Action department plan of 1986 being revised.

Entrusted to Survillane studies commenced. Phase-I survey

Evaluation cell established monitoring by Gandhi Medical College, Bhopal.

report submitted by T.N. Medical College.

VII. ARCHAEOLOGICAL SURVEY AND ANTHROPOLOGICAL STUDIES/ ARCHAEOLOGICAL SURVEY

In the case of SSP, where some sites may be submerged NWDT award stipulated that, the entire cost of relocation and protection should be chargeable to GOG. Relocation work is to be supervised by the Department of Archaeology under the provisions of the 1958 Act.

Studies:

Survey conducted for identification of various sites & monuments of significance has included the following:

- Gujarat: Archaeological Survey of Nineteen Villages Submerged by Sardar Sarovar Reservoir, 1989.
- Maharashtra : Survey of Department of Archaeology. A survey was carried out by the Department of Archaeology of cultural sites in 24 villages of Akkrani Taluk and nine village from Akkalkuwa Taluk, Dhule District.
- Madhya Pradesh: Survey of State Department of Archaeology and Museum (1992), in sixteen volumes.
- Anthropological Survey of India: Narmada Salvage Plan.
- Anthropological Survey of India: People's of India.
- Parishad, A.K. Survey of Material Cultural in the Narmada Valley.
- Rashtriya Manav Sanghralaya : Narmada Salvage Plan.

Cultural Heritage in SSP Area

	Gujarat	Madhya Pradesh	Maharashtra
Relocation of temples	2	7	-
Excavation site(s)	-	5	

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•	GOG	GOMP	GOM*
Survey of Villages in Submergence Zone.	"Comp	lete" for all	item in
Identification of Cultural Sites	· ·	the States.	
Collection of Data and Documentation of Sites	Complete	In progress	Not required
Selection of appropriate sites.	Complete	In process	Not required
Action plan	Complete	Finalised	Not required

^{*} Survey in Maharashtra identified one temple which was on the border with Gujarat. GOG has already relocated this temple 15 km. downstream of present location.

Progress of implementation:

State	Relocation of temple Target/progress	Excavation Target/Progress	Sculptures Target/Progress			
Gujarat Maharashtra	2/2	·	- -			
Madhya Pradesh	7/6 *1	5/3 *2	188/9 *3			

*1 Relocation/Protection

Work for relocation of following temples is in progress.

	<u>Village</u>	<u>Temple</u>	
1. 2.	Semalda Barda	Kalanjeshwar Shiv Mandir	ü Ü Land allotment under
3.	Khujawa		ü progress of estimate ü under preparation.
4.	Khujawa	Jaleshwar temple	ü
5.	Panthia	Satmata temple	•
6.	Panthia	Shiv temple	

The monuments viz. Shiv temple of Religaon is proposed to be protected by constructing a wall.

*2 Excavation

 For excavation at vill Khaparkheda & Brahmangaon. Funds sanctioned by NVDA & work was completed. - For excavation at village Utawad. Work was completed earlier by ASI, Govt. of India.

*3 Collection & display at Museum

- 122 - 124

- Land for museum at Barwani & Indore requested. Chemical treatment of rock cut statue at Piplagarhi has already been started. This monument is proposed to be shifted at relocation site.
- Construction of a section 'Narmada Dirgha' in the museum at Bhopal has been started.
- Besides, Film documentation of all the monuments of SSP is in progress through an agency 'Madhyam', engaged by state deptt. for documentation of the Important monuments.
- Proposal to establish Narmada park to house sculptures at Lalbagh Palace, Indore is under consideration of the state Govt.

ANTHROPOLOGICAL STUDIES

Government of Madhya Pradesh has informed that in view of the studies being carried out in connection with Narmada Sagar Project, no separate anthropological studies are required and that the Director General, Anthropological Survey of India has also expressed the same view. M.P. State Adivasi Kala Parishad has submitted its report on Tribal arts & culture. Besides Anthropological Survey of India has informed that Narmada Basin is already covered extensively under the project "people's of India". Besides Rashtriya Manav Sanghralaya has conducted needed studies in the past as follows. Further studies are covered under R&R plan of the state Governments. The work done by An.S.I is being used.

- a study of the palaeo-ecology of quaternary fossils in the central Narmada Valley;
- excavation of upper palaeolithic site of Mehtakhaeda and further exploration of Nimar;
- collection of tribal artifacts in Madhya Pradesh.

Institutional responsibility for these actions was specified in the action plan whereby the first two elements were completed by Deccan College, Puna and the third by Adivasi Kala Parished, for the Rashtriya Manav Sanghralaya, Bhopal.

STATUS REPORT NARMADA SAGAR PROJECT (NSP) ENVIRONMENTAL ASPECTS. SEPTEMBER. 1996

1) Phased Catchment Area Treatment:

The freely draining area of Narmada Sagar Project down stream of Bargi Dam is about 39,25,422 ha. As per the guidelines of MOWR, directly draining watersheds of very high and high priority categories only are to be treated Pari passu with the construction of the dam and at the project cost. Prioritisation survey of the watersheds was entrusted earlier to SGSIT&S, Indore. Later on, as per GOI's instructions the prioritisation survey was entrusted to the All India Soil & Land Use Survey Organisation, New Delhi. The Survey has been completed by AISLUSO, New Delhi and the Survey reports have been received in the NVDA.

On the basis of the reports submitted by the AIS&LUSO, 30 sub-watersheds belonging to the very high and high priority categories and directly draining into the reservoir have been identified for treatment. These 30 sub-watersheds cover an area of about 73,456 ha.

T. <u>DIRECTLY DRAINING SUB-WATERSHED OF HIGH & VERY HIGH PRIORITY</u> CATEGORIES:

Critically degraded Sub-watersheds below Bargi dam (Figure in ha).

,	FOREST		NON FOREST		TOTAL		
	Gross	Net	Gross	Net	Gross	Net	
Critically degraded sub-watersheds.	15759	11048	57697	51927 *	73456	62975	

^{*} In addition an area of 1636 ha. was treated up under pilot project earlier.

Programme and Progress of Works:

Upt	to 92-93	93-94	94-95	95-96	96-97
Non-Forest area/ha. (51,927 ha)	11439	10261	7224	3878	<u>1974</u> 19125
Forest area/ (11,048 ha)	-	-	2623	240	NTL 8185
Total Area: (62,975 ha)	11439	. 10261	9847	. 4118	<u>1074</u> 27310

II. FREELY DRAINING AREA: (EXCLUDING DIRECT DRAINING SUB-WATERSHEDS)

Number of watersheds

Gross Area

Net Area

478

10,12,650 ha.

9,15,150 ha.

Schedule of Implementation:

Year	Target (in ha.)			Planned as on 30.9.96			Progress			
	FA.	NFA	Tota 1					FA	NFA	TOTA
				Submitted		Approved				
				NAEB	RVP	NAEB	RVP			
1995-96	_	18000	18000	7332	1986	Awaited	1 19	 86		-
1996-97	_	18000	18000							
1997-98	10000	27000	37000							
1998-99	10000	28800	38800							
1999-2000	10000	28800	38800							
2000-2001	10000	28800	38800							
2001-2002	10000	28800	38800							
2002-2003	10000	28800	38800							
2003-2004	10000	28800	38800							
2004-2005	10000	28800	38800							
2005-2006	10000	28800	38800							
2006-2007	10000	28800	38800							
2007-2008	8430	28800	37230		,					
2008-2009	- .	28800	28800							
2009-2010	_	28800	28800							
2010-2011	_	28800	28800							
2011-2012	_	28800	28800							
2012-2013	_	28800	28800							
2013-2014	-	28800	28800							
2014-2015	-	28800	28800							
2015-2016	-	28800	28800							
2016-2017	-	28800	28800			٠.				
2017-2018	_	28800	28800							
2018-2019	_	28800	28800							
2019-2020	-	28800	28800							
2020-2021	-	28800	28800							
2021-2022	-	23800	28800							
2022-2023	_	26400	26400							
2023-2024	-	26120	26120							
	400400									

^{108430 806720 915150}

2) Compensatory Afforestation :

A total of 40332 ha forest land would come under submergence an additional 779.9 ha of forest land has been diverted for the residential colony, power house complex, dam, saddle dam and

⁵ projects for seeking funds for 40 subwatersheds covering an area of 53709 ha of forest were submitted by NVDA to National Afforestation & Eco-Development Board.

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approach roads. Subsequently, another 308.4 ha of forest land was permitted to be diverted for power house. Thus a total of 41,420 ha of forest land has been permitted to be utilised for the construction of ISP. To compensate for this loss of forest, 10,143 ha of non-forest and 70,802 ha of degraded forest land has been identified for compensatory afforestation.

Programme of Compensatory Afforestation:

	Commulative Progress till 91-92	92-93	93-94	94-95	95-96	96-97
Degraded Forest area (70,802 ha)	23048	11919	12987	4056	2902	<u>162</u> 8174
Non-Forest area (10,143 ha)	5239	<u>139</u> 0	1327	667	131	NTL 1100
(80,945) (say 81,000 ha)	28287	13309	14314	4723	3033	<u>162</u> 9274

3) Command Area Development:

The Government of Madhya Pradesh has submitted command area development plan. The project on completion will provide annual irrigation to 1.69 lakh ha.

The implementation of the plan would be taken up in three phases for completion in 6/2007. The study on impact of Agro chemicals, runoff from fields on surface & ground water quality in the command area has been assigned to J.L. Agricultural University, Jabalpur. An MOU for this work was finalised. An allocation of Rs.24.5 lakhs was made. Studies have commenced.

4) Flora, Fauna, Wildlife and Carrying Capacity :

Botanical exploration of Indira Sagar Dam was carried out by Botanical Survey of India during 1985. Besides, wetland and aquatic flora of Narmada Valley in Madhya Pradesh was also published in 1991 in Vol 15 No.3 in J.Econ.Toxicology.Bot.

Studies on these aspects were entrusted to the Wildlife Institute of India, Dehradun in December, 1989 and were completed by March, 1994. The final study report is submitted to MOE&F & NCA.

Besides this, the Friends of Nature's Society, Bhopal, has completed the preparation of Wildlife Retrieval and Conservation Plan. Implementation oof the plan awaits submergence.

Actions have been takenup by NVDA to implement the recommendation of the WLI regarding declaration of National Park & protected areas.

5) Seismicity and Rim Stability

The reservoir competency survey has been done by GSI and report is submitted. In the report, GSI has suggested further studies for some patches of narrow water divide. This study has been undertaken by GSI.

Establishment of 10 nos. of seismic observatories in the Narmada Sagar Complex area is takenup NVDA. Besides, 12 nos. of wood Anderson Seismometers and six nos. of photographic recorders are being procurred from IMD supply has commenced. Procurement of Micro Earthquake recorders is completed. In the mean time on the initiatives takenby NVDA, CWPRS has already installed the instrument to records. Preimpounding date and for undertaking seismic studies at NSP, Omkareshwar & Maheshwar projects through Analogic micro earthquake recorder & strong motion accillograph as an interim measure. Data will be interpreted by IMD.

6) Health Aspect:

A note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and comments were sent for modifying the report. NVDA has submitted the revised plan costing Rs.748.73 lacs for the preventive and curative aspects of health. Regarding preventive aspects, a MOU has been signed with the Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal. Four six monthly report received. For studies on health aspect in project impact areas of SSP and NSP, work is proposed through a cell of monitoring and evaluation under the Directorate of Health Services, Bhopal. The approved plan is being implemented.

Pre-impoundment and post-impoundment Limnological studies carried out by three Universities will take care of water quality aspect. These studies have been completed and the final report is submitted. Action plan is under approval of NVDA.

7) Fisheries Development:

The studies of certain aspects of fisheries have been included in the Limnological studies being conducted by the three Universities of the State; studies in the Upper Narmada, (Bargi Reservoir) by Rani Durgawati University, Jabalpur, studies in the Middle Narmada (Tawa, Barna and Kolar Reservoirs) by Barkatullah University, Bhopal, studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have completed the studies in their respective areas as per MOU and final report available. According action plan has also been drawnup to conduct & post impoundment studies on Fish & Fisheries Hydrobiological studies to the extent of Fish Abundance. This under approval of NVDA. Acquatic fauna has also been covered under the studies completed by Friends of Nature Society, Bhopal. The draft report of FONS is also available. Action plan submitted earlier is being updated.

8) Archaeological and Anthropological Survey:

A survey of the 254 villages is required for identification of the archaeological monuments falling within the submergence area. The State Department of Archaeology and Museum, Bhopal was entrusted with the survey of 87 villages which has been completed. The state Department have already submitted an action plan for relocation of monuments of Archaeological significance. This plan is being implemented.

Archaeological Survey of India has also completed the survey for 167 villages for contrally protected monuments for identification of the monuments of significance. Implementation of the action plan is already initiated. As only lower bastion in north of the Joga Fort is likely to be affected by Scour action of water, this is being studied and the Siddeshwar temple is well above the FRL of 860 ft., these two structures in NSP areas are not considered as affected by the project however action is being taken by the concerned agencies to ensure safety of the monuments.

Excavation of the early historic mound in village Khedinama in Hoshangabad distt. is completed and report is available in NCA. Actual tools & artifacts have been found. Nagpur branch of ASI has also completed excavations at village Utawad.

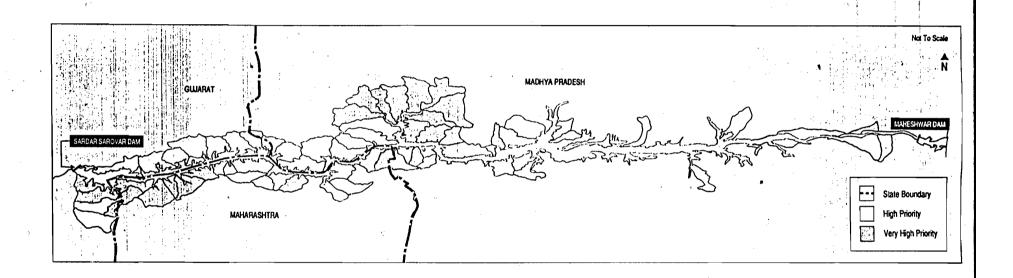
Anthropological Studies:

Efforts are being made for retrieval of bio-cultural material from the Narmada Basin. A lot of information is gathered from the field which generates immense data of Socio-Anthropological significance.

Rashtriya Manav Sanghralaya has constituted a working group for the retrieval of bio-cultural material in Narmada Basin. Survey of tribal art and handicraft entrusted to M.P. Adivasi Kala Parishad is completed and report is available. Besides Anthropological Survey of India has covered these studies under its own project called "people of India". NVDA has procurred six volumes of this report viz.Vol.I,II,III, VIII, X & XI & these are being studied for use in the R&R tribal PAFs. The report is in 61 volume out of which 7 volume are under final editing. A Narmada Salvage plan is also launched by Anthropological Survey of India recently and the entire area is scanned and some ancient tools have been found.

Priority Areas for Catchment Area Treatment

ANNEXURE - XXX -(4).



ANNEXURE-XXX-(5)

SARDAR SAROVAR PROJECT Construction Schedule

Unit - I Dam

51. No.	Ac tivity	Mile stone date for completion as per the Implementation Schedule of May'87.	Mile stone date for completion as per the Implementation Schedule of Dec. 189.
1.	Construction of sluices at EL 35.0 m	23.5.1990	23.6.1991
2.	Construction of right training wall	23.5.1991	23.6.1991
3.	Energy dissipation arrangements for service spillway.	23.5.1992	23.6.1994
4.	Installation of six penstocks	23.5.1992	23.6.1994
5.	Energy dissipation arrangement for auxiliary spillway.	23.5.1993	23.6.1994
ó.	Construction of river sluices at EL.60 m	23.5.1993	23.6.1993
7.	Right non-overflow dam, power dam and installation and commissioning of penstock gates and all other works necessary to permit diversion of water for irrigation and generation of power at EL. 110.5 with all blocks completed upto EL 112.5 m for controlling water level at EL110.5 m	23.5.1994	23.6.1995
8.	Spillway, left non-overflow dam and spillway bridge, completion of concerte works.	23.5.1995	23.6.1997
9•	Installation of crest gates and stop logs.	23.6.1996	23.1.1998
10.	All works as per the contract	23.6.1996	23.1.1998

Note: Present level is 80.3 m with 1.2m concrete humps on crest from dam safety considerations giving effective height of 81.5 m. As per construction programme discussed in SSCAC, it is proposed to raise dam to 110 m by June, 1997.

SARDAR SAROVAR PROJECT Construction Schedule

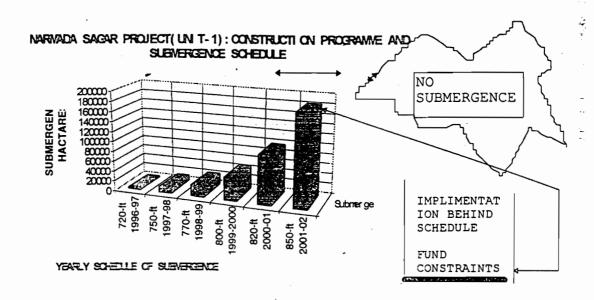
Unit - II Canals

51. No.		As per original Implementation Schedule	sed Constru- ction programme
1	2	3	4
1.	Main canal and distribution system-I i.e. up to Mahi river Ch 144.5 km of NAC.	1995	1998-99
2.	Complete Main Canal upto Rajasthan Border- Ch 457 km.	2002	2001
3.	Distribution system— II between ch 144.5 - 457 km of upto 8 ha. block outlets.	2004	2006
4.	Command Area Development works including conjuctive use of Ground Water.	2009	2009

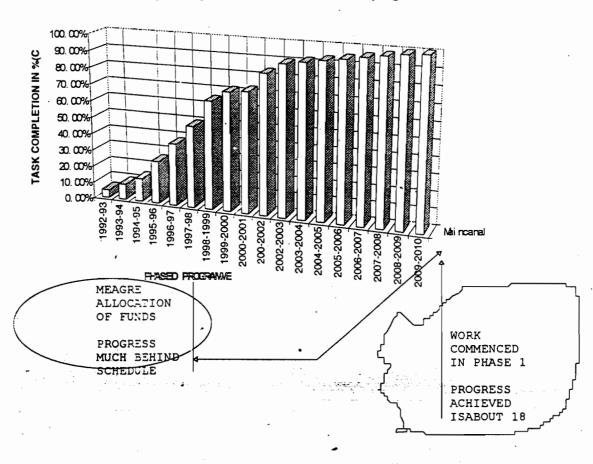
INDIRA SAGAR PROJECT (MADHYA PRADESH)

Implementation schedule

S.No.	Activity - No. 1 of the Communication of the Commu	As per the implementation schedule of June 89	As per present planning of N.V.D.A.
<u>1</u>	2 	3	4
1.	Raising of Indira Sagar dam upto crest level i.e. 241.13	1997	June, 1998
- 2.	Installation of crest radial gates	1998	June, 2000
3.	Commissioning of 1st Unit	1997	-do-
4.	Commissioning of all Units	1999	2005
5.	Completing the first zone of Indira Sagar Canal syste to Irrigate 36000 Ha.	19 98 em	2000
6.	Completing the second zone of canal system to irrigate additional 46800 Ha.	2003	
7.	Completing the entire canal system to irrigate total area of 1.23 lac. Ha.	2007	201 0

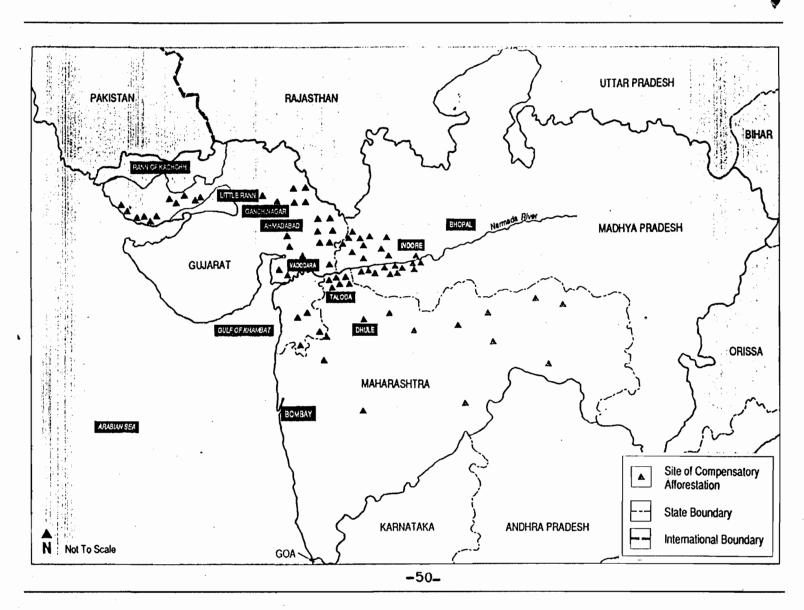


Narmada Sagar Project: Unit-2 Construction programme



ANNEXURE - XXX-(7).

Compensatory Afforestation in Gujarat, Maharashtra, Madhya: Pradesh





ANNEXURE-XXX- (8)

नर्मदा नियंत्रण प्राधिकरण ADA CONTROL AUTHO

No. Env-4(5)/96/39

Dated, the

lof January, 1997.

BY SPEED POST

To

Shri J.B.Shah. Officer on Special Duty, Govt. of Gujarat, Narmada Planning Group, 12, Narmada Block, 3rd Floor, New Sachivalaya Complex, Gandinagar.

Sub:-Observations on 2nd Interim Report on Environmental Impact Assessment Studies on Nalsarovar Bird Sanctuary.

Ref:-Your letter No.NPG/Na1/EIA/228-I-1017 dated 18.11.1996.

Sir,

Please refer to your letter under reference enclosed herewith our observations on the report entitled "Environmental Impact Assessment Study of Nalsarovar Bird Sanctuary" for needful action at your level.

Yours faithfully,

Encl:-As above.

10.1.97 (DR.PAWAN KUMAR) SPECIALIST (ENV.)

REVIEW ABSTRACT FOR IIND INTERIM REPORT IN ENVIRONMENT OF NALSAROVAR 1996

"Second Interim Report on Environmental Impact Assessment studies of Nalsarovar Bird Sanctuary located in the Command Area of the Sardar Sarovar Project" prepared by GEER Foundation, Ahmedabad, Gujarat 1996.

KEY WORDS: EIA/AVIFAUNA/ZOOPLANKTON/PHYTO PLANKTON/ECOLOGY/ CARRYING CAPACITY/NICHE/WATER QUALITY.

This is second interim report of a three year plan for the sanctuary. The present reports contain inventory of Avifauna, fishfauna, zooplanktons, phytoplanktons during seasons of the year. It also describes the socio-economic of the people dependent on the sanctuary. Pressure of cattle's on the ecology of the lake is also presented.

RELEVANCE TO THE SARDAR SAROVAR PROJECT

The study is expected to shed light on the negative as well positive impacts on the sanctuary of the irrigation within its impact zone by the SSP canal and is expected to address the use of regeneration flows from irrigation by the SSP canals for betterment of the sanctuary area.

FINDINGS

Environmental Impact Assessment study of the Nalsarovar Bird Sanctuary was entrusted to GEFR Foundation. A good piece of work has been done by the investigators in inventorying the natural resources within the impact zone of the sanctuary area. This would help the investigators in identifying the sources of impacts, their evaluation, and simulation besides, planning of proper mitigation measures.

About the 2nd Interim Report

The report includes identification of vital areas of human consentite water and soil evaluation, study of zoo plantime and vegetation in addition to inventory of fish and avifauna. The soil and water analysis includes observations of temperature, PH chlorides, dissolved oxygen, Alkaline, hardness as well as the physical parameters of the soil like, profile, density, conductivity of water holding capacity, organic parameters etc.

The parameters selected were observed at various points during seasons of the year providing a valuable input to documentation of the resources condition during pre-project phase. These parameters shall be used for evaluation of changes in the lake environment emnating from the irrigation by the SSP canal within the impact zone.

Birdfauna is very well documented. Documentation on this aspect includes habitat type and preferences by the waterfowls, availability of the food and shelter. The avifauna study shows that the wide variety of the water fowls have developed micro adaptation to various niches available during seasons of the year. The various habitat types which are available are attributed to the variations in the water level.

The report also includes, study of the wet lands, nature of vegetation, management of sanctuary and land-use pattern through analysis of the different patterns by remote sensing.

Study of zooplanktons and phytoplanktons are also included in the report. These organism play an important role in the food chains. A number of species of Algae and Zooplanktons have been recorded from sanctuary area.

The report also includes a detailed study of socio-economic profile of the people living within and also on the pheriphery of the sanctuary area. Socio-economic dimensions for major component of the report are also brought out very nicely by the investigators.

<u>GAPS</u>

Second interim report presents a good deal of findings of a factual nature, presented partially in tables and partially in text

This report, however, should also include a management plan and this plan should identify a specific management goal(s) and proposed measures for obtaining this goal(s) also should be indicated.

A study on the hydrological cycle of the lake in relation to the type of biota which thrive under seasonal niches may provide useful information. This would be particularly important as introduction of wide spread irrigation practices may alter the hydraulic regime of the lake and its impacts need to be assessed.

Study on the socio-economic aspect provide an insight into the intricacies of the social environment of the lake. The EIA report should consider incorporating the recommendations on participation of local community in the process of sanctuary development to lend it sustainability.

There is a need for identifying the sources of impacts, the scope of impacts for their proper assessment, evaluation and protection so that management aspect may include the measures necessary for upgrading the lake environment under the conditions of both with and without SSP waters from the canal.

REVIEW RECOMMENDATIONS

We suggest that the report may be oriented on the following lines to make it more useful and comprehensive document. Investigators may like to consider that the objectives of the EIA of the Nalsarovar sanctuary is bidimensional.

- Report is expected to study the changes to be brought out up in the environment of the Nalsarovar through introduction of irrigation within its impact zone by the SSP and that the changes to be brought about are to be assessed, its impacts evaluated and predicted. Measures for mitigation of the negative impacts are to be suggested.
- The EIA is also expected to address the vide ranging issues for ameliorating the lake environment with a view to lend it sustainability.

The twin objectives of the EIA report doubles the responsibility of the investigators. To help the investigators in the pursuit, we suggest that

- (i) Detailed information on meteorological parameters of existing lake environment may be collected and compiled to form a part of base line resource inventory.
- (ii) While analysis of the soil and water quality aspect is addressed in the second interim report, it will be better if various streams and rivulets draining into the lake should also be monitored for their contribution to the water quality of the lake in terms of both negative and positive impacts.
- (iii)It is suggested that the detailed study on the existing runn-off and drainage system over the 1500 Sq.Km area of the Nalsarovar network should be assessed as the SSP may bring in changes in the quality on water of the catchment. The study may also include understanding of the water-rocks-sediment interactions.
- (iv) The fishes inventory of zoo plankton, phytoplanktons, avifona has been presented in the report. It is suggested that carrying capacity of the lake various identified niches formed during seasons of year during a normal monsoon year/drought year may also be studied. This would help in ascertaining requirement of the management with or without waters. In otherwords this would provide a decision system for obtaining the water support from other sources including SSP canals. However, normally no water is to be provided from the SSP canals yet return flows of the irrigation water from the catchment to the sanctuary areas are expected and this is required to be assessed both in terms of quantity and quality for devising suitable management measures.

This would require detailed analysis of the carrying capacity of the lake environment; in terms of the habitat and food supplies, identification of the ecologically sensitive areas; requiring protection, interlinkages between impacts emanating from SSP water and ecology of the lake environment for both with and without development of the canal irrigation within the impact zone of the sanctuary.

Impact of the proposal of obtaining water from SSP canals and its storage within the sanctuary, need to be assessed in terms of its feasibility and its impact on the niches which form during the normal monsoon year under the existing conditions.

We also suggest that the comments send by NCA earlier may also be kept in view while finalising the report and drafting the management plan.



भारतीय लोक प्रशासन संस्थान

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QHAMS ADMINIST . FAX: 011-231-9954 . PHONES: 321-7009 (9 LINES)

January 02, 1997

Dear Shri Nair,

Kindly refer to the minutes of the 29th meeting of the Narmada Control Authority (NCA) Environment Subgroup circulated by the NCA vide their letter of December 16, 1996. Unfortunately, most of the issues raised by me and agreed to have not been recorded. I, therefore, give below the proposed amendments.

In the last para on page 3, it has been recorded that a copy of the CAT plans should be forwarded to the Ministry of Environment and Forests. However, what was pointed out at the meeting and agreed was that these CAT plans need the specific approval of the Ministry of Environment and Forests. Therefore, I would be grateful if the three words "for their approval" be added at the end of the last sentence of page 3.

On page 4, para 2, a sentence needs to be added at the end of the para stating: "The NCA sub group noted that without the required information becoming available to the sub group it would no longer be in a position to certify that the <u>pari-passu</u> clause in the environmental clearance given to the project was being complied with".

- An important point that was made and agreed during the meeting, regarding the catchment area treatment, can be added as follows: "The sub-group noted that unless there was an involvement of the local communities right from the planning phase of CAT, it would be difficult to get their participation in conserving these areas after the withdrawal of the forest department. Consequently, the sub group felt that this aspect must form a part of any future catchment area treatment activities and past plantations must also, as far as possible, be linked up with the local community institutions so that they can be sustainably protected".
- 4) With regards the last sentence of para 3 on page 4, my notes suggest that the desirable duration mentioned in the meeting was 5-7 years and not just 5 years, as mentioned in the note. This may be corrected.
- 5) Another point that was agreed to in the sub group meeting can be recorded as: "The sub-group noted that, according to newspaper reports, the NCA had approved the further raising of height of the Sardar Sarovar Dam. However,

before such a proposal was put up to the NCA. he environment sub group should have been consulted and its clearance taker in terms of whether such an increase in height would be in compliance with the part passu condition. This was, unfortunately, not done. The Chairman exceed that such a procedure should invariably be followed"...

of the minutes also need to reflect the following decision: "A request was made, during the meeting, that the NCA secretariat prepre a detailed statement for each meeting specifying the physical, financial are environmental progress of the project. This statement should indicate the base on which compliance with the pari passu clause could be determined. It was greed that such a statement would be presented in each meeting of the sub goup, identifying the current level of progress in each of these three broad categories".

For your convenience, I have so drafted the moposed amendments and additions that they could be included in the minutes withou further editing.

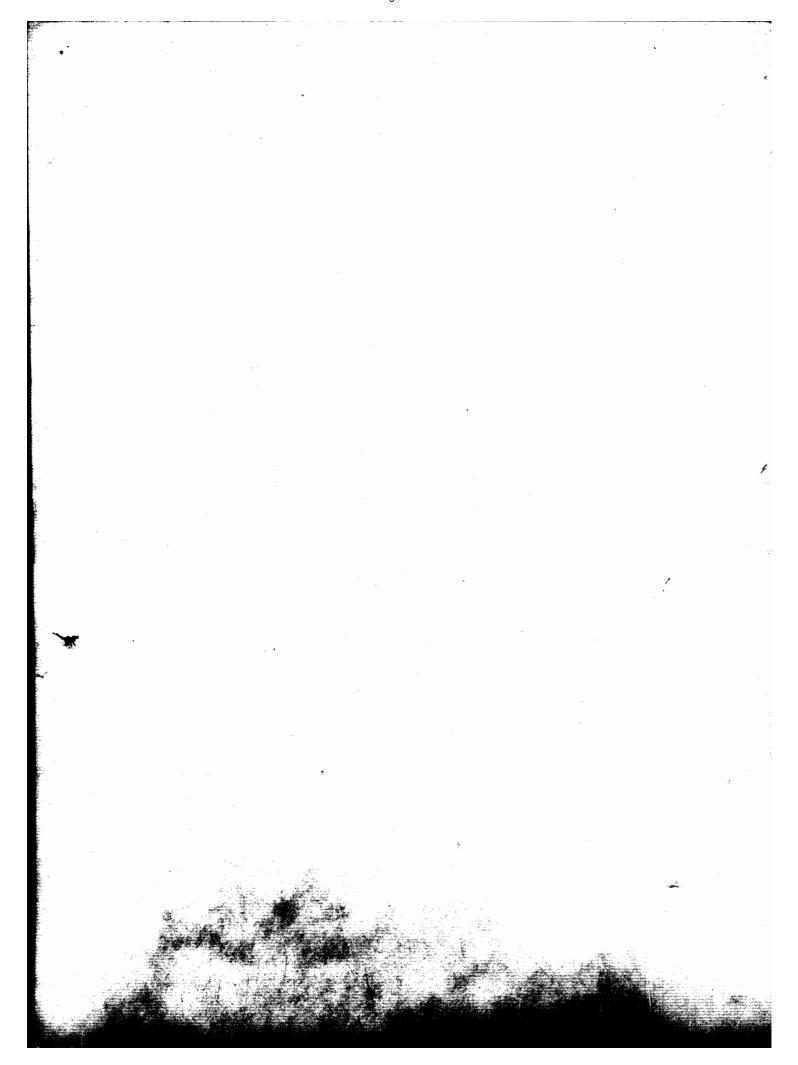
With regards and all the best for 1997,

Shri T.K.A. Nair
Secretary
Ministry of Environment and Forests
Paryavaran Bhawan, CGO Complex
Lodi Road
New Delhi 110003

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Yours sincerely.

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नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल Environment Sub-Group

तीसवीं बैठक का कार्यवृत्त Minutes of the 30th Meeting

28 जनवरी 1997 को पर्यावरण भवन नई दिल्ली में हुई

Held at Paryavaran Bhawan New Delhi on 28th January, 1997

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फरवरी 1997

INDORE February, 1997

MINUTES FOR 30TH MEETING OF THE ENVIRONMENT SUB-GROUP NCA HELD ON 28.01.1997, AT PARYAVARAN BHAWAN, NEW DELHI.

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XXX-10	Detailed report on completion of the works for Shoolpaneshwar temple and progress report on developments related to Hamfeshwar temple: A note submitted by GOG.)

MINUTES OF 30TH MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 28TH JANUARY, 1997 AT PARYAVARAN BHAWAN, NEW DELHI

The 30th meeting of the Environment Sub-Group of Narmada Control Authority was held at Paryavaran Bhawan. Min. of Environment & Forests at New Delhi on 28th January. 1997. A list of participants is enclosed at Annex-XXX-Min.l.

Secretary, Min. of Environment & Forests and the Chairman of the Sub-Group welcomed the participants. Discussion on the agenda items was taken up thereafter.

Item No.XXX-1(142):

CONFIRMATION OF MINUTES OF THE 29TH MEETING.

Member-Secretary informed that the minutes of the 29th meeting of the Sub-Group held on 15.11.1996 were circulated NCA vide letter No.Env-34/30/96/1893-1926 16.12.1996. Suggestions for some modifications in the minutes had been received only from one member viz. Dr. Shekhar Singh vide his letter dated 2.1.1997 (Annex. XXX-(9) of the Agenda). The suggested modifications were thereafter discussed when Members expressed reservation on the suggested modifications. Representatives of NCA also clarified some of the points raised Dr.Shekhar Singh in his letter. The Chairman thereafter decided that both the suggested modifications in the minutes and the reservations expressed by Members/clarifications given (as placed at Annex.XXX-Min.2) be included as a part of the minutes. The minutes were thereafter confirmed.

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Item No.XXX-2(143): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

- 1. Submission of Catchment Area Treatment (CAT) plans for freely draining critically degraded sub-watersheds [Item No.XXII-2(112).
- a) SUBMISSION OF MICRO WATERSHED PLAN FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS BY GOVT.OF MAHARASHTRA AND MADHYA PRADESH.

Member (E&F), NVDA submitted a brief on the status of preparation/implementation related to the treatment of CAT of Phase-II placed at Annex-XXX-Min-3 & informed that copies of the schemes were being prepared for sending to the NCA as decided during the 29th meeting.

Representatives of GOM also stated that copies of the plans were being sent to NCA in a fortnight. They also presented in brief the status of progress of works on CAT in non-forest and forest areas.

Regarding increasing the duration of funding CAT programmes from 3 to 5 years, progress on the efforts made by the party States was awaited, however. Specialist (Env.). NCA informed that NCA had requested the concerned agencies for a consideration. Their response was awaited.

b) FUNDS FOR TREATING CRITICALLY DEGRADED, DIRECTLY DRAINING SUBWATERSHEDS IN MADHYA PRADESH.

Regarding waiving the limits imposed by GOMP on the proposed expenditure on CAT works related to SSP & NSP, Member (E&F), NVDA informed that the matter was being taken with the State Govt. He however, informed that there was no constraint of funds for the programme till March, 1997.

c) SILT MONITORING POSTS:

Sub-group was informed that NVDA had approached ADG of ICAR for the guidance and information regarding monitoring of silt outflows at the selected locations and that the formulation of detailed plan was in hand & would be submitted soon.

Additional Chief Secretary, GOG submitted a copy of the findings of CS&WRTI placed at Annex-XXX-Min-4. He informed that presentation of the results of silt monitoring exercises carried out by CS&WRTI in Gujarat shall be made during the next meeting.

The issue of the analysis of the data for assessing the efficacy of CAT works in arresting silt was discussed and it was agreed that the analysis of the data for the purpose would be done after results of the monitoring were known and

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'full set of data was collected.

2. Cost Estimates for preparation of Action plan and implementation of environmental safeguard measures (Item No.XXII-2(112)(2)).

Additional, Chief Conservator of Forests, GOG informed that the studies related the CAD have been reviewed. A revised statement on the studies is placed at Annex-XXX-Min-5.

The information presented at the Annex-XXX-2 of the agenda papers was updated on the basis of the information provided by the party States & a revised statement is placed at Annex-XXX-Min-6.

3. <u>Establishing a separate authority for coordinating</u>
Environmental works in Maharashtra (XXVIII-3(136)(1)).

The item could not be discussed in the absence of Member from Govt. of Maharashtra.

4. Publications on Environment

(XXVIII-3(136)ii/-3(136)v/3(136):

On the issue of publishing the popular/scientific booklets on the good works being done on environmental aspect of the Sardar Sarovar Narmada Project, the sub-group observed that the GOG & GOMP have identified thrust areas & are making progress in bringing out publications.

However no information was received from Govt. of ${\tt Maharashtra}$.

5. Construction Program of Sardar Sarovar and Narmada Sagar Projects.

The item was taken up alongwith XXIX-3(140) viz. "Present Status of Studies, Surveys and Environmental Action Plans".

6. Catchment Area Treatment of Bargi Reservoir.

Vice-Chairman, NVDA objected to the item being discussed in the Sub-Group as according to him it was not provided in the Award of the Narmada Water Disputes Tribunal. Dr. Shekhar Singh was of the view that this issue very much falls within the purview of the terms of reference to the Sub-Group and that the Award was not the only basis. The Chairman desired that the issue should be examined in detail by MOEF and NCA with reference to the matter of records related with the acts, clearance & relevant

provisions, and should be presented for a review during the next meeting of the sub-group,

7. CAT works in Maharashtra - Cost Aspects.

The cost aspect of CAT works in Maharashtra was discussed and it was agreed that the detailed cost estimates & expenditure incurred by GOG & GOMP on the works executed in Gujarat & Madhya Pradesh would be made available to NCA for a comparative study.

In response to a question raised by Dr. Shekhar Singh, OSD, GOM clarified that the cost norms for SSP areas were similar to those for other CAT works in the state.

In response to another query from Dr. Shekhar Singh, it was explained that Catchment Area Treatment in forest areas was executed by the Forest Department who otherwise also were maintaining the country's forest resources. Similarly in agricultural areas, the treatment works were being executed by the Soil Conservation Department. Guidelines being followed were the one developed & approved by the nodal ministries.

Item No.XXIX-3(140): PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS.

Information contained in the Status Report annexed with the agenda papers of the 30th meeting was noted by the members.

There was discussion on what criterion should be considered for reviewing a <u>pari-passu</u> implementation. After some discussion it was agreed that for linking implementation of suggested environmental safeguard measures with the progress of construction work on the project a review of the regulatory regime would be presented during the next meeting of the Sub-Group for information of the members.

i) CATCHMENT AREA TREATMENT

&

ii) COMPENSATORY AFFORESTATION

Specialist (Env.), NCA explained the pictorial presentations made in the agenda in regard to the implementation of the CAF & CAT works in the Sardar Sarovar and Narmada Sagar Projects. For the Sardar Sarovar Project, the submergence at the proposed height of 110 m was 31% of total submergence whereas the cumulative progress in CAT works in the 3 states put together was 55.5% of target. In Narmada Sagar, although no submergence had yet been done, 38.28% of the total CAT target had been achieved. In regard to CAF, the achievement was almost 100% for SSP and 80% for NSP.

The Sub-Group appreciated the pictorial details presented in the agenda. It was however desired by the Sub-Group that in addition to progress on CAT & CAF, progress on the other suggested environmental parameters should also be similarly presented for a review.

Govt. of Maharashtra

FOREST AREA

OSD, Govt. of Maharashtra informed that in addition to the 20000 ha. of forest area planned earlier for treatment, some more area lying outside the priority areas was proposed for treatment.

NON FOREST AREA

Superintending Agricultural Officer, Nasik Division reported that out of 28226 ha. of the area directly draining critically degraded subwatersheds, 4359 ha. was under agriculture, and that out of 4359 ha., department had prepared plan for treating 3175 ha. He further informed that out of 3175 ha. area planned for treatment, 3011 ha.

area was treated up and an expenditure of Rs.1.27 crore was incurred.

Specialist (Env.), NCA however stated that the figures being supplied were at variance and have to be verified.

Govt. of Madhya Pradesh

Member (E&F), NVDA informed that by the end of December, 1996, an area of $48545\ ha$. was treated up for the SSP.

iii) COMMAND AREA DEVELOPMENT

Narmada Sagar Project

Specialist (H&S), NVDA informed that terms of references received from Govt. of Gujarat were for the environmental impact assessment studies whereas Govt. of M.P. wanted the terms of references for the integrated development of the command area. Govt. of Gujarat agreed to provide a copy of terms of references for the studies commissioned by Gujarat on this aspect.

The Chairman suggested that GOMP could also refer to the TOR of GOR for the studies commissioned by them for the Narmada Canal in Rajasthan and the TOR after finalisation could be placed before the Sub-Group for information.

Regarding progress of studies on use of insecticides and the pesticides in the command area of NSP, Member (E&F), NVDA informed that NVDA had constituted a committee to monitor the progress periodically. Monitoring report shall be submitted in due course.

Sardar Sarovar Project

Addl. CCF, Govt. of Gujarat informed the Sub-group of the revised list of time frame of the studies under progress in Gujarat. The information provided is placed at <u>Annex-XXX-Min-5</u>.

For categorisation of the studies commissioned by Gujarat as suggested by the Sub-group earlier. Addl. Chief Secretary, GOG informed that Dr. Mahesh Pathak was being requested to expedite the issue of making reference to the DDG, ICAR before the next meeting.

Observation of Wild Life Institute of India on the 2nd Interim Report entitled "EIA of Black Buck National Park" located within the command area of SSP are placed at Annex-XXX-Min-7. Director, Wild Life Institute of India informed the Sub-group that good work had been done by the investigators. He requested for other related documents also for providing scientific inputs for giving further

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suggestions.

On the suggestions of the Chairman, Addl. Chief Secretary, Govt. of Gujarat agreed to include Director, Wild Life Institute of India as Member of the Expert Multi-Disciplinary Group which periodically monitors and reviews the progress of various studies commissioned by Gujarat. Director, Wild Life Institute of India agreed to be a member of the Committee and also agreed to share the information and reports available with the Institute for the benefit of the project authorities. It was also suggested that any report or information needed by the Director, Wild Life Institute of India, would be made available by the project authorities through NCA.

Regarding ground water modelling, Dr.S.Ramaseshan informed that he had received the Executive Summary of the report of the Institute of Hydraulics, Wallingford. His preliminary reaction was that insufficient data had been used. Plenty of ground water data was available and needed to be used after eliminating erroneous and inconsistent data. He expressed the opinion that a little deeper work is required before coming to any conclusion. Additional Chief Secretary, GOG agreed to interact with Dr.Ramaseshan on this issue.

Govt. of Rajasthan

Deputy Conservator of Forests (Env. Deptt), Govt. of Rajasthan informed that the draft report on EIA and drainage aspects were now available and that GOR shall be covening a meeting to discuss the report for finalisation by the end of February, 1997.

iv) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

Narmada Sagar Project

Regarding creation of national park for NSP area, the information requested on the current status of issuance of notification was awaited.

Sardar Sarovar Project

No information from Govt. of Maharashtra was received on the submission of final report by the investigators of the University of Pune.

v) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY ARCHAEOLOGY

ARCHAEOLOGY

Narmada Sagar Project

Regarding progress report on the issues related with

the submergence to be caused by the project, Member (E&F), NVDA informed that the report was awaited from Archaeological Survey of India.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Regarding review of report produced by Deccan College Pune, NVDA submitted a brief note placed at <u>Annex-XXX-Min-8</u>. for information of the members.

NVDA also submitted a copy of the note depicting R.L.'s of the monuments getting affected by submergence placed at $\underline{Annex-XXX-Min-9}$ for information of the members.

Govt. of Gujarat

 $^{\dagger}A$ brief note on completion of works undertaken by Gujarat on the development of Shoolpaneshwar temple along with a brief report on development related to shifting of Hamfeshwar temple presented by Govt. of Gujarat is placed at Annex-XXX-Min-10.

ANTHROPOLOGY

Sardar Sarovar & Narmada Sagar Projects

Govt. of Madhya Pradesh

On the issue of providing benefits and privileges to the PAPs of SC and ST categories being resettled in Gujarat, Member (E&R), NCA informed that he had checked up with the Ministry of Welfare and it was informed that the issue was under their consideration. In the meantime Govt. of Gujarat had made arrangements for providing the benefits to S.T PAFs of Madhya Pradesh.

Regarding procurement of balance publications related to the tribals of Narmada from Anthropological Survey of India by NVDA. Sub-group was informed that required volumes were out of print and would be procured no sooner they were available.

vi) SEISMICITY AND RIM STABILITY OF RESERVOIR

Narmada Sagar Project

Govt. of Madhya Pradesh

Regarding procurement of seismic equipments, the Subgroup was informed that the orders were being placed.

Sardar Sarovar Project

On the issue of taking up further studies on the suspected loss of water from Narmada, observations of CWPRS on the comments given by Prof. Ramaseshan were awaited.

vii) HEALTH ASPECTS

Narmada Sagar Project

Goyt. of Madhya Pradesh

Member (E&F), NVDA submitted a copy of half yearly report for the period 1 January - 30 June, 1996 prepared by Deptt. of Preventive and Social Medicines, Gandhi Medical College, Bhopal. A copy of the report was given to ICMR for their review and observation.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Regarding epidemilogical studies for the SSP area, Subgroup was informed that the Gandhi Medical College, Bhopal was being pursued for incorporating recommendations in respect of SSP in their final report.

Govt. of Gujarat

Govt. of Gujarat informed the Sub-group that the required steps on the lines suggested by the State Council of Health and Medical Services (SCHMS) in their EIA report were already taken. However, while reviewing posting of staff, it was suggested that the vacant posts may be filled up on the contract basis so that there was no permanent liability on the Govt.

In response to a question raised by Dr. Shekhar Singh. Sub-group was informed that action plan suggested by SCHMS includes both preventive and curative aspects. The Chairman, however, desired that implementation of all the suggested safeguard measures should be ensured before commencement of the irrigation in the command area.

Govt. of Maharashtra

Joint Director (Health), Govt. of Maharashtra informed that the second phase of studies by Medical College & Deptt. of Health was making progress. Regarding implementation, he informed that the staff was in the position as delineated in the action plan and launch was being purchased for providing greater mobility to the medical workers.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR

Member (E&F), NVDA informed that a comprehensive plan on fisheries development covering limnological aspects for the entire Narmada zone and NSP had been sent to NCA on 21.1.97. Additional. Chief Secretary, Govt. of Gujarat informed that fisheries development plan submitted by Deptt. of Fisheries was being revised and would be sent to the NCA soon. Progress in Maharashtra could not be reviewed as no information was made available.

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DATE & VENUE OF THE NEXT MEETING :

The date & venue of the next meeting will be informed separately.

ANNEXURES

ANNEX. XXX.Min-(1).

LIST OF PARTICIPANTS OF THE 30TH MEETING OF ENVIRONMENT SUB-GROUP HELD ON 28TH JANUARY, 1997 AT NEW DELHI.

GOVERNMENT OF INDIA

Ministry of Environment & Forests

- Shri T.K.A. Nair, Secretary, Ministry of Environment & Forests, New Delhi. CHAIRMAN
- 2. Shri R.H. Khwaja, Jt.Secy., MOEF, New Delhi.
- З. Shri V.P. Singh, CCF (C), RO, MOE&F, Bhopal.

Ministry of Water Resources

Shri K.C. Aggarwal, Commissioner (PP), MOWR, New Delhi.

Narmada Control Authority

- Shri R.S. Prasad, Executive Member, NCA, Indore.
- Shri A.Sekhar, Member (E&R), NCA, Indore Member Secretary.
- 3. Dr. Pawan Kumar, Specialist (Env.), NCA.

Botanical Survey of India, Allahabad.

Shri O.P. Mishra, Dy. Director, BSI, Allahabad.

Wildlife Institute of India, Dehradun

Dr. S.K. Mukherjee, Director, WLI, Dehradun.

Indian Council of Medical Research, New Delhi.

Dr. R. Arora, Asstt. Director General, ICMR, New Delhi.

GOVERNMENT OF MADHYA PRADESH

- 1. Shri Nanhey Singh, V.C., NVDA & Principal Secretary, GOMP.
- Shri Suresh Chandra, Member (E&F), NVDA, Bhopal 2.
- 3. Shri H.N. Tiwari, Director (TW/Reh.), NVDA, Bhopal.
- Shri L.K. Wagh, Advisor, NVDA, Bhopal. 4.
- 5. Shri R.K.Bahere, Specialist (Hyd. & Sedi.), NVDA, Bhopal.
- Shri V.P.Nagayach, Project Officer (Arch.Dept), NVDA, Bhopal

GOVERNMENT OF GUJARAT

- Shri R.Ramabadran, Addl.Chief Secretary, N&WRD, GOG. l.
- 2. Dr. Sanat A.Chavan, Addl.CCF, GOG, SSPA, Gandhinagar.
- Shri K.R. Narayanan, Asst.Director, Fisheries Dept.GOG. 3.
- Shri George Kurien M. State Entomologist, Health Dept.

GOVERNMENT OF MAHARASHTRA

- Shri M.K.Jiwrajika, O.S.D. (Projects), GOM. l.
- 2. Dr. Ram Bharuka, Jt. Director of Health, GOM.
- Shri A.K. Niswade, Superintending Agril Officer, Nasik.COM 3.

GOVERNMENT OF RAJASTHAN

Shri C.S.Ratnasamy, Dy.C.F.(Env.Dept.), GOR, Jaipur.

EXPERT MEMBERS

- Dr. R.K. Katti, Prof., UNEECS, Bombay. l.
- Dr. S. Ramaseshan, Prof.(Retd.) (IIT, Kanpur), Chennai. Dr. Shekhar Singh, IIPA, New Delhi. 2.

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ANNEX - XXX - Min.(2).

FACTUAL POSITION ON THE OBSERVATIONS OF DR.SEKHAR STRICH, FACULTY MEMBER, IDRA ON THE MINUTES OF 29TH MEETING OF THE ENVIRONMENT SUB-GROUP RECEIVED WIDE LETTER DATE 2.1.1997 ADDRESSED TO SECRETARY, MOESE, GOI.

- 1) In the last para on page 3, it has been recorded that a copy of the CAT plans should be forwarded to the Min. of Environment & Forests. However, what was pointed out at the meeting and agreed was that these CAT plans need the specific approval of the Min. of Environment & Forests. Therefore, I would be grateful if the three words "for their approval" be added at the end of the last sentence of page.3.
- On the points raised by Dr. Sekhar Singh, it was informed that the CAT plans submitted earlier by the party states of Madhya Pradesh, Maharashtra were reexamined on the basis of the guidelines issued by the agencies agreed to fund the works. Re-examining the plan was directed by the Sub-Group so that this plan gets approval by the funding agency. In fact, according to the decision of GOT, project authorities are the submit the plan required to of areas of treatment the draining catchment.
- Areas for treatment have been identified based on the prioritisation survey carried out by ATSLUSO and the menu of the treatment is in accordance with the standard guidelines of the concerned agencies.
- According to the directives of the GOT project authorities have prepared the plan for treating the areas even more than what is delineated by ATS&LUSO.

In view of the above, it was agreed during the meeting that the CAT plans even if submitted to the agency funding the works for its approval should also be submitted to the NCA and NCA would forward these plan with observations to the MCE3F for a review.

On page 4, para 2, a sentence needs to be added at the end of the para stating: "The NCA sub-group noted that without the required information becoming available to the sub-group it would not longer be in a position to certify that

the

- Information available with the NCA is always presented for a review by the subgroup. During the last meeting of the sub-group, after discussion, it was agreed that a letter would be addressed by Chairman of the sub-group to the Chief Secretary, GCM for Principal | regular attendance of ensuring responsible officers during the meeting for providing an updated information. Decision arrived, at to this effect, is already recorded.
- 3) An important point that was made and agreed during the meeting, regarding the catchment area treatment, can be added as Follows:

<u>pari passu</u> clause in

environmental clearance given to the project was being complied with.

2)

a) In response to the point raised by Dr.Sekhar Singh, Sub-Group was informed that the CAT in agricultural areas is taken up on

Long of the same in the same with the

"The sub-group noted that unless there was an involvement of the local communities right from the planning phase of CAT, it would be difficult to get their participation in conserving these areas after the withdrawal of the forest department. Consequently, the sub-group felt that this aspect must form a part of any future catchment area treatment activities and past plantations must also, as far as possible, be linked up with the local community institutions so that they can be sustainably protected".

the field of farmer only after agreement with the farmer entered into, to that Before entering an agreement the proposal is submitted District Land Improvement Committee (DLTC) chaired by Collector of the District. Collector holds meeting of the farmer(s) and the executing agency and invites objections and counter objections and agreement is entered into only after all the objections are removed and the approval to the proposal is accorded by the DLIC.

Work in the agricultural area involves active participation of the individual farmers.

b) Work in the forest area is being executed by the forest department who otherwise also are responsible for monitoring forest resources of the country and the forest areas even after the treatment remains under the control of forest department and are protected at par with other forest resources of the country.

Party States have respected positively for including the people's participation in CAT and Ocepensatory Afforestation works and have already issued policy statement(s).

a) In fact granting of funds Cir a period of three to five or saven years is required to be addressed in the suitable fora at appropriate level of the government(s) and may require change at the highest level. This may require consideration of the fact that more than 50% of the country's areas is in the need of treatment. Causal factors of the degradation should be removed before making an effort for treating the vast areas. The key causal factors held responsible for degradation are the population and poverty.

th) Since resources for theating the catchment are limited treating less areas more intensively would not be in the interest of watershed management.

3

With regards the last sentence of para 3 on page 4, my notes suggest that the desirable duration mentioned in the meeting was 5-7 years and not just 5 years, as mentioned in the note. This may be corrected.

4)

5) Another point that was agreed to in the sub group meeting can be recorded as: "The sub-group noted according to newspaper reports, the NCA had approved the further raising of the Sardar Sarovar Dam. However, before such a proposal was put up to the NCA, the environment sub group should have been consulted and clearance taken in terms of whether such an increase in height would be in compliance with the pari passu condition. This was, unfortunately, not done. The Chairman agreed that such a procedure should invariably be followed".

The minutes also need ta reflect the following decision: "A request was made, during the meeting, that the NCA secretariat prepare a detailed statement for meeting specifying physical, financial and environmental progress of the project. This statement should indicate the basis on which compliance with the <u>pari passu</u> plause could 100 It was agreed that determined. such a statement would be presented in each meeting of the sub group, identifying the current level of progress in each of these three broad categories".

c) Silt monitoring exercise are being taken up by the project authorities. The result may provide guidance.

The construction programme for Sardar Sarovar Dam was discussed in the Sardar Sarovar Construction Advisory Committee and subsequently in the Review Committee of NCA. In the NCA, only issues related to R&R and environment, for which specific sub-groups are setup, were discussed. Since the environmental §afeguards were considered to be implemented satisfactorily, as brought out in current agenda, there was no issue related to environment raised in SSCAC or RCNCA.

In fact after discussions it was agreed during the 29th meeting that detailed updated information on the progress of CAT and Compensatory Afforestation works in relation to progress on the works of the project shall be made available by the NCA for a review by the sub-group during its next meeting and this was complied with. It was earlier accepted that submergence of the areas would be the attribute for ascertaining level of progress of the project works. Agenda for the 30th meeting has been drafted accordingly.

ANNEX-XXX-Min. (3).

Status of Preparation/implementation related to the treatment of CAT of Phase-II.

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3.N	o. Item		of sub- Ara	ea Funds	` -
	· 	,	ersneds (ned		,
ı.	Schemes submitted under	15	25380	\$20.81	
	R.V.P.	.•		(Tentative)	
2.	Schemes approved so far	12	15539	505.16	
		7		•	
3.	Funds released	. 5	6117	229.00	
4.	Schemes under execution	5	6117		
	(Progress on CAT)				
	a- Forest	1	. 1485	E2.86	
	b- Non-forest	4	. 2245	41.46	

ANNEX-XXX-Min.(4)

EXTRACT FROM REPORT ON RUNOFF AND SILT LOSS MONITORING IN SARDAR SAROVAR PROJECT AREA.

Multi-purpose Sardar Sarovar dam under construction across Narmada river in Bharuch district of Gujarat is of importance for the nation in general and Gujarat, Rajasthan, Maharashtra and Madhya Pradesh states in particular who will largely share the benefits of generated electricity, irrigation, water and controlled flash floods etc. Useful life span of the dam largely depends upon the quantity of water flow and silt carried with it to the reservoir from the catchment area. forest department has taken up massive treatment of Gujarat the catchment area by afforestation and other soil conservation to minimise silt flow with runoff water into the measures reservoir during rainy season. Central Soil & Water Conservation Research & Training Institute, Research Centre, (CSWCRTI), Vasad initiated a study in 1994 with help of forest department to evaluate the soil and water conservation measures in the Sardar Sarovar Catchment.

Following officers were identified to be associated with the project for its implementation and conduct of the studies.

Central Soil & Water Con. Res. & Trg. Instt. Dehradun

Leader

Director, Central Soil & Water Conservation Research & Trg. Institute, Dehradun.

Associates

- 1. Head, CSWCRTI, RC, Vasad.
- Scientist (Engg), Vasad.
- Scientist (Agro.), Vasad.
- 4. Scientist (For.), Vasad.
- 5. Scientist (Soils), Vasad.
- 6. Scientist (Extn.), Vasad.
- 7. Scientist (Econ.), Vasad.

Sardar Sarovar Project Gujarat Forest Department

Leader

Chief Conservator of Forests, Sardar Sarovar Project Vadodara, Gujarat.

Associates

- 1. Conservator of Forests, SSP, Project, Vadodara.
- Dy. Cons. of Forests, (Monitoring), SSP, Vadodara.
- Dy. Cons. of Forests, Vadodara, Division-I.
- 4. Dy. Cons. of Forests. Kevadia, Division-2.
- Dy. Cons. of Forests, Rajpipla, Division-3.

Seven micro watersheds within Sardar Sarovar Catchment in Rajpipla, Kevadia and Baroda forest divisions were identified to represent varying conditions of soil, slopes, vegetation rainfall and soil conservation measures for the evaluation studies.

Table 1: description of micro watersheds for sample studies

Gauging station	Range Division	Type of forest as per SSNN classification	Priority grade
Sagai	Dadiapada/Rajpipla	Control (Untreated)	_
Ingawadi	Dadiapada/Rajpipla	В	High
Wagdamba	Dadiapada/Rajpipla	В	-ob-
Mokhadi	Mokhadi/Rajpipla	A	Very high
Gulwani	Gulwani/Kevadia	Α	High
Dharsimal	Naswadi/Baroda	В	-ob-
Kumetha	Naswadi/Baroda	Control (Untreated)	-

The studies being in their initial phase, it is difficult to draw conclusions or make recommendations at the stage. However, the initial observations indicated that -

Soil in the catchment area vary considerably with uncrease in depth, texture, structure, slopeness reaction and nutrient content. This is reflected in growth of vegetation and erodibility parameters also.

Most of the inhabitants in the catchment are poor of tribal origin who practice primitive agriculture for their livelihood.

Execution of afforestation and soil conservation works have increased vegetation cover in some areas. This welcome feature will reduce silt load in the runoff waters.

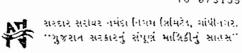
Annual and seasonal variations in precipitation over the catchment are quite conspicuous. It ranged from less than 500 mm in about 20 rainy days during 1994-95 at Mokhadi and Dharsimal to 1579 mm or more in about 70 rainy days at Sagai and Wagdamba. The wide variation in rainfall in bound to exert quantitative and qualitative effect on the vegetation in catchment and flow of runoff and silt load into the reservoir.

In high precipitation areas 14 to 20% of rain water went as overland flow taking negligible to about 98 g/lit. silt with it to reservoir in different rain storms. In low rain fall areas overland flow was negligible in many rain events and the silt load was negligible to 26 g/lit. in the runoff waters.

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ANNEX-XXX-Min.(5).

COMMAND AREA DEVELOPMENT :

Government of Gujarat have undertaken several Environmental studies related to the Command area development. Some of which have been completed and the remaining are in progress. Their position is as follows:

S1.N	o. Name of Study	Name of Agency	Year of completion
1. <u>c</u>	ompleted Studies :	-	
1	Invironmental Impact Assessment Studies on Intandand and Marine Fisheries role- vant to the Command Area of Sardar Sarovar (Narmada) Project.	M.S.University vaucuota.	Nov. 1994.
2.	Environmental Impact Assessment(EIA)Studies on Water Related Diseases in Sardar Sarovar Project(SSF) Command Area including the Area Down Stream of the SSF Dam.	Commissionerate of Health, Medical Services & Medical Education, Govt.of Gujarat, Gandhinagar.	Oct., 1995.
3.	Study of Flora and Fauna of the Command Area of Sardar Serover(Narmada) Froject: Lying between the Narmada & Sabarmati Rivers. (EIA Studies).	Sardar Patel University, Vallabh Vidyanagar.	Nov. 1995.
4.	EIA on downstream of Sardar Sarovar Dam upto Gulf of Cambay.	H.R. Wallingford	April, '95
5.	Study on Flora and Pauna of the Command Area of Sardar Sarovar (Narmada) Project Lying in Saurashtra and Kachchh Area (Environmental Impact Assessment Studies).	Saurashtra Univer- sity, Rajkot.	Jan., 1996
6.	Review of ground water drainage study.	H.R. Wallingford	Feb., 1996
7.	Agro Pollution aspect of Command Area. 8	_ do _	Feb., 1996

/2/

I ON GOING STUDIES : Multi Disciplinary Sept. 192 1. 1 Development of Aliabet Island in the Estuary of Expert Group. River Narmada. - Environmental Impact Asse-Chief Engineer, Dec., '93 ssment(EIA) studies on (CAD) SSP) Expert Aliabet Island. Multidisciplinary Group. Gujarat University, Marcy, '9: 2. * Study on Flora and Fauna Ahmedabad. of the Command Area of Sardar Sarovar(Narmada) Project: Lying between Sebarmati Biver and Rajasthan Border (Environmental Impact Assessment Studies). 3. * Ecological study of Wild Dec. 193 Guj.Ecological Ass Sanctuary and surrou-Education & nding area using remote sensing technology for Environmental Impact Research Foundation (GEER Foundation), Gandhinagar. Environmental Impact Assessment. Dec., 193 4. * Environmental Impact GEER Foundation Assessment of Nal Sarovar Bird, Canctuary. 5. * Environmental Impact GEER Foundation Dec. 193 Assessment of Velavadar National Park located in the command area of DDF.

* Draft/interim reports received in NCA.

HOWITHOWNENUAL (COST OF SSSP

RELATIKO TO UNTIT II & III IDAM & PROWER HOUSE ::

A) Expenditure by project authorities:
i) Cost of Survey & Studies (in lacs.)

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S.N	o. Component	GOG		GOMP	NCA/GOR	Total
1.	Compensatory Affores- tation		5.29 5.29	2.44 2.44	_	12.25 12.25
2.	Catchment Area Treatment.	8.77 8.77	7.00	3.28 2.80	-	19.05 18.57
3.	Flora & Fauna	101.84 80.47	38 16		15.27 15.27	
١.	Health	2.5	1 <u>0</u> 2.5	29.63 27.84	~	42.13 32.84
5.	Archaeology/Anthro- pology.	$\frac{1.3}{0.60}$	NA	59.00 36.33	_	60.3 36.93
3.	Seismicity & Rim Stability.	5.05 5.07	NA	23.00 12.50	1.98 1.98	30.03
7.	Command Area Development	11.25 11.25	-	-	N.A.	11.25 11.25
			То	otal - (i)		350·45 260·75
i)	Cost of Laplementation (in	n llans))	- 400 (400 (400 (400 (400 (400 (400 (400			
•	Compensatory Afforrestation.	1809.10 1722.82		1800.000 831.16	-	5725.1 4204.25
2.	Catchment Area Treatment.	3509 2776.67	2894.67 2218.267	8835.05 3008.53	-	15238.72 8003.467
3.	Flora & Fauna including Shoolpaneshwar	$\frac{75.31}{64.42}$			-	192·3; 2399·63
3.1)Fisheries	-	102.10	-	-	102.10 -
4.	Health (incremental expenditure) for 10 yrs.	3800.0 192.28	546.60 9.26	1354.63 521.20		5701.23 722.74
· .	Archaeology/Anthro- pology.	156.00 95.55		700 12.97	-	856 108·52
ჩ.	Seismicity & Rim Stability.	219.57 318.55	-		-	219.57 318.55
· .	Command Area Development.	N.A.	-	_	N.A.	-
			Tota	al - (ii)		23932.93
			Total	al: (i & ii)	28283.38 16017.957

ANNEX-XXX-Min. (7).

Sub: Comments on EIA Report on Velavadar Black Buck National Park.

Ref: DO No.Eny-34(30/96/96 dated 15th January, 1997.

The 2nd interim report on EIA study of Velavadar Black Buck National Park prepared by GEER Fundation, Gandhinagar was examined and the following comments are given here:

- 1. WII has not received the copy of first interim report on the subject and it is requested that this may kindly be provided.
- 2. The objective of the study as given at page 2-3 of the report so submitted is infact a very long term project and no conclusion can be drawn based on one or two years study.
- of Sardar Sarovar project i.e. inner buffer area of Velavadar National Park but it appears that most of the observations are from Velavadar National Park and the findings of that cannot be projected over the buffer zone of the national park and therefore the project should look into the following:
 - (a) Water and salinity regime in the buffer area of the national park and also within the park area and make a complete geo-morphological profile. This may be done with the help of satellite imageries and application of digital image processing technology.
 - (b) Vegetation and productivity profile in the buffer area and also within the park before and after the canals of Sardar Sarovar is commissioned.
 - (c) The habitat use by black buck and lesser florican in buffer zone should also be studied alongwith other mammalian and avian fauna in that area.

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BRIEF NOTE ON FINDING OF DECCAN COLLEG, PUNE.

ANNEX-XXX-Min. (8).

FINDINGS:

Mehtakheri is one of the few excavated Upper Palaeolithic sites in India. The major findings from this work can be summarized as follows:

(1) Period and context of the site -

The artefacts occur within Narmada Alluviam. Rediccarbon dating of the site (30,680 + 1040 - 920 A 6518) indicates that this period of aggradation of the Narmada belongs to the oxygen isotope stage 3, which was an interstadial of the last glacial period. This means that the climate, while drier than that of the present, was still more congenial than that of the preceding or following periods.

Nature of human activity at the site:

The site environment must have provided abundant rescurces for exploitation. The rescurces being exploited include stone for making tools, water, shellfish shells and probably other aquatic rescurces. One puzzling aspect is the significant amount of pebbles and quartzite rubble associated

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with the artefact horizons. It is suggested that this rubble was produced by pounding and grinding, probably in connection with processing of some food items. The correlation of the two Upper Paleolithic levels on both sides of the hala means that the human activity which produced the site occurred over more than 30 mtrs. This is another indication that the site represents the remains of a camping place of the Upper Palaeolithic people.

Disturbance of the site by Narmada-

The excavated area varies in the degree of disturbance by the flooding of the Narmada. The northern part of the trench is relatively less affected by the fluvial disturbances than the southern part of the trench.

4. Tehnology-

The Upper palaeolithic people at Mehtakheri used chalcedony and chert to prepare stone blades which were hafted for use as barbs and knives. Quartzite flakes were used to prepare scrapers. The blade technology in this phase is comparatively simple and exploitation of raw material is comparatively wasteful compared to later blade producing technologies.

ANNEX=XXX=lun.(9)

As regards delineation of reduced levels of the monuments proposed for protection and/or shifting the information is as under :-

Monument	Location/		duced	Back water
	Tehsil/	Le	evel	level with
	District	(F	eet)	reference to
		·		FRL 455 (feet
		•		
1. Shiv Mandir	Barda/M	anawar/Dhar	344.40	482.29
2. Kanjaleshwar	Semalda	/Manawar/Dhar	360.80	461.06
Mahadeo Mandir				
3. Bhawani Mata Ma	ndir			
4. Jalaleshwar Man	dir Khujava	/Dharampuri/	377.20	484.91
5. Three huge idol	s Dhar			
6.'Shailotkeern' i	dols Pipalda	garhi/Dha-	399.89	491.21
	ramouri	/Dhar	•	
7. Shiv Mandir	Roligao	n/Alirajour/	377.20	457.30
	Jhabua.			

(A) Detailed report on completion of the works for Shoolpaneshwar Temple:

The old Shoolpaneshwar Temple was situated in Manibeli village of Maharashtra on the border of Gujarat. The temple was coming under submetrance due to Construction of Sardar Sarovar Project.

It was planued to Consturuct new Shoolpaneshwar Temple at Gora on the bank of river Narmada on the D/s of the Dam site. The work was finalised by Executive Engineer Narmada Project (Reh)Const.Dm.No.1, Kevadia Colony under the S.S.P.A. on 7-4-1995. A brief account of developments upto completion is narrated as below.

Plans & Estimates mfor this temple was prepared by the Architect and A.A. Amounting to Rs. 32.02 Lacs was accorded. The work was entrusted to Shri H.M.Trevedi under tender agreement No.B-2/4 of 1993-94 for ammount Rs. 28.81 Lacs. The work order was given on 4-11-93 and stipulated date of completion was 3-3-94, but the agency had not completed the work in time even upto 10-10-94. The contractor had completed the work of Rs. 16.95 lacs, hence it was decided to fix a new agency in the meeting of commissioner and Chief Executive Officer with Chief Engineer (Reh). Remaining work was entrugted to Shri Bhupatrai R.Sompura, Dhangadhra. The stipulated date of Starting for the remaining work was 24-10-94. Upto 31-12-94 the contractor had completed the work amounting to Rs. 7.75 lacs. The timelimit was extended further 11 months, but the agency could not complete the work. The work was finalised by the department on 7-4-95.

The final cost of Construction works out to Rs.55.67 lacs.

Now there is a trust and necessary decession are being taken in the trust for the functioning of the Shoolpaneshwar Temple.

(B) Progress report on developments related to Hamfeshwar temple:

Hanfeshwar temple in situated in Chhateudepur taluka

of Vadodara distruct. The temple is coming under submergence

of Sardar Sarovar reservoier at later stage of Construction

of the Narmada Dam. The plinth level of temple ____, is

105.00 mts.

The site for new temple is selected about 2 km.

away from old temple and at a average height of 150mts.

A temple committee in constituted to watch the progress of temple work & for necessary decesion related to new temple. The work is technically sanctioned for Rs.61.742 lacs. The work order was given on 21-3-95 and some of the plinth work was completed departmentally. The work is in progress and is expected to be completed by April/May-97. The expenditure of Rs. 23.24 lacs has been incurred till Dec-96 against revised tender cost of Rs.47.14 lacs.

- (1) Water supply pipeline from G.M.D.C.
- (2) Ground water tanks 2 Nos.
- (3) Hand pump 1 No
- (4) Tin sheds -8 units each of 30 sq.m.
- (5) Electric supply.

The construction of approach road to new temple is in progress and is likely to be completed by the end of March-97. The shifting of temple is scheduled to be completed by May-97.

केवल सरकारी प्रयोग के लिए FOR OFFICIAL USE ONLY



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल ENVIRONMENT SUB-GROUP

इकतीसवीं बैठक की कार्यसूची AGENDA FOR THE 31ST MEETING

स्थान: पर्यावरण भवन,नई दिल्ली

VENUE: PARYAVARAN BHAVAN,

NEW DELHI

दिनांक:20.01.1998

DATE: 20-01-1998

TIME:11.00 A.M. समय: 11.00 पूर्वोहन

इन्दौर INDORE जनवरी, 1998 January,1998

AGENDA FOR THE 31ST MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA

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AGENDA ITEMS



Item No.XXXI-1(145): CONFIRMATION OF MINUTES OF THE 30TH MEETING.

Minutes of the 30th meeting of Environment Sub-group of Narmada Control Authority were circulated to all Members and invitees vide letter No.Env-34(31)/97/368-402 dated 11.3. 1997.

Comments received from Jt. Commissioner (R), SSNNL vide his letter dated 4.4.97 are placed at *Annex-XXXI-1* (page-1).

Comments received from Dr. Shekhar Singh, Faculty Member, IIPA vide his letters dated 20.5.97 addressed to the Chairman, Environment Sub-group are placed at *Annex-XXXI-2* (page-2).

The minutes are put up for confirmation.

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Item No.XXXI-2(146): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

- Submission of Catchment Area Treatment (CAT plans for freely draining critically degraded sub-watersheds [Item No.XXII-2(112).
- A) Submission of micro watershed plan for freely draining critically degraded sub-watersheds by a Govt.of Maharashtra and Madhya Pradesh.

As agreed during the 30th meeting, copies of the micro sub-watersheds schemes prepared by NVDA and submitted to the funding agency were received in the office of NCA and are under scrutiny.

Similar plans were also required from Govt. of Maharashtra (GOM) within 15 days' time and are yet awaited.

Recognising that funds for treating the catchment area were available for a period of 3 years only, it was suggested that the State Govt(s) of M.P. and Maharashtra may get in touch with funding agencies for seeking funds for a period of 5 years instead of 3 years. Progress on the efforts made by Govts. of M.P. and Maharashtra may be presented by GOMP and GOM for a review.

B) Funds for treating critically degraded, directly draining sub-watersheds in Madhya Pradesh.

During the 30th meeting, Govt. of M.P. (GOMP) informed that there was no constraint of funds for the programme of treating directly draining critically sub-watersheds till March, 1997. Achievements during 1997-98 were 5,853 ha against the scheduled targets of 19,484 ha. Detailed report on availability of funds and mobilisation of resources for treating the area within the given time frame may please be presented by GOMP for a review by the Sub-group.

C) Silt monitoring:

During the 30th meeting, Sub-group was informed that NVDA had approached Addl. Dy. Director General of ICAR for the guidance and information regarding monitoring of silt outflows at the selected locations. It was further informed that a detailed plan was under preparation. Progress made in this regard may be please be presented by the NVDA for a review by the subgroup.

Regarding presentation of the results of silt monitoring exercises carried out by Central Soil , Water Research & Training Institute (CSWRTI) on Narmada river catchment in Gujarat, it was agreed by the GOG to make a comprehensive presentation during the 31st meeting. GOG may like to make a presentation for a review by the sub group

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2. Cost Estimates for preparation of Action plan and implementation of environmental safeguard measures [Item No.XXII-2(112)(2)].

The cost estimates for preparation of action plan and implementation of suggested environmental safeguard measures were discussed during the 22nd meeting. State Govts. were requested to present an updated picture for assessment as to how much cost is being incurred by the project authorities on studies and implementation of environmental action plans related to dam and canals.

Information regarding studies and action plan related to unit-I dam as available in this office is presented in the Annexure-XXXI-3 (page-7) for information of the sub-group.

Regarding the cost estimates towards studies action plan and implementation aspect related with unit-II canals, as many studies were still under progress, cost estimates for the development of the command area were not included in the estimate presented. However, GOG have agreed to frame up realistic cost estimates based on the recommendations of the studies immediately after their completion and drawing up of the needed action plans. This is for information of the Subgroup

3. Establishing a separate authority for coordinating Environmental works in Maharashtra [XXVIII-3(136)(1)].

Terms of References (TORs) of Environment Sub-group required assessment of the necessary organisation with management capability being set up for adequate implementation of environmental safeguard measures besides devising a suitable monitoring and evaluation mechanism to ensure effective implementation of Action Plans. The issue of creating a separate authority for the areas in Maharashtra on the lines these were established in Gujarat and Madhya Pradesh like NVDA/SSNNL was suggested by the Environment Sub-group during its 28th meeting. The issue, however, could not be discussed in the absence of needed response from GOM. The issue could not be takenup for a discussion during the 30th meeting also, due to absence of the concerned member from Govt of Maharashtra. **Detailed information** may please be presented by the GOM for a review by the Sub-group.

4. Publications on Environment (XXVIII-3(136)ii):

During 28th meeting of the Sub-group, it was suggested that the project authorities should identify thrust areas on environmental issues and make suitable scientific and popular publications on the good works being done by them. Sub-group, reviewed the progress made by GOMP and GOG and observed that thrust areas have been identified and work was making progress. Further progress may please be reported by GOG and GOMP.

No information was received from GOM, detailed information may please be presented by the GOM for a review by the subgroup. to per cretuf. h & crossed & the werk Egged Condto h & crossed & the werk

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Parameter for reviewing pari-passu compliance of the environmental safeguard measures for SSP & NSP [XXX-3 (140)]

During the 30th meeting held on 28.1.1997, on the issue as to what criteria should be considered for reviewing a pari-passu implementation, it was agreed that for linking implementation of suggested environmental safeguard measures with the progress of construction on the project, a review of the regulatory regime would be presented during the next meeting of the sub-group for information of the members, Summary information of the regulatory regime is presented in the *Annex XXXI-4* (page-8).

According to the decision taken during the 18th meeting of the Environment Subgroup pai-passu condition is operated as to complete all the works on the areas commensurate with submergence which is an indicator of the progress of construction works.

The state of preparedness of the survey, studies and implementation of action plans for the suggested parameters, in relation to submergence resulting from construction works on the project, is presented under Item No.XXXI-3(147) of the current Agenda.

6. Catchment area treatment works in Maharashtra - cost aspect [XXX-2(123)(7)]

Narmada Control Authority during it's 55th meeting held on 13.11.1996 desired that the cost norms for treating catchment area in Maharashtra may be looked into by the sub-group. Sub-group discussed the issue during it's 29th and 30th meetings and it was agreed that the detailed cost estimates and expenditure incurred by the SSNNL and NVDA on the works executed in Gujarat and M.P. would be made available to NCA for a comparative study and review by the Sub-group. The information is yet awaited from NVDA and SSNNL...

7. Monitoring of R&R aspects of Narmada Sagar Project [XXV-2(123)(3)]

The issue of monitoring of R&R aspects of Narmada Sagar Project was discussed during the 25th meeting of the Environment Sub-group. It was noted that R&R Sub-group of NCA was monitoring only the issues related to SSP. A concern was therefore expressed by the Sub-group on the issues related to the monitoring of R&R aspects of NSP. The status with reference to acts, clearances and provisions is presented as here under.

• The need for faithful compliance of the Forests & Environmental clearances accorded to the NSP was laid down in the gazette notifications of the Ministry of Irrigation on Narmada Water Scheme vide No.554, dated 3.5.87. Forest clearance required submission of R&R plan upto the satisfaction of GOI. Env. clearance required monitoring of suggested parameters which included monitoring of R&R of NSP by NCA.

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- Terms of references of the Environment Sub-group required to work out the environmental safeguard measures to be planned and implemented for the entire Narmada Basin so that environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar and Sardar Sarovar Projects.
- Secretary, MOEF vide his D.O. No.3-87/80-IA-I, dated 10th August, 1993 addressed to the Chairman, NCA, copy placed at *Annex-XXXI-5 (page-10)* also clarified that while according the conditional Environmental clearance to SSP & NSP in June, 1987 implementation of R&R Master Plan pari-passu with the project work was included. The monitoring of R&R plan for NSP, therefore falls within the preview of MOEF & NCA. The state govt. therefore needs to be directed to submit comprehensive rehabilitation plan to MOEF alongwith other environmental plans for it's scrutiny in the Environment Sub-group. The composition & function of the R&R Sub-group reflects that the sub-group is specially for the inter-state Sardar Sarovar Project.

Members may like to discuss and review

8. Catchment area treatment of Bargi reservoir [XXX-2(143)(6)]

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The issue of catchment area treatment of Bargi reservoir came up for a discussion on a reference received from CCF (C), Western Region, MOEF during the 28th meeting. The point whether the issue related to Bargi reservoir could be discussed in the Environment Sub-group of NCA was discussed during the 29th and 30th meetings. During the 30th meeting, Chairman desired that the issue should be examined in detail by MOEF and NCA with reference to the matter of records related with the acts, clearance and relevant provision and should be presented for a review. The position regarding acts and clearances is placed below:

- On 6.9..87, the Planning Commission issued the investment clearance of NSP at a cost of Rs.1993.67 crores. The State Govt. was required to comply with the conditions laid down by MOEF while according environment and forest clearances.
- On 5.10.88, the Planning Commission accorded investment clearance for SSP at a cost of Rs.6406.04 crores. The main stipulation pertaining to environment in the clearance was faithful compliance with environmental and forestry approvals
- As per Narmada Water Schemes (Ministry of Irrigation notification as amended upto December, 1990) under para-9 (Powers, functions and duties of the authority), clause-5: All

- the concerned States shall submit to the Authority all the relevant information called for by the Authority in connection with Narmada Valley Development expeditiously.
- Under functions of the environment sub-group, the need for working out the environmental safeguard measures on a basinwide approach was stressed under point (B) functions: 1) To work out the environmental safeguard measures to be planned and implemented for the entire Narmada Basin so that environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar and Sardar Sarovar Projects.

Related information is presented in Annex-XXXI-6 (page-14).

Item No.XXXI-3(147): PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS.

A copy of the status report for the quarter ending, September 1997 is enclosed and placed at Annex-XXXI-7 (page-15).

The present status of studies, surveys and action plans in brief is presented below for a review by the Sub-group.

1) PHASED CATCHMENT AREA TREATMENT

Narmada Sagar Project

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Government of Madhya Pradesh

According to the progress reported by NVDA by the end of November, '97 an area of 39,431 ha. was treated against a cumulative target of 62,975 ha. Out of 39,431 ha area treated so far, 1,009 ha area was treated during 1997-98.

• Sardar Sarovar Project

A map showing the directly draining sub-watersheds under treatment is placed at *Annex-XXXI-8* (page-43). The cumulative progress reported so far is 61% of the total targets.

Status of pari-passu compliance is given in the Fig. below

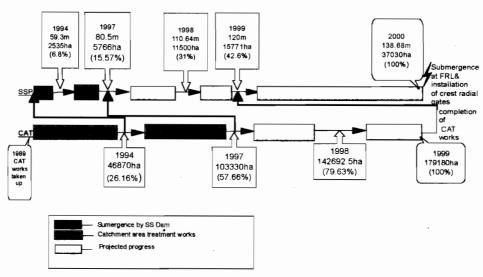


Fig. Catchment area treatment works in relation to the submergence by the SSDam

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh had planned to treat 1,25,725 ha area, out of which an area of 58,349 ha has been treated by the end of November, 1997. The cumulative progress reported so far is 46.32% of the total targets.

During the year 1997-98, against a target of 19,484 ha of treatment works the progress reported so far is 5,977 ha only. As per discussion in the 28th meeting, NVDA was to provide revised schedule for treatment of CAT works. This is yet awaited.

Govt. of Gujarat

Govt. of Gujarat had taken up the entire catchment area upstream of the Sardar Sarovar Project in Gujarat for treatment. By the end of November, 1997, an area of 28995 ha had been treated up against a target of 29,157 ha. The cumulative progress reported so far is 99.44% of the total targets.

Govt. of Maharashtra

GOM had planned to treat 24,298 ha covering forest and non-forest area. By the end of November, 1997, works on an area of 21,763 ha had been completed. The cumulative progress reported so far is 89.56% of the total targets. Further progress, if any may please be reported by GOM.

ii) COMPENSATORY AFFORESTATION

Narmada Sagar Project

Govt. of Madhya Pradesh

Compensatory afforestation works over an area of 67,133 ha against the target of 80,945 ha were reported to have been completed by the end of November, 1997. Progress of plantations during the current monsoon has been reported as 3,305 ha.

Sardar Sarovar Project

A map showing the compensatory afforestation sites is placed at *Annex-XXXI-9* (page-44). The cumulative progress reported so far is 99.62% of the total targets.

Govt. of Madhya Pradesh

By the end of November, 1997, Govt. of M.P. had completed plantation works over an area of 8,433 ha against the final target of 8740 ha. Progress on afforestation for the balance area may please be reported.

Govt. of Maharashtra

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Out of total target of 19,468 ha planned for treatment in lieu of the areas undergoing submergence, an area of 19,293 ha had been planted by the end of November, 1997. However detailed location map of some of the districts where compensatory afforestation works are progressing is yet awaited. Earlier, Chairman had suggested that highlights of plantation activities in Maharashtra may be published. Progress may please be reported.

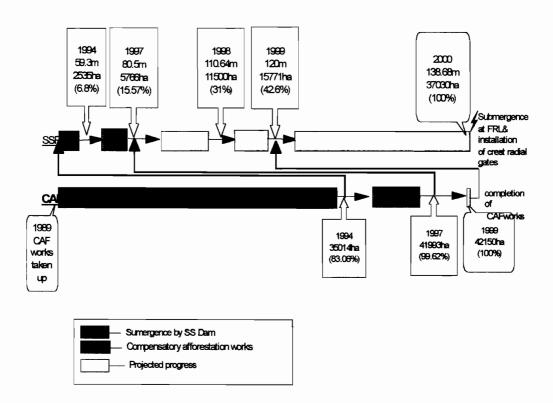


Fig. Compensatory afforestation in relation to submergence by the SSDam

Govt. of Gujarat

By the end of September, 1994, Govt. of Gujarat had completed plantation works in the entire planned area of 13,950 ha. (including non forest and degraded forest areas).

A preliminary report on the suggestion given during the 27th meeting on taking up scientific observations concerning improvement of the area planted up was annexed with the minutes of the 28th meeting, further report may please be presented.

iii) COMMAND AREA DEVELOPMENT

• Narmada Sagar Project

Outlines of the TOR for the command area of NSP annexed with agenda papers of the 27th meeting were reviewed by the sub-group during 28th meeting & it was suggested that detailed terms of reference may be drafted by the NVDA on the lines of TOR framed by GOG for the command area of SSP. Copies of the terms of references for the studies on integrated development of the command area in Gujarat were made available to NVDA. Progress on finalisation of the TOR may please be reported.

During the 27th meeting it was informed that an allocation of Rs.24.5 lakhs had been made by NVDA for the work on collection of data for study on use of insecticides, pesticides in the Command of NSP. During the 30th meeting, it was informed that NVDA had constituted a committee to monitor the progress of works periodically. Results of the monitoring may please be presented.

Sardar Sarovar Project

Govt. of Gujarat

During the earlier meetings, Sub-Group noted that a number of studies were commissioned by the Govt. of Gujarat on the Command Area Development. These reports were required to be categorised on the basis of issues addressed in each report in consultation with Dr. Abrol of ICAR. Dr. Abrol was requested by the sub-group to refer to these studies from the agriculturist point of view and to suggest whether studies were sufficient or there was something more required to be studied. Besides, on the issue of irrigated Agroforestry in SSP it was agreed by NPG to refer the issues to ICAR for needful guidance. Subsequently one meeting was held with Dr. Abrol at New Delhi where it was suggested that the Planning Commission had prepared certain maps which may be helpful in preparing an integrated Command Area Development Plan. Govt. of Gujarat was requested to get in touch with him with copies of the needed reports to expedite the issue. During the 28th meeting it was suggested that NPG may get in touch with DDG, ICAR, who succeeded Dr. Abrol in ICAR and expedite all the related issues referred to above. Progress in this regard may please be reported.

Observations of NCA on the interim reports of the studies entitled "Ecological study of wild ass sanctuary and surrounding areas using remote sensing technology for EIA" and study report on "Environmental Impact Assessment of Sardar Sarovar Project on Nal Sarovar Bird Sanctuary (Draft final report) prepared by Gujarat Ecological Education Research (GEER) Foundation, Gandhinagar, located in the command area of SSP are placed at *Annex-XXXI-10a&b* (page-45) for observation of the members.

Recommendations on impact assessment and management contained in the report entitled "Environmental Impact Assessment of Sardar Sarovar Project on Velvadar National Park" prepared by Gujarat Ecological Education and Research (GEER) Foundation, Gandhinagar, is placed at *Annex-XXXI-11* (page-49) for information of the members.

Govt. of Rajasthan

Environmental impact assessment studies for Narmada project were entrusted to WAPCOS and draft final report was under finalisation. Chief Engineer (Irrigation), Rajasthan was requested to expedite finalisation. According to the communication received from CE, Rajasthan, Irrigation Deptt. was to initiate convening of the meeting under the Chairmanship of the Secretary to the Govt., Environment Deptt., Govt. of Rajasthan for acceptance of the report. Progress in this regard may please be reported.

iv) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

To realise the objectives set forth in the D.O. letter No.3/87/90/RCT/ENV-5/IA dated 4th Feb.1988 of the Secretary, Environment & Forests, Govt. of India with regard to the studies on flora & fauna of SSP & NSP, second meeting on flora fauna and carrying capacity aspects for reviewing the status of upstream environment of Sardar Sarovar & Narmada Sagar Project was convened by NCA on 26th Sept.1996. The main points that emerged from the discussions were:

- That there is no endemic rare or threatened species of animal or plant within the submergence area of Sardar Sarovar Project as such there is no danger of loosing any genetic resource.
- For SSP one sanctuary Shoolpaneshwar is being developed in Gujarat may also be
 useful in accommodating the wildlife moving out from the submergence area and that
 there was no need for creating any sanctuary/National park either in Madhya Pradesh or
 in Maharashtra for the areas of SSP. For NSP action is already being taken for creation
 of National parks as recommended by Wildlife Institute of India (WII).
- That Carrying capacity of the adjoining forest areas within the impact zone is being improved through soil moisture conservation and afforestation/reforestation works being executed under catchment area treatment programme.

Govt. of Gujarat

Action plan prepared by Govt. of Gujarat for development of Shoolpaneshwar sanctuary was submitted earlier. Progress on implementation of plan may please be reported.

Govt.of Madhya Pradesh

Recommendations of the expert committee on flora and fauna convened by NCA earlier regarding creation of national park/sanctuary in impact zone of Indira Sagar Complex and preparation of action plan based on the report of State Forest Research Institute (SFRI) for the impact zone of SSP were under consideration of the State Govt. Progress in this regard may please be reported.

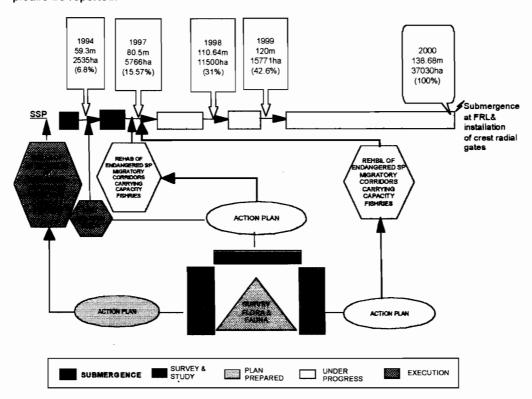


Fig. Flora , Fauna and carrying capacity aspects in relation to submergence by the SSDam

Govt. of Maharashtra

Final report on the "Status of Flora and Fauna in and around Sardar Sarovar Project, Maharashtra, submitted by School of Environmental Sciences, University of Pune" was circulated to all members vide NCA's letter No.Env-4 (5)/97/1236-52, dated 14.8.1997. Members may like to review.

v) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Narmada Sagar Project

Govt. of Madhya Pradesh

With regard to status of Joga fort in relation to the submergence to be caused by the back water effect, during the 28th meeting, NVDA informed that Superintending Archaeologists of ASI, Bhopal had been requested to study this aspect and that all the information needed was made available to him. Progress may please be reported.

Regarding the reference on important archaeological and historical sites likely to be impacted by the NSP, received from MOEF, copy placed at *Annex-XXXI-12* (page-61), a detailed note was requested from NVDA. This is yet awaited. However, status note on the basis of the information available in NCA is compiled and placed at *Annex-XXXI-13* (page-73) for a review by the Sub-group.

Sardar Sarovar Project

Govt. of Gujarat

Govt. of Gujarat have completed the construction of new Shoolpaneshwar temple, downstream at village Gora on the bank of river Narmada at cost of Rs.55.67 lakhs. The functioning of the temple is now controlled by the trust established for the purpose. Regarding shifting of Hamfeshwar temple situated in Chhota Udaipur taluk of Vadodara distt., it was informed during the 30th meeting that the shifting of the temple was schedule for completion by May, 1997. (The plinth level of the temple is 105 mts.). Progress may please be reported.

Govt. of Madhya Pradesh

A number of agencies have developed interest in archaeological & anthropological history of the Narmada Basin. NVDA is coordinating the organisation engaged by them. In addition, the agencies not engaged by NVDA but working in the Narmada Valley are also being addressed for better coordination by NVDA. A comprehensive review of the overall progress may please be presented by GOMP.

Govt. of Maharashtra

No works were required to be done in Maharashtra in this regard

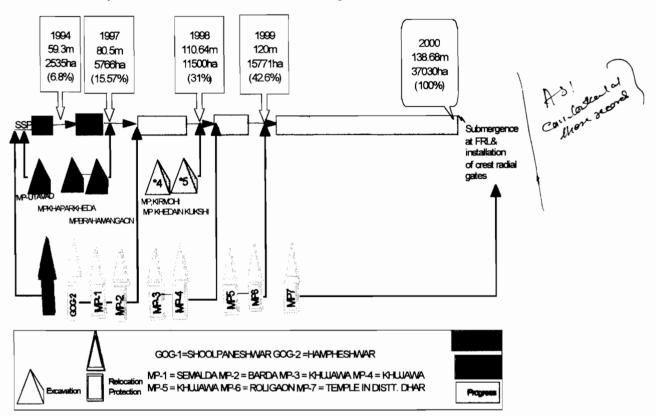


Fig. Protection/relocation/excavation of monuments of Archeological importance

ANTHROPOLOGY

Sardar Sarovar & Narmada Sagar Projects

On the issue of providing benefits and privileges to the SC and ST categories being resettled in Gujarat, it was informed that the issue was under consideration of the Govt. of India, Ministry of Welfare. It was also informed that in the meantime, Govt. of Gujarat have made arrangements for providing the benefits to ST PAFs of M.P. Progress in this regard may please be reported by the Govts.of Gujarat and M.P.

Progress on procurement of the publication related to Tribals of Narmada from An.S.I. by NVDA may please be reported.

vi) SEISMICITY AND RIM STABILITY OF RESERVOIR

Narmada Sagar Project

Govt. of Madhya Pradesh

During the 30th meeting, NVDA reported that the orders for procurement of the balance imported seismic instrument were being placed. Progress may please be reported.

Sardar Sarovar Project

GSI had completed the survey and submitted its final report on rim stability analysis for the areas in Maharashtra and Madhya Pradesh in 1993. The survey for the rim stability analysis in Gujarat was completed much earlier by Jaipur branch of the GSI. In order to confirm the findings of the GSI, NVDA had entrusted some more time bound studies to CW&PRS, Pune at an estimated cost of Rs.12.55 lakhs. During the 26th meeting NVDA informed that the institute had submitted two reports No.3229 & 3234 & that these reports suggests some more time bound studies. However Prof. Ramasheshan suggested that further studies may not be necessary. He requested copies of these reports which were supplied to him by NCA. The observations of Prof. Ramaseshan were forwarded to CWPRS for their perusal as directed by Chairman of the Subgroup during 29th meeting held on 15.11.96. Chairman had directed that till such time, a decision is taken by the Sub-group, no further studies should be taken up. In the reply received from CWPRS, copy placed at *Annex-XXXI-14* (page-75), CWPRS has corroborated the views expressed by Prof. Ramaseshan that no further studies were required.

Members may like to discuss and review.

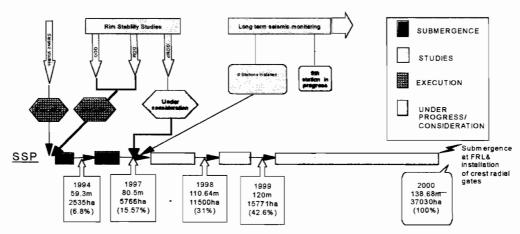


Fig. Seismicity and rim stability aspects in relation to submergence by SSDam

vi) HEALTH ASPECTS

Narmada Sagar Project

Govt. of Madhya Pradesh

NVDA have submitted the revised plan costing Rs.748.73 lakhs for providing the facilities as proposed in health plan. Epidemiological surveillance studies are being pursued by Gandhi Medical College (GMC), Bhopal. Five interim reports have been received so far. Comments on 5th interim report received from Indian Council of Medical Research, copy placed at *Annex-XXXI-15* (page-76), were forwarded to NVDA on 25.6.97.

Members may like to discuss and review.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Cost details have been incorporated in the final action plan of GOMP for providing the facilities as proposed in the health plan. Five half yearly interim reports on Epidemiological surveillance studies were received from GMC, Bhopal. Steps taken for providing the facilities as proposed in the health plan may please be reported. Report on status of Epidemiological surveillance studies being pursued by GMC, Bhopal for the SSP areas may also please be reported.

Govt. of Gujarat

GOG submitted a copy of the final report entitled "Environmental Impact Study on water related diseases in SSP command area, Gujarat, India prepared by Commissionerate of Health, Medical Services & Medical Education, GOG. The report was reviewed & comments were communicated to the investigators during the 27th meeting. Detailed action plan based on the findings of this study was under preparation. Progress may please be reported.

In view of the progressive filling of the reservoir action taken so far to safeguard the interest of the people at the project site on the periphery of the reservoir and also in the command may please be reported.

The detailed progress report of current status of Epidemiological surveillance second phase of Sardar Sarovar Health Project from December, 1996 to December, 1998, placed at *Annex-XXXI-16* (page-80) received from Directorate of Health Services, Govt. of Maharashtra was forwarded to the Indian Council of Medical Research (ICMR). Observations received were forwarded to the GOM. Response from GOM is yet awaited.

Members may like to discuss and review.

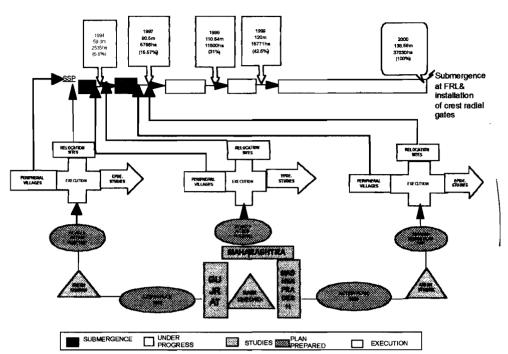


Fig. Health aspects in relation to submergence by the SSDam

Govt. of Maharashtra

Detailed statement on existing infrastructure at Akarni & Akkalkua Taluk along with progress of works was reported by GOM during the 27th meeting. Incremental health facilities provided by GOM are presented in *Annex-XXXI-17* (page-81). Further progress may please be reported.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR

To speed up the work on conservation and development of the fish resources in the reservoir, sub-group recommended the formation of a group of experts. The proposal for formation of a high level expert group was approved by NCA with inclusion of one more expert member to be nominated by GOMP. Fourth meeting of this expert group was held on 11.7.97 at Bhopal. Minutes of the meeting are placed at *Annex-XXXI-18* (page-83). Reports of the working groups constituted earlier, were forwarded to the State Govts. for their observations. These observations are to be considered by the group constituted by the Chairman of the High Level Expert Group while finalising the guidelines for conservation and development of fisheries in the reservoirs, streams, rivulets and command area. State Govts. are requested to expedite their comments at the earliest.

Item No. XXXI-4(148): ANY OTHER ITEM: **DATE & VENUE OF THE NEXT MEETING** 18

ANNEXURES

ANNEX - XXXI - (1).

Sardar Sarovar Narmada Nigam Ltd.



(A Wholly Owned Company of Govt. of Gujarat)

Block No. 12, 1st Floor, New Sachivalaya Complex,

Gandhinagar-382010 Gujarat India

Phone: 23530 - 37

Fax: 02712-23056

No.SSPA/ENV/ESG/MEET/642/42-43

Date: 3 /4/97.

- 1

To

The Member Secretary
Environment Sub-Group of NCA, &
Member (E&R)
Narmada Control Authority
Indore.

Subject: Minutes of 30th Meeting of Environment Sub-group of NCA held on 28-1-97.

Dear Sir,

With reference to the subject abovecited, it is requested that the following correction may be incorporated in the minutes

Under the Health Aspects on page-10 in the response of GOG the following words ' if there is a need to fill the posts' may please be added after the words 'on the Govt.' in para-I.

Yours faithfully,

Jt. Commissioner (R)

Copy to :

Commissioner, H.M.S. & M.E.Block No.5, Old Sachivalaya, for information and necessary action.

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ANNEX - XXXI - (2)

विश्वनाथ आनंद अSHWANATH ANAND

सचिव पर्यावरण एवं वन मंत्रालय

भारत सरकार SECRETARY MINISTRY OF ENVIRONMENT & FORESTS GOVERNMENT OF INDIA

D.O.No.3-87/80-IA.I

June 13, 1997

Dear Shri Singh,

I have received your letters dated 20th May, 1997 regarding amendment to the Minutes of the 30th Meeting of the Environment Sub Group of the Narmada Control Authority (NCA) and various issues pertaining to the Sardar Sarovar Project (SSP).

2. The Minutes of the 30th Meeting have been circulated to all the Members of the Environment Sub Group. During confirmation of these minutes in the next meeting, views expressed by you will be duly considered. As agreed in the last Environment Sub Group Meeting, a detailed note is being prepared in regard to pari-passu clause vis-a-vis raising the height of the dam of SSP which will also be discussed in the next meeting of the Environment Sub Group. I am forwarding your comments/observations to the NCA for incorporation in the Agenda for the next meeting.

With regards,

Yours sincerely.

5d/-

(Vishwanath Anand)

Shri Shekhar Singh Indian Institute of Public Administration Indraprastha Estate. Ring Road New Delhi 110 002

Copy alongwith letters dated 20th May, 1997 from Shri Shekhar Singh, IIPA, to Member. Environment and Resettlement, Narmada Control Authority, 113-BG. Scheme No 74-C, Vijay Nagar. Indore-452010 (M.P.).

o. how

(Vishwanath Anand)



21 140 (194)

भारतीय लोक प्रशासन संस्थान

इन्द्रप्रस्य एस्टेट, रिंग रोड, नई दिल्ली-110 002 • दूरभाव : 331 7309 (9 लाइन)

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION

INDRAPRASTHA ESTATE, RING ROAD, NEW DELHI-110 002

GRAMS : ADMNIST . FAX : 011-331-9954 . PHONES : 331-7309 (9 LINES)

May 20, 1997

Dear Shri Anand

I have separately written to you, today, regarding the minutes of the 30th meeting of the NCA sub-group on environment. However, I am bringing to your notice some very critical issues currently under consideration of the sub-group.

Two of the critical issues being debated in the NCA sub-group meetings are:

1. Whether the recommendation of NCA sub-group on environment is required for proposing the raising of the dam height, keeping in mind the pari-passu clause of the environmental clearance. This issues was also discussed in earlier meetings of NCA sub-group and there was a clear decision, recorded in the minutes, that invariably any proposal to increase the dam height must first be cleared from the pari-passu angle by the NCA sub-group on environment. Unfortunately, in the last two meetings of the NCA sub-group, there was a hesitation at acknowledging this earlier decision and at clearly recording it in the minutes. However, since the last meeting was held, there has been an advertisement issued in the Indian Express, New Delhi edition, of Sunday, March 30, 1997, by the Sardar Sarovar Narmada Nigam Ltd. (SSNL). This advertisement says:

"Criticism: Is there a committee similar to the Rehabilitation committee which ensures that environment measures have been taken?

Facts: The Environment committee of the NC.1 under the chairmanship of Secretary, Environment & Forest, Govt. of India closely monitors the environmental steps to be taken. This committee has also expressed its satisfaction and has recommended the raising of the dam height."

From the above it is clear that the SSNL also believes that the NCA sub-group is to recommend the raising of the dam height. Therefore, I would suggest that once and for all we settle this dispute and clearly record in the minutes, as stated by me in the last meeting that the NCA sub-group on environment must invariably be consulted and its recommendations taken, based on its assessment regarding compliance with the parinassu clause, before any proposal for raising dam height is made to the NCA or to the government".

2. The second issue that has been debated is whether the NCA sub-group has, in the last meeting, actually recommended the raising of the dam height. As you would notice, the SSNL has claimed this in the advertisement issued in the Indian Express.

Contd..2..

In the 29th meeting the matter was raised by me that newspaper reports suggested that the government was considering raising the height of the Sardar Sarovar project. I had mentioned in the meeting that as this proposal had not been placed before the subgroup and its recommendations taken, it was not clear how such a proposal had been submitted to the Government. The Chairman had agreed with this and had requested the NCA to present the relevant facts in the next meeting.

Accordingly, in the 30th meeting, there was a detailed statement of the CAT and compensatory afforestation work done in connection with the project. I had then pointed out that these are not the only parameters which need to be considered while determining whether construction work was <u>pari-passu</u> with the environmental work. I had stressed that the NCA and the Ministry of Environment and Forests must present a clear statement specifying what level of implementation regarding each aspect of the environment would correspond to what level of dam construction, impoundment and other works, in order to maintain <u>pari-passu</u>. It was agreed that this would be presented in the next meeting, as already mentioned earlier:

However, despite this, neither was this decision clearly stated in the draft minutes nor did it deter the SSNL from stating in their advertisement that "this committee has also expressed its satisfaction and has recommended the raising of dam height".

I would strongly reiterate that the NCA sub-group neither expressed its satisfaction nor recommended the raising of the dam height. I would, therefore, suggest that you, as Chairman of the NCA sub-group, set the record straight in the next meeting of the sub-group.

I would also recommend that your Ministry present, at the next meeting of the NCA sub-group and for the sub-group's consideration, a note outlining the detailed parameters by which compliance to pari-passu clause can be assessed.

With regards,

Yours sincerely

Shekhar Singh

Shri Vishwanath Anand
Secretary
Ministry of Environment and Forests
Government of India
Paryavaran Bhawan, CGO Complex
Lodi Road
New Delhi 110003



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भारतीय लोक प्रशासन संस्थान

इन्द्रपस्य एस्टेट, रिंग रोड, नई दिल्ली-110 002 • दूरभाष : 331 7309 (9 लाइन)

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May 20, 1997

Dear Shri Anand.

Kindly refer to the minutes of the 30th meeting of the environment sub-group of Narmada Control Authority (NCA) circulated vide letter No. 34/3/97/363-402 dated March 11, 1997, from the NCA. In this connection I have the following points to make:

In response to agenda item No. 5 regarding construction programme of Sardar Sarovar Narmada Sagar projects, there was an agreement at the meeting that because progress had been reported only for Catchment Area Treatment (CAT) and compensatory afforestation, and no clear indication was there of what amounted to <u>pari-passu</u> this matter would be kept in abeyance till the next meeting, when all these issues would be clarified and discussed. I would, therefore, request that a sentence be added after the second para of Point 2 of item No. XXIX-3 (140) as below:

"In light of there being no information on other aspects of the environment and rehabilitation, except for CAT and compensatory afforestation, and no clear indication of what would constitute as <u>pari-passu</u>, the sub-group decided to keep in abeyance its decision on whether <u>pari-passu</u> would be <u>maintained</u> if the height of the dam was raised beyond its current level."

In annexure XXX-Min(2) of the said minutes, in response to para 5 of my letter, it is stated that

"Since the environmental safeguards were considered to be implemented satisfactorily, as brought into current agenda, there was no issue relating to environmental raised in SSCA or RCNSA".

However, in light of the discussions in the sub-group meeting, as indicated in the earlier point given above, it is not correct to say that environmental safeguards were considered to be implemented satisfactorily. This is a matter which the NCA sub-group on environment has to determine and, as decided in the 30th meeting, it is not yet in a position to so determine. Consequently, this should be reflected in the minutes by replacing the earlier quoted sentence with the following sentence:

"It was agreed that the question of whether environmental progress was paripassu with construction would be determined by the environment sub-group after the relevant information had been made available to them."

Contd..2..

3) In response to point 6 annex XXX-min(2), it is stated that

"It was earlier accepted that submergence of the area would be the attribute for ascertaining level of progress of the project works".

However, this was discussed in the meeting and the NCA was asked to produce extracts from earlier minutes where this had been decided. Pending this, this issue cannot be considered to have been agreed. In any case, submergence of an area cannot be the sole criterion for determining <u>pari-passu</u>. Therefore, the total sentence should be replaced by

"It was agreed that a detailed statement would be put up before the sub-group in the next meeting suggesting the basis on which the <u>pari-passu</u> clause can be, monitored. Earlier decisions, if any, on the matter would also be brought to the notice of the sub-group along with copies of the relevant documents."

I would be grateful if these changes were incorporated in the minutes of the 30th meeting.

With regards.

Yours sincerely,

Shekhar Singh

Shri Vishwanath Anand
Secretary
Ministry of Environment and Forests
Government of India
Paryavaran Bhawan. CGO Complex
Lodi Road

New Delhi 110003

ENVIRONMENTAL COST OF SSP

RELATED TO UNIT-I DAM:

A) Expenditure by project authorities

i) Cost of Survey & Studies (in Rs. lacs)

	EAL		PHM II				HANNEL E		fistal	
	Estimate	Exp.	Estimate	Exp.	Estimate	Exp.	Estimate	Exp.	HER TENNETHEN THE PERSON MANAGEMENT	Total Exp.
CAF	4.52	4.52	5.29	5.29	2.44	2.44	Estimate	EAP.	12.25	12.25
CAT	8.77	8.77	7	7	3.28	2.8			19.05	18.57
F&F	101.84	80.47	38	16	20.33	17.63	15.27	15.27	175.44	129.37
Health	2.5	2.5	10	2.5	29.63	27.84			42.13	32.84
Arch./Anth.	1.3	0.6	N.A.		59	36.33			60.3	36.93
Seismicity	5.05	5.07	N.A.		23	12.5	1.98	1.98	30.03	19.55
CAD	11.25	. 11.25					N.A.		11.25	11.25
							Total (i)		350.45	260.76

ii) Cost of Implementation (in Rs. lacs) lacs)

				MÉHI SESSEE				APTIO COLUMN	
	HINDTOTICAL		間が出たい。原門	A MANAGEMENT	相談はいいいに	in said by the	战功。从(哈斯隆)	THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COL	
:	Estimate	Exp.	Estimate	Exp.	Estimate	Exp.	Estimate	Exp. Total Estim.	Total Exp.
CAF	1809.10	1722.82	2116.00	1650.27	1800,00	831.16		5725.10	4204.25
CAT	3509.00	2776.67	2894.67	2218.27	8835.05	3008.53		15238.72	8003.47
F&F	75.31	64.42	117.00	2335.26	NA			192.31	2399.68
FISH			102.10					102.10	-
HEALTH	3800.00	192.28	546.60	9.26	1354.63	521.20		5701.23	722.74
ARCH\ANT	156.00	95.55			700,00	12.97	1	856.00	108.52
SEIS.	219.57	318.55						219.57	318.55
CAD	NA		13				NA		
					•		Total (ii)	28035.03	15757.21
						T	otal (i & ii)	28385.48	16017.97

Annex-XXXI-4

REGULATORY REGIME: EXPANDED ROLE FOR NCA.

Central Govt. in June 1987, modified the powers, functions and duties of the Authority as under.

- 1. The role of the Authority will mainly comprise of overall coordination and direction of the implementation of all the projects, including the engineering works, the environmental protection measures and the rehabilitation programme and to ensure the faithful compliance of the terms and conditions stipulated by the Central Government at the time of clearance of the aforesaid projects.
- 2(a) The Authority may constitute one or more sub-committees and assign to them such of it's function and delegate such of its powers as it thinks fit".

CONDITIONS OF ENVIRONMENT CLEARANCE

While clearing the SSP and NSP from the environmental angle on 24.6.87, MOEF considered environmental safeguard parameters including R&R, catchment treatment, flora fauna, carrying capacity, etc. and noted that (i) Field surveys are yet to be completed. The first set information has been made available and complete details have been assured to be furnished by 1989. (ii) The NCA has been expanded and its terms of reference have been amplified to ensure that environmental safeguard measures are planned and implemented in-depth and it's pace of implementation pari-passu with the progress of work on the project." MOEF granted clearance subject to the condition among others that:

- (i) The NCA will ensure that environmental safeguard measures are planned and implemented pari-passu with progress of works on projects.
- (ii) The catchment area treatment plan and the rehabilitation plan be so drawn as to be completed ahead of reservoir filling.

ENVIRONMENT SUB-GROUP

In the 26th meeting of the NCA held on 29.9.87, it was decided to set up a group of nodal officers of participating states for deciding the terms of reference and composition of the Environment Sub-group of the NCA. The group met on 30.10.87 and finalised the composition and terms of reference. It was that the sub-group would be headed by Secretary, MOEF and have as members one representative each from the four participating states, representative of ICAR, MOWR, Technical Experts in the field of forestry, wild-life, hydrology, flora, health, archaeology, anthropology, agriculture, and environment. The terms of reference to the sub-group were also finalised as under:

i. to work out the environmental safeguard measures to be planned and implemented for the entire Narmada basin so that the environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar and Sardar Sarovar Projects.

- ii. to determine the terms of reference of required surveys necessary for the implementation of environmental safeguard measures inclusive of data-base required, the methods by which the data-base is to be prepared and also to identify the institutions/individuals to undertake the preparation of such documents.
- iii. to get prepared for clearance by Ministries and NCA the action plans with regard to all environmental safeguard measures and the assessment criteria thereof.
- iv. to devise a suitable monitoring and evaluation mechanism so that the action plans are effectively implemented in consonance with stipulations at the time of clearance of the projects.
- v. to assess the necessary organisation with management capability being set up for adequate implementation of environmental safeguard measures.
- vi. to undertake all measures necessary to assist the Narmada Control Authority in the planning and implementation of environmental safeguard measures.

CRITERION FOR REVIEWING PARI-PASSU COMPLIANCE OF ESM: DECISION OF THE ENVIRONMENT SUBGROUP

This issue was discussed in the 18th meeting of the Environment Sub-group held on 28.5.93, Chairman, while reviewing the preparedness of the environmental studies in relation to the construction works on project, reiterated that the pari-passu clause is to be so operated as to complete all the works on the areas commensurate with submergence which is an indicator of the progress of construction works. In order to get a clear view, Chairman desired that the progress of works on each component should be synchronised with submergence and shown in the form of a chart accompanied by an explanatory statement.

During the 22nd meeting, Chairman stated that all the works which adversely affect the environment steps for their mitigation have to proceed on pari-passu basis whereas certain other works can be done on a different scheduling for which a view has to be taken by the MOEF

Accordingly, state of preparedness of the survey, studies and implementation of action plans for the suggested parameters, in relation to submergence resulting from construction works on the project, is presented under Item No.XXXI-3(141).

$\underline{ANNEX - XXXI - (5)}$.



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सचिव (पर्यावरण एवं बन) भारत सरकार SECRETARY (ENVIRONMENT & FORESTS) GOVERNMENT OF INDIA

D.O.No.3-87/80-IA-I

New Delhi, 10th August, 1993.

Dear Dr. Thatte,

We are in receipt of the agenda notes for the 46th meeting of the Narmada Control Authority to be held on 13th August, 1993, at 3.00 P.M. As I may not be able to attend the meeting, I am enclosing observations on the agenda notes pertaining to the Environmental Aspects which you may like to place on record.

With regards,

Yours sincerely,

(R. Rajamani)

Dr. C.D. Thatte, Secretary, Ministry of Water Resources, Shram Shakti Bhavan, Rafi Marg, New Delhi-110 001.

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(IMPACT ASSESSMENT DIVISION)

46TH NEETING, OF THE MANUADA, CONTROL AUTHORITY. , :

Item No. XLVI-2(525): REVIEW OF ACTION TAKEN ON EARLIER DECISIONS

B. Submergence Under Sardar Sarovar Projects

A meeting was convened by IG(Forest) MORE with PCCFs of party states in Nov.,1992 to sort out the issues regarding compensation for forest land coming under submsergence of Sardar Sarovar Project. Certain suggestions were made to work out the cost and the Executive Member, NCA was to take up further follow up action. It appears that no further progress has been made in this regard. Since submergence(temporary/permanent) is likely to take place shortly, the matter needs urgent attention because a phased felling programme accordingly will have to be worked out along with its cost estimates. Chairman, NCA, therefore, may like to direct the concerned states to comply with the suggestions of IG(Forest), NCEF.

H. Monitoring of RGR Aspects of Narmada Sagar Project by MCA

No communication has so far been received from Govt. of Nadhya Pralesh to sort out the rehabilitation problem of Marmada Sagar Project. While according the conditional environmental clearance to Sardar Sarovar and Marmada Sagar Projects in June, 1987, implementation of Rehabilitation Master Plan, pari passu with the project work has included. The monitoring of RER Plan for Marmada Sagar Project, therefore, falls within the purview of Ministry of Environment & Porests and MCA. The State Govt., therefore, meeds to be directed to submit comprehensive Mehabilitation plan to MOSF along with other environmental plans for its scrutiny in the Environmental Sub-Group.

The composition and function of the R&R Sub-Group mentioned at Annexure-14 of the agenda reflects that the Sub-Group is specifically for the Inter-State Sardar Sarovar Project.

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Item No. XLVI-8(531): ACTIVITIES OF THE ENVIRONMENT SUB-GROUP

Under Item 1 of the Meliberations of the 18th
Sub-Group meeting, it is indicated that schedule of closing
of sluices by December, 1993 is considered to be too tight
and, therefore, Sub-Group recommended that date should be
shifted to March, 1994. No decision regarding the closure
of the sluices was taken in the 18th Sub-Group meeting and, the
fore, this part needs correction. In fact in the last meeting to
Sub-Group decided to discuss the matter furtherafter receiving
more information.
Under Item 3, it is referred that the issue regarding
proper funding arrangements for Environmental Managements
Barmada Basin as well as command would be taken up by MOSF.
Unless requirements of funds on the basis of broad outline
of the proposal are swallable, initiation of any discussion
on funding would be difficult and as such MCA should indicate
the requirements of funds/Plans.

Item No. MLVI-9(532): ACTIVITIES OF RERE SUB-GOMEP OF MEA

Under Item 9 regarding composition of RERE SUB-Group of HCA, it is proposed to nominate Member (Power) HCA as the Member -Secretary of the Sub-Group. In the modified composition at Annexure-15 of the agenda, Member (In-Charge) of Rehabilitation) HCA is designated as Member-Secretary of the REE Sub-Group. Keeping in view the functions of the REE Sub-Group, the official with the background of environment/social sciences and who is sware of the proceedings of land acquisition and rehabilitation etc. should be the Member-Secretary. Resettlement and rehabilitation is a very sensitive issue and, therefore, needs to be handled by a very competent person.

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For other items, we have no specific comments to offer.

BASIN WIDE ENVIRONMENTAL MONITORING :NEED FOR DATA FROM BARGI RESERVOIR

- Terms of references of the Environment Sub-group required working out of the environmental safeguard measures, their planning and implementation for the entire Narmada Basin to ensure that environmental safeguard measures are executed and remain fully in consonance with a clearance accorded to the Narmada Sagar and Sardar Sarovar Projects.
 Basinwide monitoring required data from upstream projects including Bargi.
- For cumulative impact assessment of the negative environmental impacts of Sardar Sarovar and Narmada Sagar Projects also, it is essential to have data from upstream projects including Bargi
- In a meeting convened on 3.5.84 in the Planning Commission to examine the environmental aspects of SSP and NSP, it was decided that there was a need for an integrated approach to basin development covering the catchment and command area and a supplementary project report should be prepared to cover these aspects. It was also decided that the Ministry of Agriculture may set up an inter-departmental group to guide the preparation of the project report. Consequently the Ministry of Agriculture constituted on 13.9.84 an inter-departmental working group under the chairmanship of Dr. M.L.Dewan for examining the present condition of the catchment areas of the two projects and to suggest soil conservation and afforestation measures for the protection of the catchment area of the above mentioned project together with phasing and financial outlays. After discussions with the State Govts. of M.P., Gujarat, the working group submitted it's report in August, 1985. The report recommended that in view of the large scale investment in Sardar Sarovar and Narmada Sagar, the siltation rate of these reservoirs must be reduced through proper catchment treatment. It strongly recommended initiation of an integrated soil conservation and watershed management programme in the participating States.
- Diwan Committee in its report recommended creation of a Computerised information management and monitoring system under the project for effective implementation of the programme within the three States. The Committee estimated that due to large number of existing and proposed dams and reservoirs in the basin, the free draining area into Sardar Sarovar was about 16000 sq. km. and about 24800 sq. km. drain into Narmada Sagar. This area covered the catchment of upstream including Bargi.

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STATUS REPORT

SARDAR SAROVAR PROJECT (SSP) ENVIRONMENTAL ASPECT September, 1997

The action plans and status of studies and implementation of Environmental Safeguard Measures upto quarter ending Sept, 1997 are as indicated below:

Environmental Safeguard Studies / Measures

- 1) Phased Catchment Area Treatment
- 2) Compensatory Afforestation
- 3) Command Area Development
- 4) Flora, Fauna, Carrying Capacity Fisheries
- 5) Seismicity, Rim Stability
- 6) Health Aspects
- Archaeological & Anthropological studies

1. CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

- more detailed surveys for prioritisation of the subcatchments in the SSP area should be undertaken;
- a phased CAT programme should be prepared and implemented ahead of reservoir filling.

GOI issued a directive in June 1992 that, for the SSP, the project would bear the costs of the treatment of all critically degraded sub-watersheds draining directly into the reservoir. These watersheds were identified amongst those classified as either very high or high-priority categories by the All India Soil and Land Use Survey

(AISLUS). The project would also be responsible for the treatment of those areas of the catchment which are directly damaged by the project activities.

In addition, plans are required to be prepared for the treatment of the balance of the critically degraded subwatersheds but the cost of this will be met from other ongoing schemes and in a timeframe to be determined.

Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the SSP catchment.

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), .
 1985.
- Report on Prioritisation of Subwatersheds in Subcatchments of Narmada Catchment, 1991 by AIS & LUSO, New Delhi.

CATCHMENT AREA TREATMENT PLANNING. (area in '000 ha.): `-

The total catchment area of Sardar Sarovar Project below Narmada Sagar Dam is 24,42,440 ha. Out of this 500 sub-watersheds spread to 6,88,410 ha. area are identified as critically degraded sub-watersheds. These sub-watersheds have silt yield index 1,200 and above. Project authorities were required to prepare the plans for treating those of the above sub-watersheds which are

directly draining into the reservoir. As per the data furnished by AIS&LUSO 1,75,565 ha is required to be treated at the cost of the project. Project authorities have however prepared the

plan for treating 1,79,180 ha. at the cost of the project and pari-passu with the project works. Details are given in the table-1.01 below.

Table 1.01 The total catchment area of SSP below NSP is 2,442.44 th. ha.

Item	GOMP	GOG	GOM	Total
Total Catchment	2,248.600	30.230	163.610	2,442.440
Very High & High	546.700	30.230	116.355	688.410
Directly draining Very High & High	121.330	29.573	28.226	175.565
Planned to treat	125.725	29.157	24.298	179.180

I. DIRECTLY DRAINING SUB-WATERSHEDS: The project authorities have submitted the action plans in varying stages of completeness. These plans contained information related to survey work, management options, monitoring & phased programme of treatment besides provisions for annual budget. The current status for each item of the plan is given in the table-1.02 & table-1.03 below.

Table 1.02 Summary of Status of CAT Planning

ITEM	GOG	GOM	GOMP
Preliminary Survey	Complete	Complete	Complete
Prioritisation of sub-watersheds	Complete	Complete	Complete
Development of Management Options	Complete	Complete	Complete
Annual Action Plan	Complete	Complete	Complete
Effective monitoring	Complete	Complete	Complete
Phased Programme	Complete	Complete	Complete

Table 1.03 Principal Elements of Action Plans for CAT

Element of Action Plans	GOG	GOM	GOMP
Survey work	Complete	Complete	Complete
Preparation of detailed map	Complete	Complete	Complete
Micro-watershed development map	Complete	Complete	Complete
Assignment of responsibility for conducting the work	Complete	Complete	Complete
• Time table .	Yes	Yes	Yes
Budget	Yes	Yes	Yes
Menu of treatment	Yes	Yes	Yes
Proposals for monitoring	Yes	Yes	Yes

IMPLEMENTATION OF THE CATCHMENT AREA TREATMENT PLANS: Project authorities have prepared the plans for treating

1,79,180 ha. area in about 10 years time. Govt of Gujarat started the treatment works w.e.f. monsoon of 1990 whereas Govt. of Maharashtra

and Govt. of Madhya Pradesh could start the work in the year 1992. The

progress of treatment works are summarised in the table-1.041 below:

Table 1.041 Implementation of CAT plans:

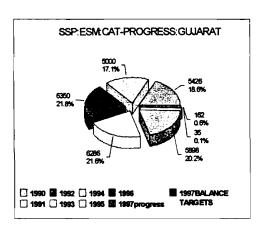
Area under treatment = 1,79,180 ha Progress 1,09,107 ha.. Balance = 70,073 ha.

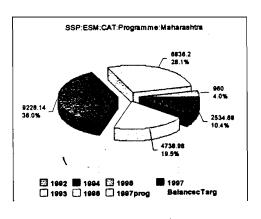
YEAR	GOG, F A	GOG N FA	TOTAL	GOM, FA	GOM N FA	TOTAL	GOMP FA	GOMP N FA	TOTAL
1990	4,28.00	898.00	5,426.00	0.00	0.00	0.00	0.00	0.00	0.00
1991	4,770.00	230.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1992	6,014.00	336.00	6,350.00	960.00	0.00	960.00	0.00	8,800.00	8,800.00
1993	6.000.00	286.00	6,286.00	6,514.50	321.71	6,836.20	966.00	6,246.00	7,212.00
1994	5,730.00	168.00	5,898.00	6,541.97	2,686.17	9,228.14	4,263.00	594.00	4,857.00
1995	0.00	35.00	35.00	4,735.00	3.98	4,738.98	N/A	N/A	17,021.00
1996	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	14,482.00
1997	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	5,977.00
Total	27.042.00	1,953.00	28,995.00	18,751.47	3,011.86	21,763.32	N/A	N/A	58,349.00

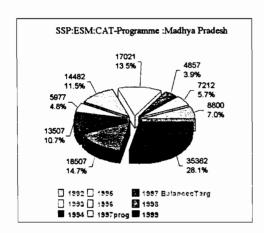
Govt. of Gujarat:

As the Catchment area of Sardar Sarovar was were little in Gujarat, GOG accepted the recommendations of Diwan Committee and commenced the work of treating entire catchment area within the state of Gujarat in the year 1990. By the end of 1994 forest area of 27,042 ha. & non forest area of 1951 ha. were treated. Treatment work is almost completed except for 162 ha. of non-forest area. Graphic representation of the progress is given in the pie chart.

Govt. of Maharashtra: Treatment plans in Maharashtra were revised after submission of the prioritization report by AIS & LUSO in 1991. Treatment works in Maharashtra could commence in the year 1992. By the end of Sept.1997 forest area of 18,751 ha. and non-forest area of 3,011.86 ha. were treated. It is planned to treat the balance area by the end of 1999 as given in the table 1.042. Graphic profile of the progress is given in pie-chart







Govt. of Madhya Pradesh: Treatment works in Madhya Pradesh. could commence after submission of the revised work plan in 1992. By the end of Sept.'97 a total of 58,349 ha. area including both forest & non forest areas was treated-up. The yearly target to achieve the balance treatment is given in table-1.042. Graphic profile of the progress is given in the pie-chart.

Table 1.042 Balance Targets.

1997	162.00	0.00	162.00	450.00	165.00	615.00	N/A	N/A	13,507.00
1998	0.00	0.00	0.00	798.52	0.00	798.52	ΝA	N/A	18,507.00
1999	0.00	0.00	0.00	1,121.48	0.00	1,121.48	N-A	N/A	35,362.00
Total	162.00	0.00	162.00	2,370.00	165.00	2,535.00	N/A	N/A	67,376.00

II FREELY DRAINING SUB-WATERSHEDS: (Excluding Directly Draining Subwatersheds). Project authorities were required to prepare plans for treating balance of the critically degraded sub-watersheds. State Govts. of Maharashtra and Madhya Pradesh have submitted the plans. The summary of the plan is given in table-1.05. The funds for

treating these areas have been promised by the RVP Scheme of Planning Commission, National Afforestation and Eco-development Board etc. The plans are being revised in a phased manner in accordance with the guidelines of the funding agencies. Some of these plans have been approved by the RVP and NAEB. Works have commenced.

Table 1.05 Summary of Status of CAT Planning:

Element of Action Plans	GOG	GOM	GOMP
Survey work	Complete	Complete	Complete
 Preparation of detailed map 	Complete	Complete	Progressing
 Micro-watershed development map 	Complete	Progressing	Progressing
Assignment of responsibility for conducting the work	Complete	Complete	Complete
Schedule of treatment	Yes	Yes	Yes
Menu of treatment	Yes	Yes	Yes
Proposals for monitoring	Yes	,Yes	Yes
Funds	Yes	RVP/NAEB *	

* Agreed by Planning Commission for inclusion in River Valley Project Scheme and funds are also promised by MOE&F from National Afforestation & Eco-Development Board. Work commenced on 6 schemes in Maharashtra & a few others in Madhya Pradesh.

07-08		16,000.00	16,000.00						
08-09		16,000.00	16,000.00						
09-10		16,000.00	16,000.00						
10-11		16,000.00	16,000.00						
11-12		16,000.00	16,000.00						
Total	78_368.00	2,39,750.0	3,18118.0	25,380.00	0.00	15,539.00	1,485.00	2,245.00	3,730 00

F.A. = Forest Area, N.F.A. = Non-Forest Area.

B. Maharashtra: An area of about 77,568 ha. which is critically degraded freely draining is proposed to be treated as Phase-II programme under RVP, NAEB, etc. Schemes of the State and Central Govt. The area proposed to be treated includes 40,619

ha. of forest land and 36,949 ha. of non-forest land. The status of submission of the revised schemes to the funding agencies is given in table-1.071. The progress achieved by the end of Sept.,1997 was 4,288 ha. Details of the planning are given in table-1.072.

Table 1.071: Progress = 4,288 ha

Catchment area: Gross = 80,881 ha.

Year	Submitted	Approved		Progres	is
			FA	NFA	TOTAL
1995-96	36,722.00	16,079.00			4.288.00
1996-97					
TOTAL	36,722.00	16,079.00			4.288.00

Table 1.072 Target :77,568 ha.

Year	Forest area	Non-Forest area	Total	Unworkable area
1996-1997	N/A	N/A	N/A	N/A
1997-1998	N/A	N/A	13,467.00	N/A
1998-1999	N/A	N/A	N/A	N/A
1999-2000	N/A	N/A	N/A	N/A
2000-2001	N/A	N/A	N/A	N/A
2001-2002	N/A	^ N/A	N/A	N/A
2002-2003	N/A	N/A	N/A	N/A
Total	40,619.00	36,949.00	77,568.00	3,313.00

N/A = Not Available.

2. COMPENSATORY AFFORESTATION

Approval for the diversion of forest land for the SSP was granted by

the MOEF in 1987, 1990 & in 1993 (including for R&R works) but several conditions were attached relating to the planning and conduct of CAF.

A. Madhya Pradesh: Catchment area of Sardar Sarovar Project below Narmada Sagar in Madhya Pradesh is 5,46,702 ha. This area includes the freely draining area attributable to Jobat, Man, Maheshwar, Omkareshwar Projects also as per the details given in the table-1.061. After subtracting such areas, the net area of critically degraded entire freely draining area is 4,77,814 ha. Out of this, 1,21,330 ha. is falling under directly draining Therefore, the net area category. proposed to be treated as Phase-II programme is 3,56,484 ha. However, Govt. of Madhya Pradesh have prepared plans for treating 1,25,725 ha. area at the cost of the project. Therefore, the net area for which plans are required to be submitted is 3,52,089 ha. Schedule of implementation is given in table-1.062.

By the end of Sept., 1997, an area of 3730 ha. was treated.

Table 1.061 Total Area of Freely Draining Critically Degraded Subwatersheds

Catchment below NSP = 5,46,702 ha. Net = 3,18,118 ha. Gross = 3,56,484 ha.

Project	Phase-I (Directly Draining)	Phase-II (Balance area)	Total Area
SSP	1,21,330	3,56,484	4,77,814
Jobat			28.211
Man			12,720
Mahes hwar			13,209
Omkar eshwar			14,748
		Total:	5,46,702

Table 1.062 Schedule of Implementation

Year		Target			Planned	l		Progress	
	F.A	N.F.A.	Total	Submitted to RVP	Submitted to NAEB	Approved	Achieved-	Achieved- NFA	Total
97-98	8,000.00	15,750.00	23,750.00	25,380.00	0.00	15,539.00	1,485.00	2,245.00	3,730.00
98-99	8,000.00	16,000.00	24,000.00						
99-00	8,000.00	16,000.00	24,000.00						
00-01	8,000.00	16,000.00	24,000.00			·			-
01-02	8,000.00	16,000.00	24,000.00						
02-03	8,000.00	16,000.00	24,000.00						
03-04	8,000.00	16,000.00	24,000.00						
04-05	8,000.00	16,000.00	24,000.00			\			
05-06	8,000.00	16,000.00	24,000.00						
06-07	6,368.00	16,000.00	22,368.00						

These plans were submitted in varying stages of completeness but each has now been revised and updated. Action plans of 3 State Govt. contained following components:

Elements of Action Plan:

- 1. Identification of areas for CAF,
- 2. Description of selected areas,
- 3. Justification of Selection of Areas,
- 4. Identification of responsible Agency.
- 5 Description of staffing requirements,
- 6 Description of material requirements,
- 7. Estimate of costs,

- 8. Identification of tree species,
- 9. Description of preparatory work needed.
- 10. Description of planting techniques,
- 11. Provision for aftercare,
- 12. Yearly planting target,
- 13. Yearly budget,
- 14. Provision made for monitoring implementation.

These action plans spell out a programme of tree planting in the three states on both non-forest and degraded forest areas as shown in Table 2.01, 2.021 & 2.022.

Table 2.01 Areas for Compensatory Afforestation (Area in ha.)

State	Area of forest diverted for SSP	Area of Degraded forest to be replanted	Area of non-forest land to be affronted	Total area for CAF
GOG	4523.00	9,300.00	4,650.00	13,950.00
GOM a)Sum.	6,488.00	12,980.00	6,488.00	19,468.00
b)R&R	4,200.00	0.00	4,200.00	4,200.00
GOMP	2,732.00	6,550.00	2,190.00	8,740.00
Total	17,943.00	28,830.00	17,528.00	46,358.00

Schedule for Implementation of CAF.

Table 2.021: Table showing progress of CAF, against the submergence area of 42,158 ha.

					(Are	ea in ha)
	G	O G	G	O M	G	OMP
Monsooi year	Degraded forest	Non- forest	Degraded forest	Non- forest	Degraded forest	Non- forest
1990		2,150.00			132.00	716.00
1991	2,834.00	350.00	8,383.00		1,200.00	373.00
1992	2,450.00	847.00	4,552.00	2,276.00	2,400.00	-
1993	2,500.00	460.00	20.00	1,156.00	2,215.00	-
1994	1,516.00	843.00	-	2,894.00	a	1,189-a
1995	Completed	Completed	Completed	NIL	NIL	NIL
1996		-	-	NIL	b	515-b
Total	9,300.0	4,650.00	12,977.00	6,326.00		

Principal amongst these are the following stipulations.

- For every hectare of forest land submerged or diverted for construction of the project there should be Compensatory Afforestation on one hectare of non-forest land plus reforestation on two hectares of degraded forest. This represents a two fold increase of the usual requirement.
- For the 4,200.00 hectares of forest land in Maharashtra which is to be used for R&R, an equal area of non-forest land or double the area of degraded forest should be planted.
- The governments of the three states involved should prepare plans detailing their proposals for Compensatory Afforestation and submit these to the MOEF before work in the forest area is due to commence.
- The project should supply firewood to its construction workers, at its own cost, to prevent them from having to meet their fuel needs from the surrounding forests.

Studies

There have been a number of studies in three states aimed at assessing the extent and significance of the loss of forest land attributable to the SSP.

- Sardar Sarovar (Narmada)
 Project Development Plan,
 Volume-II prepared by the
 Narmada Planning Group
 (NPG) in 1983.
- Studies on Ecology and Environment by M.S. University of Baroda (MSU) in 1983.

- Sardar Sarovar Project: Preparation of Environmental Work Plan by the Forest Department of Maharashtra in 1988.
- Eco-Environmental and Wildlife Management Studies on the Sardar Sarovar Submergence Area in Gujarat 1992 by MSU.
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems by State Forest Research Institute, Jabalpur (1989-92).
- Draft Report on Flora and Fauna In and Around Sardar Sarovar Project, Maharashtra by the University of Pune 1994.

The Action Plans

In compliance with the conditions set by the MOEF, each state has prepared an action plan for the CAF of areas within its boundaries. The relevant documents are:

- Government of Gujarat Work Plan for Management of Environmental Effects, Section on Forests and Wildlife: The Compensatory Afforestation Plan for the Rann of Kutchchh,
- Project for Afforestation in Sardar Sarovar Project Impact Areas due to Diversion of Forest Lands For Sardar Sarovar Project (GOG), 1991.
- Compensatory Afforestation Scheme in Lieu of Sardar Sarovar Project in Dhule District, Maharashtra State (1989).
- Government of Madhya Pradesh Forest Department Action Plan of Compensatory Afforestation for Sardar Sarovar Multipurpose River Valley Project (1989).

Table 2.022 Compensatory Afforestation against Forest Land released for R&R works in Maharashtra

(Area in ha.)

Year	Land released	Progress 1993-94	Progress 1994-95	Progress 1995-96	Progress 1996-97	Progress 1997-98	Cumulative Progress	Target 1997-98
1990	2,700.00	2,192.37	311.00	184.50	0.00	0.00	2,687.87	12.13
1993	1,500.00	0.00	0.00	896.00	0.00	0.00	896.00	604.00
TOTAL	4,200.00	2,192.37	311.00	1,080.50	0.00	0.00	3,583.87	616.13

Plantation along Canal Banks:

The total potential of canal bank plantations is estimated to be 5,300 ha. A project report prepared for this purpose by forest Dept. is under scrutiny by SSNNL. The plantation programme was launched from the year 1990-91. Plantations on 924 ha have already been established till monsoon of 1997.

Additional Plantation Activities

(a) Dam Vicinity Plantation (240ha)

An area of 240 ha. in the vicinity of the dam had also been planted. This work was completed by Forest Deptt. and is now being maintained by project authorities.

(b) Ravine Land Afforestation (200 ha.)

On the left bank of the river Sabarmati an area of 200 ha. in two villages i.e. Ratanpur (120 ha.) and Phirojpur (80 ha.) was takenup for model plantation. The entire work has now been completed.

(c) Project area plantations:

An area of 311 ha. had been planted in the project area and the work is completed.

3. COMMAND AREA DEVELOPMENT: (Including Drainage Studies)

(A)Government of Gujarat:

Government of Gujarat have undertaken several studies related to the Command area development. Some of which have been completed and the remaining are in progress. Their position is as follows:

I. Studies completed

	Studies	Name of Agency	Year of completion
1.	Pre-Feasibility Study for Low Level Canal	Jyoti Consultants Ltd., Vadodara.	1981
2.	Mathematical Modeling of Ground Water for System Single Layer Model- Narmada-Mahi Doab.	Operation Research Group Vadodara.	1982
3.	Pre-Feasibility Level Drainage Study of Narmada Mahi Doab of SSP Command.	Core \Consultants Ltd. Ahmedabad	1982
4.	Some Aspects of Role of Panchyats and	Institute of Cultural and	1982

	Institutional Arrangements for Canal	Urban Anthropology,	
	Irrigation in Two Talukas of Ahmedabad District.	Ahmedabad.	
5.	A Study of Settlement Pattern (6 Talukas in the Narmada Command Area of Mahesana Distt. of Gujarat).	Department of Geography, Gujarat University, Ahmedabad.	1982
6.	Regionalisation of Narmada Command.	Operations Research Group, Vadodara.	1982
7.	Marginal Cost Study of Two Typical Distributeries and Two Typical Branches.	Dr. C.R. Shah, Vadodara	1983
8.	Socio-Economic Bench Mark Survey of	Fourteen Different	Between
	62 Talukas (Sub-districts) of Narmada	Agencies including	1982 &
	Command Area.	Universities Research Institutions etc.	1983
9.	Population Projection and Migration Study for Narmada Command Area.	Operations Research Group, Vadodara.	1983
10.	Study on Water Demand for Non- Agricultural Use from Narmada Project.	Gujarat Water Supply and Sewerage Board, Gandhinagar	1983
11.	Consumer Expenditure, Assets and Indebtedness of Rural Households of the Command Area of Sardar Sarovar (Narmada) Project	Directorate of Economics & Statistics, Gandhinagar	1983
12.	Wasteland Development Project for Command Area of Narmada Canal (Region 11 and 12).	Gujarat State Rural Development Corporation Ltd., Gandhinagar.	1984
13.	Mathematical Modeling of Ground Water System Narmada Mahi Doab.	Operations Research Group, Vadodara	1985
14.	Additional Work on Mathematical Modeling of Ground Water System-Single Layer Model Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
15.	State of Adoption of Improved Technology in Narmada Command and Rest of Gujarat State (Based on Analysis of Crop cutting Experiments Data).	Operations Research Group, Vadodara	1985
16.	Computer Aided Planning of Conveyance and Delivery Network.	Indian Institute of Management, Ahmedabad.	1986
17.	Land Use and Cropping Pattern Survey and Mapping of Narmada Command Area Zone 4A & 4B.	Department of Geography, M.S. University, Vadodara.	1986
18.	Survey and Investigation Work of Ground Water Resources in Narmada-Mahi Doab.	Gujarat water Resources Development Corporation Ltd.,	1987
	Official P. H	Gandhinagar.	100-
79.	Cropping Pattern and Waste Demand	Operations Research	1987

Study in Narmada Command Area.	Croup Vadadara	
	Group, Vadodara.	4000
20. Inter-Regional Water Allocation and Determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1989
21. Extended Study on Inter Regional Water Allocation and Determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1989
22. Growth of Agro-Processing Industries in Phase-I of the SSP.	Gujarat Industrial & Technical Consultancy Organisation Ltd. Gandhinagar	1990
23. Consultancy Work for Control, Telemetry and Communication Network on Narmada Canal System for SSP.	Gujarat Communication & Electrical Ltd. Vadodara	1991
24. Techno-Economic Study for Utilising Village Tanks as Borrow Area for Construction of Canal Network.	Operations Research Group, Vadodara.	1992
25. Studies in Water Rates Policy, in 3 parts:	•	
26. Pricing of a Public Utility Survey of Literature.	Department of Economics, South Gujarat University, Surat	1992
27. Financial working of Irrigation Projects - A Case of Four Projects in Gujarat.	Department of Economics, Sardar Patel University, Vallabh, Vidyanagar.	1992
28. Some Policy Issue for Canal Water Rates in Gujarat.	Department of Economics, Sardar Patel University, Vallabh, Vidyanagar.	1992
29. Mathematical Modeling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati.	Consultancy Engineering Service, New Delhi.	1993
30. Mathematical Modeling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati.	Operation Research Group, Vadodara	1993
31. Mathematical Modeling of Groundwater System for SSP Command Beyond Banas up to Rajasthan Border.	Daial Consultants, Ahmedabad.	1993
32. Pre-feasibility Level Drainage Study for SSP Command Beyond Mahi.	Consultancy Engineering Services, New Delhi.	1993
33. Study on Preparation of a Detailed Integrated Command Area Development Plan for SSP.	M/s. Wamana Consultants Pvt. Ltd., Hyderabad.	M ay, 1994
34. Environmental Impact Assessment Studies on Inland and Marine Fisheries relevant to the Command Area of Sardar Samovar (Narmada) Project.	M.S. \ University, Vadodara.	Nov. 1994
35. Environmental Impact Assessment (EIA)	Commissionerate of	Oct. 1995

Studies on Water Related Diseases in Sardar Sarovar Project (SSP) Command Area including the Area Down Stream of the SSP Dam.	Health, Medical Services & Medical Education, Govt. of Gujarat, Gandhinagar	
36. Study of Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project: Lying Between the Narmada & Sabarmati Rivers (EIA Studies).	Sardar Patel University, Vallabh Vidyanagar.	Nov. 1995
37. EIA on Downstream of Sardar Sarovar Dam up to Gulf of Cambay.	H.R. Wallingford.	April, 1995
38. Economic Dimension of the Sardar Sarovar Project.	S.P.Institute of Social & Economic Research, Ahmedabad.	May, 1995
39. Study on Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project Lying in Saurashtra and Kachchh Area (EIA studies).	Saurashtra University, Rajkot.	Jan. 1996
40. Review of Ground Water Drainage Study.	H.R. Wallingford	Feb. 1996
41. Agro Pollution Aspect of Command Area.	H.R. Wallingford	

II. ON GOING STUDIES:

1.	Agricultural Research Studies.	Gujarat Agricultural Univ.	1987
2.	Survey and Investigation Work of Ground Water Resources Beyond River Mahi in SSP Command.	Gujarat Water Resources Development Corporation Ltd. Gandhinagar.	1989
3.	Action Research on People' Participation in Water Management in SSP.	Gandhi Labour Institute, Ahmedabad.	1991
4.	*Study on Flora and Fauna of the Command Area of SS(N) Project: Lying Between Sabarmati River and Rajasthan Border, EIA Studies.	Gujarat University, Ahmedabad.	Маг., 1993
5.	Ecological Study of Wild Ass Sanctuary and Surrounding Area Using Remote Sensing Technology for EIA.	Gujarat. Ecological Education & Research Foundation (GEER Foundation), Gandhinagar.	Dec. 1993
6.	*Environmental Impact Assessment of Nal Sarovar Bird Sanctuary.	GEER Foundation	Dec. 1993
	*Environmental Impact Assessment of Velavadar National Park located in the command area of SSP.	GEER Foundation	Dec. 1993

^{*} Draft/interim reports received in NCA.

Govt. of Gujarat has formed an expert Multidisciplinary group to coordinate the studies & for drawing up the needed plans.

(B) Government of Rajasthan

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The Government of Rajasthan had submitted a report on Environmental & Ecological aspects and remedial measures for 'Narmada Canal Project', Copy of the report was

submitted to Ministry of Environment and Forests. Govt. of Rajasthan have assigned studies on EIA of Command area in Rajasthan portion to WAPCOS. Revised draft final report is available.

4. FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

The guidelines of the MOEF require that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present can be assessed, listed (rare and endangered)species can be detected, if present, and appropriate conservation measures devised.

On the basis of relevant details supplied by the various states, MOEF issued clearance for the SSP in 1987. A condition of this clearance, as far as it related specifically to the Flora & Fauna, was that the Narmada Control Authority would ensure in-depth studies on flora & fauna needed for implementation of Environmental Safeguard measures.

Studies/Surveys:

Important survey work included the following:

- The Environmental Impact Study of 1983 prepared by MSU.
- Preliminary Report on First Botanical Exploration and Plant Collection from Narmada Valley by the Botanical Survey of India in 1986.

- Report on the Survey of the Narmada Sagar Area by Zoological Survey of India, 1988.
- Note on Sardar Sarovar Project -Preparation of Environmental Work Plan for Forest and Wildlife by the State Forest Department, GOM, 1988.
- Status of Flora and Fauna in and Around Sardar Sarovar Project, Maharashtra is studied by the University of Pune (1992-94). Interim report is received in NCA.
- Eco-Environmental and Wildlife Management Studies in the Sardar Sarovar Area in Gujarat, 1992, by MSU.
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems. The study was conducted by the State Forest Research Institute (SFRI) in Jabalpur and financed by the NVDA. This study was completed & report was submitted in 1994.
- Workshop on Approaches to Integrated Wildlife Management in Gujarat: A Report by the SSNNL, October 1990.
- People's Involvement in Wildlife Management, by VIKSAT in 1991.
- Wildlife Management Studies in the Submergence and Catchment Area of Narmada Project: With Special Reference to Shoolpaneshwar Wildlife Sanctuary, by the SSNNL, 1992.
- Narmada Basin Water
 Development Plan: Development
 of Fisheries, 1987, was prepared by
 the Narmada Planning Agency,
 GOMP.
- Rapid Reconnaissance Survey of Limnological Aspects Part I, II and III, 1987, were undertaken by the Bhopal, Vikram and Rani Durgavati Universities for GOMP.
- Water quality data has been collected by the Central Pollution Control Board, Central Water

Commission, the State Pollution Control Boards and the National Institute of Oceanography.

Narmada River Basin Development Project: Fisheries Component, 1991 by the German Consultants to the World Bank, GOPA.

Sociological Survey of the Fishing Families of the Narmada River by

CICFRI, 1991.

- Aquatic Fauna (Fish) Studies in Indira Sagar Submergence Area, prepared by the Friends of Nature Society in 1991 on behalf on the NVDA reported on the fish fauna of the Narmada.
- Post-Impoundment Pre-and Limnological Studies of Narmada Basin, by three universities coordinated by Barkatullah University for the NVDA. (1989-92) Study report was available in 1994.
- Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream is a desk review sponsored by the NCA and undertaken by CICFRI, 1993.
- Ecology and Fisheries of the Narmada Estuarine System with Special Reference to Proposed Impoundment (Sardar Sarovar Dam), is an ongoing study begun in 1988 by CICFRI.

The Action Plans

A) Wildlife (Terrestrial):

To ensure that the wildlife conservation measures are implemented effectively, action plans for the three states were prepared as follows:

Felling plans for the forest area coming under submergence in Maharashtra and Madhya Pradesh will avoid the possibility

- of animals being trapped in the submergence area
- Plans for improvement works in the wildlife sanctuaries of Gujarat. Shoolpaneshwar sanctuary development action plan prepared by GOG in 1996.

B) Fisheries (Aquatic):

Three state Govt.(s) submitted the fisheries development plans which are as follows:

- The Narmada Basin Water Plan: Development The Development of Fisheries, 1984. This comprehensive plan for addressed GOMP development of fisheries in the Omkareshwar, Maheshwar and SSP areas. Phasing programming with respect to pre and post-impoundment, clearance of the forests, training of fishermen, cooperative societies and post-impoundment management were proposed.
- Environmental Work Plan: Sector Fish and Fisheries, GOG. 1986. This work plan, prepared compliance with agreement with the World Bank included the establishment of fish farms, hatcheries and fish training of fishermen, establishing primary cooperatives, and State establishing Inter an Fisheries Board. In addition, it included proposals for conducthydrobiological ing studies, studies on the morphology of the river, investigations into the physical and chemical characteristic of the water and soil, and studies on flora, fauna, fish yield, plankton, and productivity in the reservoir.

A Note on SSP: Preparation of Environmental Work Plan for Fisheries Development Maharashtra, 1987. This plan included proposals for the felling in the reservoir submergence zone, fish seed, hatcheries, stocking, fishing, manpower requirements, and training and management through the Inter-State Board. Some more studies have been proposed by GOM through CICFRI.

Subsequently, the governments have revised their plans with a view to address to issues as they arose. The revised plan for GOM included proposals for the fishing Summary of Status of Environmental Planning:

population to be resettled on the periphery of the reservoir or in R&R sites in Maharashtra. In addition, the establishment of low-cost hatcheries and irrigation tanks, the development of pen cage culture fisheries, and intensive fish farming were proposed. GOG also revised their plan by end 1994. The plan contained four volumes covering upstream, downstream & command areas. In view of the progressive impoundment which commenced in March, 1994. NCA has constituted an expert group to lay down the guidelines for conservation & development of fisheries & its ecosystem. The plan submitted by state governments are under scrutiny of this expert group.

Table 4.011 Wildlife

		Gujarat	Maharashtra	Madhya Pradesh
•	Preliminary Surveys	Complete	Complete	Complete
•	in-depth Studies	Complete, Final report available.	Completed, Draft Final report available	Complete Final report available.
•	Development of Management Options	Complete for Shoolpaneshwar sanctuary.	Awaiting results of study report from SES, Pune.	Some work completed but awaiting deliberations of the expert group.
Act	ion Plans :			
•	Migratory corridors	Not needed	Not needed	Plan ready
•	Sanctuary development	Shoolpaneshwar sanctuary Management Plan prepared	Not needed.	Not needed.
•	Wildlife conservation measures in adjoining forest(s)	Massive afforestation in catchment of SSP.	Awaits, report of SES, Pune.	Awaits final outcome of the expert group.
•	Implementation	Shootpaneshwar development complete, CAT work (increasing carrying capacity) nearing completion.	Awaiting outcome of the study. CAF & CAT nearly completed.	Arrangements complete, awaiting final outcome of study. Substantial CAT works in the catchment completed.

The SSP will also provide an opportunity enhance nature to conservation outside the immediate

catchment area of the Narmada. In particular three wildlife sanctuaries located in the command area of the project will benefit from the increased

freshwater availability resulting from the project and there are plans by the GOG to further develop these. They comprise:

- Nal Sarovar, Bird Sanctuary;
- Wild Ass Sanctuary in the Rann of Kutchehh.

Velvadar Black Buck National Park.

Table 4.012 Fisheries

		Govt. of Gujarat	Govt. of Maharashtra	Govt. of M.P.
•	Preliminary surveys work plan	Yes	Yes	Yes
•	Updating of detailed surveys/studies of fish fauna	Yes		Yes
•	Updated Action plans	Yes	Yes	Submitted in 1997
Im	plementation:			
1.	Plan for clear felling	Completed .	Yes, to synchronise with submergence about 479.91 han felled.	Yes, to synchronise with submergence work commenced.
2.	Development of fish farms	Under implementation	Proposal under revision	Proposal under revision
3.	Establishment of IFDB for future R&D Management	Agreed	Agreed	Disagreed
4.	Expert group to lay down guidelines for Conservation & Development	Yes, agreed by the State & constituted by the NCA. Three meetings held, guidelines are on the anvil.	As per col. No.2	As per col. No.2

Progress of Implementation

CICFRI have already established one hatchery in Gujarat for augmenting the numbers of the 'Hilsa' fish in the reservoir. This currently produce around 25,000 spawn per year. CICFRI have also been commissioned to monitor the whole of the estuary and their study has been extended to examine pollution and to undertake

Modelling studies in the downstream environment.

A draft plan for the creation of an Interstate Fisheries Development

Board (IFDB) has been prepared by the NCA and agreed, in principle, by the governments of Gujarat and Maharashtra. However GOMP suggest as an alternative to IFDB. Reaction from GOG & GOM are awaited. The Organisation is expected to be set up and fully functioning prior to reservoir filling. An expert group has been constituted by NCA to lay down the guidelines for fish conservation & development during progressive filling of the reservoir to advise the state executive agencies for follow-up action. Guidelines are on the anvil.

On-going Fisheries Activities in the Sardar Sarovar.

Some fisheries development activities are already going in the Sardar Sarovar from the year 1992 onwards. From 1993-94, these programmes received the financial support from the Sardar Sarovar projects. These activities are:

- Seed Stocking in the Sardar Sarovar;
- Development of Rearing space for Fish Seed Production;
- Mangrove Plantation Programme.

Till the year 1995-96, the State Fisheries Department and other Fisheries Development Agencies have stocked 8.516 lakh fingerlings in the dykes of Sardar Sarovar, as a part of reservoir development programme of the State Fisheries Department. During 1995-96, 2.31 lakh fingerlings and 11.48 lakh yearlings were stocked. In 1996-97, 60 lakh fingerlings have been stocked.

There is a provision to create rearing space for seed rearing in the Sardar Sarovar and the funds have been provided by the SSP as follows:

Year	Lakh Rs.
1993-94	04.36
1994-95	30.00
1995-96	30.00

The total amount for the rearing ponds is at present Rs.64.36

lakh. The site selected for the rearing ponds initially in the reservoir premises was found to be unsuitable on account of higher water permeability of the soil. Hence, another site has been located in the village of Timbi (Nanded Taluk) of Bharuch district, in the Survey No.303. The soil samples have been sent for analysis to decide the suitability.

In Gujarat, reservoir bowl is already cleared of all vegetative growth. Execution of felling in M.P. & Maharastra, as per felling plans prepared, awaits the commencement of impounding.

5. SEISMICITY

Studies

Studies of reservoir induced seismicity (RIS) and rim stability have been carried out by the Geological Survey of India (GSI), Central Water and Power Research Station (CWPRS), University of Roorkee and World Bank Consultants. The principal studies are described below:

- University of Roorkee. 1980. Geological and Seismological Investigations of the Environs of Narmada Valley Around Navagam Dam site in Gujarat.
- GSI. 1981-82 and 1982-83. A
 Geotechnical Report on the
 Reservoir Competency
 Investigations in Parts of
- Sardar Sarovar Area, Bharuch & Vadodara Districts. Volumes I&II.
- Shenoi et al. 1982. Shenoi et al presented at the New Delhi Conference on the significance of Seismotectonic Aspects on Reservoir Development.

- Balasundaram, M.S. 1982 Sardar Sarovar Project: A Geotechnical Report Compiled and Edited for the Government of Gujarat.
- MSU. 1983. The Sardar Sarovar Narmada Project Studies on Ecology and Environment.
- NVDA published a Position Paper on Seismic Studies in January 1986.
- Krishna, Dr. J. 1989. Dams and Seismicity.
- GSI.1990. Study of the Rim Stability of the SSP.
- GOI.1993. Sardar Sarovar Project Seismicity and Sardar Sarovar Dam.

Progress of Implementation

The various recommendations for modification of the dam design

which have all been implemented are summarised as:

- adoption of horizontal design coefficient of 0.125g on the recommendation of the Dam Review Panel;
- installation of stress monitors in the main body of the dam;
- increase of the depth of the foundation to 18m below the lowest river bed.

The Government of Gujarat has identified 9 locations for the installation of seismic monitoring stations, 4 each on either side and one at the downstream of the Sardar Sarovar reservoir, out of a total of 9 stations there are 3 in M.P., 1 in Maharashtra & 5 in Gujarat. Construction work at all the 9 seismograph stations is completed and installation of instruments at all the stations , except at Sagbara, is completed

Location of the seismographic station for the SSDam

PLACE	DISTRICT
i) Kevadia Colony,	Bharuch
ii) Naswadi	Vadodara
iii) Kawant,	Vadodara
iv) Alirajpur,	Jhabua
v) Kukshi	Dhar
vi) Barwani	Khargone
vii) Shahada,	Dhule
viii) Sagbara,	Bharuch
ix) Jitgadh,	Bharuch

The seismological observatory at Kevadia Colony is in operation since 1973. The data of Kevadia Colony seismograph station for the period from 1973 to 1984, was analysed by CWPRS, Pune and GEAR, Vadodara. Also, Micro-earthquake surveys around Navagam Dam were carried out in the year 1980 by Dept. of Earthquake Engineering, University of

Roorkee. The Micro-earthquake activity was found to be of low level and was generally scattered in the Narmada basin.

The seismological network with latest instruments was established in the year 1989. After the installation of new seismic instruments at new sites. local micro - earthquakes as well as global earthquakes are being recorded. The events which are recorded at

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network are analysed and located using the computer program 'FASTHYPO' incorporated with seismic Data processing and Analysis Computer (DAC - 300). The progress of implementation is illustrated in Table below:

Status of implementation

Action	Status
Dam design modifications	Completed
Installation of monitoring stations	8 stations installed by June, 1994, 1 more awaited.
GSI (Nagpur Division) rim stability studies	Completed
Tracer Studies by CWPRS	Reports submitted.

6. HEALTH ASPECTS

Studies

A large number of studies have been carried out on the health profile of villages in the three affected states. The key studies are summarised below:

- Narmada Programme Schistosomiasis -Back-to-1986, Office Report, assessment was carried out by Goodland, consultant to the World Bank, the National Institute Communicable of (NICD) and Diseases the World Health Organisation (WHO)
- Proceedings and Recommendations of the Meeting on Schistosomiasis Research and Surveillance held at NICD on 22nd November 1985.
- Disease Profile of Command Area by the State Commissariat of Health, Medical Services and Medical Education (SCHMS), 1986.

- Health Statistics, GOM, 1987. The state department of health produced a report on the health profile of 33 project-affected villages in Dhule district, Maharashtra.
- Health Statistics 1982-84, GOMP. This study, published by GOMP in 1985 & updated in 1994.
- The Sardar Sarovar Narmada Project Studies on Ecology and Environment by MSU in 1983, considered public health in Chapter-3.
- Numerous studies have been conducted on the incidence of malaria in India, amongst others, by the Malaria Research Center (MRC).
- Revised Plan by GOM, 1995.
- Revised Plan by GOG, 1996.
- Epidemiological Surveillance Studies by GOM, 1996.
- Epidemiological Surveillance Studies by Gandhi Medical College, Bhopal for GOMP 5th Interim report (1997) submitted.

Status of Implementation of Actions for Public Health

Action	Gujarat	Maharashtra	Madhya Pradesh
Baseline studies	Complete, 1986 updated '95	Complete, 1987 being updated.	Complete. 1994 being updated.
Preparation of	Submitted and modified in 1986; Urban Malaria	Original submitted in 1987, revised in 1991.	Original submitted in 1986,

	state action plan	Scheme proposed. Plan is being revised.	1992 & 1993.	revised in 1988 and final plan submitted in 1991. Cost details incor- porated in 1996.
•	Survey of existing facilities	Complete	Complete	Complete
•	Establishment of new facilities	Hospital at Kevadia for workers; laboratory and mobile unit complete, drug dispensaries	Somawal village hospital; health centers and health units sanctioned	Hospital, mobile unit and civil dispensaries for labour; detailed scheme for resettled population
•	Vector control measures in place	NMEP; SSNNL work- shop on malaria control; laboratory established, studies on health completed	NMEP; adoption malaria control guidelines of irrigation Department	NMEP: state malaria control organizations strengthened
•	Appointment of specialist staff	One senior health officer is posted at Kevadia	Yes one PHC. 3 dispensaries & one floating dispensaries established & 51 posts filled up & laboratory facilities Provided.	Needs identified.
•	Disease monitoring and responsibility	Entrusted to SCHMS EIA report submitted. Action plan of 1986 being revised.	Entrusted to regular health department Sur- veillance studies comm- enced. Phase-I survey report submitted by T.N. Medical College.	Evaluation cell established monitoring by Gandhi Medical College. Bhopal. Five interim. rep-orts reccieved

Implementation:

A) Govt. of Gujarat:

SSP has dispensary at Dam site run by Jai Prakash Associates Company. It has regular medical officer and other staff to diagnose and treat all malaria patient. Generally labourers and staff at dam site and their families take benefit of this dispensary.

Affected villages and Rehabilitation sites of Bharuch Vadodara and Kheda District are

Looked after by respective District Panchayat Health staff for Malaria and

Water born diseases. Health worker and A.N.M. visits these sites regularly. Sr. Health officer is visiting these villages besides Rehabilitation sites and coordinating functions of Health Department.

B) Govt. of Maharashtra:

The following Health Schemes have been sanctioned by Government of Maharashtra vide Govt. Resolution No.1(PHC-1593/2038/CR-268/93/PH-4 dtd.4..4.1994 and No.MISC-

1095/5/CR-I/PH-4dtd.15th November,

1995. The position is as follows:

Status of implementation of health plan in Maharashtra

	Name of Scheme	No. of schemes sanctioned	No. of post sanctioned	No. of post filled in
1.	Transfer of Primary Health Centre from Bamni to Vallheri- Gavthan Tehsil Taloda.	1	13	13
2.	Sanction Laboratory facilities in Primary Health Center of a catchment area.	1	16	16
3.	Establishment of sub-center Dispensary	3	18	18
4.	Establishment of Floating Dispensary	1	5	4

7. ARCHAEOLOGICAL SURVEY AND ANTHROPOLOGICAL STUDIES

ARCHAEOLOGICAL SURVEY

In the case of SSP, where some sites may be submerged the NWDT award stipulated that, the entire cost of relocation and protection should be chargeable to GOG. Relocation work is to be supervised by the Department of Archaeology under the provisions of the 1958 Act.

Studies:

Survey conducted for identification of various sites & monuments of significance has included the following:

- Gujarat: Archaeological Survey of Nineteen Villages Submerged by Sardar Sarovar Reservoir, 1989.
- Maharashtra : Survey by Department of Archaeology. Survey was carried out by the State Department of Archaeology for cultural sites in

24 villages of Akkrani taluk and nine village from Akkalkuwa taluk, Dhule district.

- Madhya Pradesh: Survey by State Department of Archaeology and Museum (1992), in sixteen volumes.
- Anthropological Survey of India: Narmada Salvage Plan.
- Anthropological Survey of India: People's of India.
- Adivasi Kala Parishad: Survey of Material Cultural in the Narmada Valley.
- Rashtriya Manav Sanghralaya : Narmada Salvage Plan.

Cultural Heritage in SSP Area

		Gujarat	Madhya	Mahara
			Pradesh	shtra
•	Relocation	2	7	
	of temples			
•	Excavation		5	
	site(s)			

Summary of Current Situation and Progress

		Gujarat	Madhya Pradesh	Maharashtra *
•	Survey of villages in Submergence Zone	"Complete' for all item in all the States.		
•	Identification of Cultural Sites.	"Complete' for all item in all the States.		
•	Collection of Data and Documentation of Sites	Complete	In progress	Not required.
•	Selection of appropriate sites	Complete	In process	Not required
•	Action plan	Complete	Finalised	Not required

 Survey in Maharashtra identified one temple which was on the border with Gujarat. GOG has already relocated this temple 15 km. downstream of earlier location.

State	Relocation of temple Target/Progress	Excavation Target/Progress	Sculptures Target/Progres s
• Gujarat	2/2	•	
• Maharashtra			
Madhya	7/6 *1	5/3 *2	188 & 76 artifacts
Pradesh			collected. *3

*1 Relocation/Protection: Work for relocation of following temples is in progress.

Village	Temple	Remarks
1. Semalda	Kalanjeshwar	Land allotment under
2. Barda	Shiv Mandir	progress of estimate
3. Khujawa	Bhawani Mata temple	under preparation.
4. Khujawa	Rock-cut-caves	Decorded facades pro-
5. Khujawa	Jaleshwar temple	posed for Shifting to
6. Roligaon	Shiv Temple	Lal Bagh.

Shiv temple of Roligaon is proposed to be protected by constructing a wall.

*2 Excavation

- For excavation at village Khaparkheda & Brahmangaon. Funds sanctioned by NVDA & work was completed.
- For excavation at village Utawad. Work was completed earlier by ASI, Govt. of India.

*3 Collection & display at Museum

A good number of sculptures were collected from the regions coming under the submergence area of the Sardar Sarovar dam. This sculptures were obtained from Pipladgarhi, Khujawa, Dharamapuri and different other villages. Since these sculptures were lying open for a very long time they bear traces of weathering effect on them like salt formation, red-oxide deposition, besides accumulating dust, dirt and fungus on them.

They were cleaned by the chemists using necessary chemicals like Ammonia, Sodium hydroxide, Benzene P.V.A. etc. After cleaning the sculptures were coated with preservative for saving them from further deterioration.

- Land for museum at Barwani & Indore requested. Chemical treatment of rock cut statue at Pipladgarhi has already been started. This monument is proposed to be shifted at relocation site.
- Construction of a section 'Narmada Dirgha' in the museum at Bhopal has been started.
- Besides, Film documentation of all the monuments of SSP is in progress through an agency 'Madhyam', engaged by state dept. for documentation of the Important monuments.

Proposal to establish Narmada park to house sculptures at Lalbag Palace, Indore is under consideration of the State Govt.

ANTHROPOLOGICAL STUDIES

Government of Madhya Pradesh has informed that in view of the studies being carried out in connection with Narmada Sagar Project, no separate anthropological studies are required and that the Director General, Anthropological Survey of India has also expressed the same view. M.P. State Adivasi Kala Parishad has submitted its report on Tribal arts & culture. Besides Anthropological Survey of India has informed that Narmada basin is already covered extensively under the project "people's of India". Besides Rashtriya Manay Sanghralaya has conducted needed studies in the past as follows.

Further studies are covered under R&R plan of the state Governments. The work done by An.S.I is being used.

- a study of the palaeo-ecology of quaternary fossils in the central Narmada Valley;
- excavation of upper Paleolithic site of Mehtakheda and further exploration of Nimar;
- collection of tribal artifacts in Madhya Pradesh.

Institutional responsibility for these actions was specified in the action plan whereby the first two elements were completed by Deccan College, Pune and the third by Adivasi Kala Parishad, for the Rashtriya Manav Sanghralaya, Bhopal.

STATUS REPORT

NARMADA SAGAR PROJECT (NSP) ENVIRONMENTAL ASPECTS September, 1997

1. PHASED CATCHMENT AREA TREATMENT:

The freely draining area of Narmada Sagar Project down stream of Bargi Dam is about 39,25,422 ha. As per the guidelines of MOWR, directly draining watersheds of very high and high priority categories only are to be treated pari passu with the construction of the dam and at the project cost. Prioritisation survey of the watersheds was entrusted earlier to SGSIT&S, Indore. Later on, as per GOI's instructions the prioritisation survey

was entrusted to the All India Soil & Land Use Survey Organisation, New Delhi. The Survey has been completed by AIS&LUSO, New Delhi and the Survey reports have been received in the NVDA.

On the basis of the reports submitted by the AIS&LUSO, 30 subwatersheds belonging to the very high and high priority categories and directly draining into the reservoir have been identified for treatment. These 30 subwatersheds cover an area of about 73,456 ha.

I. DIRECTLY DRAINING SUBWATERSHEDS:

Table 1.01 Critically degraded Subwatersheds below Bargi dam (Figure in ha).

		FOREST		NON-FO	REST	TOTAL	
L		Gross	Net	Gross	Net	Gross	Net
•	Critically	15,759.00	11,048.00	57,697.00	51,927.00	73,456.00	62,975.00
	degraded sub-		1				
	watersheds.						

^{*} In addition an area of 1636 ha. was treated up under pilot project earlier.

Table 1.02 Programme and Progress of works: Target = 62,975 ha. Progress = 39,431 ha.

	Upto 92-93	93-94	94-95	95-96	96-97	97-98	Cumulative
Non-forest area/ha (51,927 ha)	11,439.00	10,261:00	7,224.00	3,878.00	2,757.00	1,009.00	36,568.00
Forest area (11,048ha)	-	•	2,623.00	240.00	\ NIL	NIL	2,863.00
Total Area: (62,975 ha)	11,439.00	10,261.00	9,847.00	4,118.00	2,757.00	1,009.00	39,431.00

II. FREELY DRAINING AREA (Excluding Directly Draining Subwatersheds)

 Number of watersheds
 478

 Gross Area
 10,12,650 ha.

 Net Area
 9,15,150 ha.

Table 1.03 Schedule of Implementation: (Area in 000 ha.)

Year	-	Tai	Plans Submitted Approved			ad	Progress			
	FA	NFA	TOTAL	NAEB	RVP	NAEB	RVP	FA	NFA	TOT AL
1995-96	0.00	18.00	18.00	7.332	1.986	Awaited	1.986	-	-	-
1996-97	0.00	18.00	18.00							
1997-98	10.00	27.00	37.00				_			
1998-99	10.00	28.80	38.80							
99-2000	10.00	28.80	38.80							
2000-01	10.00	28.80	38.80							
2001-02	10.00	28.80	38.80							
2002-03	10.00	28.80	38.80		İ					
2003-04	10.00	28.80	38.80							
2004-05	10.00	28.80	38.80							
2005-06	1000	28.80	38.80					-		
2006-07	10.00	28.80	38.80							
2007-08	8.43	28.80	37.23							
2008-09	0.00	28.80	28.80							
2009-10	0.00	28.80	28.80						_	
2010-11	0.00	28.80	28.80							
2011-12	0.00	28.80	28.80		1			1		
2012-13	0.00	28.80	28.80	<u> </u>	 	 			_	
2013-14	0.00	28.80	28.80	 	1			 	_	-
2014-15	0.00	28.80	28.80			<u> </u>				
2015-16	0.00	28.80	28.80						\vdash	
2016-17	0.00	28.80	28.80							
2017-18	0.00	28.80	28.80						<u> </u>	† ——
2018-19	0.00	28.80	28.80		1		T	1	†	1
2019-20	0.00	28.80	28.80		1			<u> </u>		_
2020-21	0.00	28.80	28.80							
2021-22	0.00	28.80	28.80		1					
2022-23	0.00	26.40	26.40						 	
2023-24	0.00	26.12	26.12	1	1		T			
Total	108.43	806.72	915.15			1				

^{* 5} projects for seeking funds for 40 subwatersheds covering an area of 53,709 ha. of forest were submitted by NVDA to National Afforestation & Eco-Development Board.

2. COMPENSATORY AFFORESTATION:

A total of 40,332 ha. forest land would come under submergence and an additional 779.90 ha.of forest land has been diverted for the residential colony, power house complex, dam, saddle dam and approach roads.

Subsequently, another 308.40 ha. of forest land was permitted to be diverted for power house. Thus a total of 41,420 ha. of forest land has been permitted to be utilised for the construction of ISP. To compensate for this loss of forest, 10,143 ha. of nonforest and 70,802 ha. of degraded forest land has been identified for compensatory afforestation.

Table 2.011 Programme of Compensatory Afforestation: Target = 80,945 ha.

Progress = 67,133 ha.

Balance targets = 13,812 ha

				Dalance targets -			- 13,812 Ha.		
	Cumulative Prog. till 91- 92	92-93	93-94	94-95	95-96	96-97	97-98	Cumulative	
Deg.forest area (70,802 ha)	23,048.00	11,919.00	12,987.00	4,056.00	2,902.00	162.00	3.204.00	58,278.00	
Non-forest area (10,143 ha)	5,239.00	1,390.00	1,327.00	667.00	131.00	NIL	101.00	8,855.00	
Total (80,945 ha)	28,287.00	13,309.00	14,314.00	4,723.00	3,033.00	162.00	3,305.00	67,133.00	

Table 2.012 Targets

	1996-97	1997-1998*	Balance
Forest Area	15,890.00	15,728.00	0.00
Non Forest area	1,389.00	1,389.00	0.00
Total	17,279.00	17,117.00	

*Due to slipage of targets during 1996-97 balance targets are shown

3. COMMAND AREA DEVELOPMENT:

The Government of Madhya Pradesh has submitted command area development plan. The project on completion will provide annual irrigation to 1.69 lakh ha.

The implementation of the plan would be taken up in three phases for completion in June-2007. The study on impact of Agro chemicals, runoff from fields on surface & ground water quality in the command area has been

assigned to J.L. Agricultural University, Jabalpur. An MOU for this work was finalised. An allocation of Rs.24.5 lakhs was made. Studies have commenced and are making progress.

4. FLORA, FAUNA AND CARRYING CAPACITY

Botanical exploration of Indira Sagar Dam was carried out by Botanical Survey of India during 1985. Besides, wetland and aquatic flora of Narmada Valley in Madhya Pradesh

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was also published in 1991 in Vol 15 No.3 in J.Econ.Toxicology.Bot.

Studies on these aspects were entrusted to the Wildlife Institute of India, Dehradun in December, 1989 and were completed by March, 1994. The final study report is submitted to MOE&F & NCA.

Besides this, the Friends of Nature's Society, Bhopal, has completed the preparation of Wildlife Retrieval and Conservation Plan. Implementation of the plan awaits submergence.

Actions have been taken by NVDA to implement the recommendation of the WLI regarding declaration of National Park & protected areas. Matter is under consideration of the State Govt.

FISHERIES DEVELOPMENT:

The studies of certain aspects of fisheries have been included in the limnological studies being conducted by the three Universities of the State; studies in the Upper Narmada, (Bargi Reservoir) Rani Durgawati by. University, Jabalpur, studies in the Middle Narmada (Tawa, Barna and Kolar Reservoirs) by Barkatullah University, Bhopal, studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have the studies in completed their respective areas as per MOU and final report is available. Accordingly action plan has also been drawn up & is presently under scrutiny of NCA.

Aquatic fauna has also been covered under the studies completed by Friends of Nature Society, Bhopal. The draft report of FONS is also available. Action plan submitted earlier is being updated.

5. SEISMICITY AND RIM STABILITY

The reservoir competency survey has been done by GSI and report is submitted. In the report, GSI has suggested further studies for some patches of narrow water divide.

Establishment of 10 nos. of seismic observatories in the Narmada Sagar Complex area is taken up by NVDA. Besides, 12 nos. of Wood Anderson Seismometers and 6 nos. of photographic recorders are being procured from IMD supply has commenced. Procurement of Micro Earthquake recorders is completed. In the mean time on the initiatives taken NVDA, CWPRS has already installed the instrument to record, preimpounding data and for undertaking seismic studies at NSP, Omkareshwar Maheshwar projects Analogic micro earthquake recorder & strong motion accillograph as an Data will interim measure. interpreted by IMD.

6. HEALTH ASPECT:

A note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and comments were sent for modifying the report. NVDA has submitted the revised plan costing Rs.748.73 lacs for the preventive and curative aspects of health. Regarding preventive aspects, a MOU has been signed with the Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal., Five half-yearly reports received. For studies on health aspect in project impact areas of SSP and NSP, work is proposed through a cell of monitoring and evaluation under the Directorate of Health Services, Bhopal.

The approved plan is being implemented.

Pre-impoundment and post-impoundment Limnological studies carried out by three Universities will take care of water quality aspect. These studies have been completed and the final report is submitted. Action plan approved by NVDA is under scrutiny of NCA.

7. ARCHAEOLOGICAL AND ANTHROPOLOGICAL SURVEY:

Archeological Survey

A survey of the 254 villages is required for identification of the archaeological monuments falling within the submergence area. The State Department of Archaeology and Museum, Bhopal was entrusted with the survey of 87 villages which has been completed. The state Department have already submitted an action plan for relocation of monuments of Archaeological significance. This plan is being implemented.

Archaeological Survey of India has also completed the survey for 167 villages for centrally protected monuments for identification of the monuments of significance. Implementation of the action plan is already initiated.

As only lower bastion in north of the Joga Fort is likely to be affected by scour action of water, this is being studied and the Siddeshwar temple is well above the FRL of 860 ft., these two structures in NSP area are

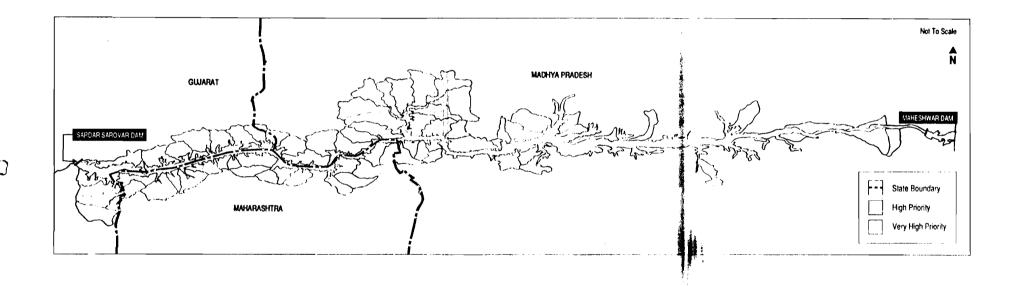
considered to be unaffected by the project however action is being taken by the concerned agencies to ensure safety of the monuments.

Excavation of the early historic mound in village Khedinama in Hoshangabad distt. is completed and report is available in NCA. Ancient tools & artifacts have been found. Nagpur branch of ASI has also completed excavations at village Utawad.

Anthropological Studies:

Efforts are being made for retrieval of bio-cultural material from Narmada Basin. A lot of information is gathered from the field which generates immense data of Socio-Anthropological significance. Rashtriya Manav Sanghralaya has constituted a working group for the retrieval of bio-cultural material in Narmada Basin. Survey of tribal art and handicraft entrusted to M.P. Adivasi Kala Parishad is completed and available. report is Besides Anthropological Survey of India has covered these studies under its own project called "people of India". NVDA has procured six volumes of this report viz. Vol.I,II,III, VIII, X & XI & these are being studied for use in the R&R of tribal PAFs. The report is in 61 volumes out of which 7 volumes are under final editing. A Narmada Salvage also launched is by Anthropological Survey of India recently and the entire area is scanned and some ancient tools have been

Priority Areas for Catchment Area Treatment



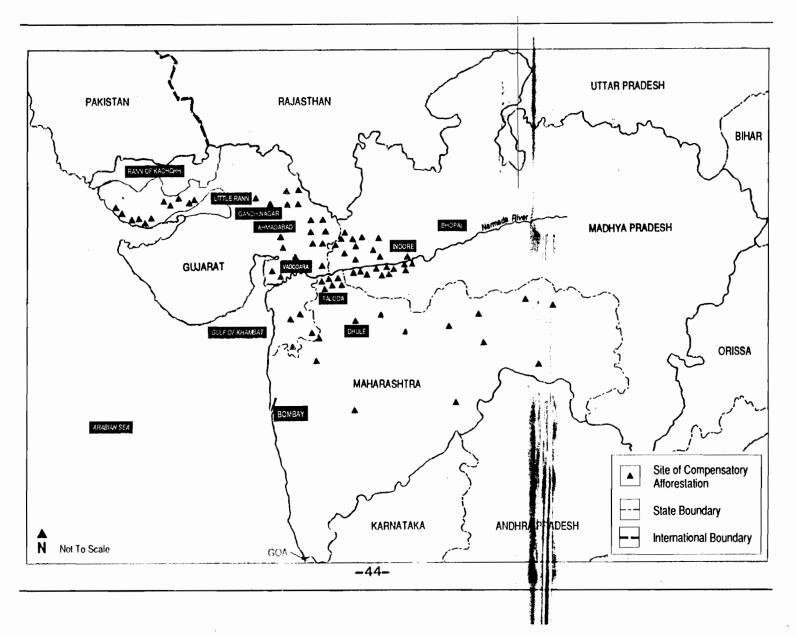
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ANNEX - XXXI-(9).

Compensatory Afforestation in Gujarat, Maharashtra, Madhya

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Pradesh



REVIEW ABSTRACT ON "DRAFT FINAL REPORT ON ECOLOGICAL STUDY OF WILD ASS SANCTUARY AND SURROUNDING EIA" OF AUGUST, 1997

The draft final report on Ecological study of wild ass sanctuary and surrounding areas using remote sensing technology for EIA prepared by GEER Foundation, Ahmedabad, Gujarat, 1997. This was a two year study commencing from March, 1995. The report provides information about the changes in land cover/land use glasses during last eleven years and also the latest status of land cover/land use classes.

RELEVANCE TO THE SARDAR SAROVAR PROJECT

Concerted efforts are required to secure the future of wild ass sanctuary. The negative impact on the sanctuary emanates basically from the expending salt industry in area, intrusion of domestic live stock, spread of prosopis juliflora, this coupled with likely changes due to Katchh branch canal which will cross the narrow neck at the northern tip of little runn, shall put heavy demand on the normal behavior pattern of the wild ass.

Environment Sub-group had directed that construction of this Katchh branch canal should not be taken up till such time experts establish the negative/positive impacts of this canal and/or till such time the mitigatory measures were designed and implemented. Present study seeks to address only one of the component which is required to be addressed, i.e., changing land use in the sanctuary and expansion of salt pans.

FINDINGS OF THE REPORT

An excellent piece of work has been done by the investigators in Utilising the remotely sensing data for achieving the objectives of the studies. The report will serve as a reference material on the subject. Tables, maps, and photographs included in the report make a significant contribution which may be useful in preparing management plans for the sanctuary area. Investigators have recommended measures for facilitating the movement of wild ass, regulations of salt works, bet development and made available the land use and land cover maps besides measures for control of prosopis, waste land development and have also identified the salinity ingress zone.

IDENTIFICATION OF CRITICAL GAPS IN THE REPORT

Changes in the title of the report may be considered since the main objective of the study revolves around monitoring of land use cover through application of remote sensing technology. The topic of the study indicates that this is an ecological study of wild ass sanctuary for it's EIA, it is a bit confusing to general reader since the report is a baseline inventory dealing with very limited aspects of EIA. we would suggest that if possible, topic may be suitably changed to reflect the objectives of the study.

Terms of references for the studies required the investigators to give suggestions for improvement of habitat with respect to the effect of Narmada

canal. Although, this was not the main objective of the study (Page-62, para-3, last line).

Suggestions for improvement of habitat with respect to the effect on Narmada canal have been included under Chapter-6, Point-1. Under this Chapter, it is stated that the canal crossing may affect the movement of wild ass, chinkara and other animals between the two runns. Except for a indirect reference of the report of NPG, which assumes that the canal crossing may affect movement of wild ass. No supportive data, observations, etc. have been given in the report to establish that the wild ass group will be negatively impacted by the canal. There is a need for addressing the effects of Narmada canals on ethology of the wild ass. It needs to be established that construction of canal is detrimental to the survival of the wild areas. No efforts have been made by the investigators in this direction. However, it may be due to the fact that a comprehensive study on the issue is planned separately. Without this study, the concern raise by the Environment Subgroup remains unresolved. Investigators may like to limit the suggestions and recommendations which emanates from their own observations.

Considering the importance of vital natural ecological of the sanctuary resources, the other vital ones of impact by irrigation development on the sanctuary's ecosystem including impacts on varied land use, habitat, wild life and salt industry, behavior and movement pattern of wild ass with reference to crop damages etc. identified by the expert, multi-disciplinary group may have to be taken up on priority.

Improvement of the habitat which includes food, water and shelter for the wild animal only would be possible if we know the biology, movement, behavior of the wild ass and the sanctuary area and the relationship that exists between little runn-off Katchh with that of grater runn-off Katchh. Since such issues as per the terms of reference, are outside the scope of present report, the recommendations made by the investigators on these issues may require a review. Facts must be distinguished from the fiction.

CONCLUSION:

Investigators on the whole deserves compliments for carrying out commendable works on application of remote sensing technology for periodic monitoring, land use cover within the sanctuary and surrounding areas.

Observations on the draft final report on EIA of SSP on Nal Sarovar Bird Sanctuary

Draft final report on Environmental Impact Assessment (EIA) studies of Nal Sarovar Bird Sanctuary located in the command area of SSP has been submitted by GEER Foundation. A good piece of work has been done by the investigators on the resource base inventory, recording 216 species of birds which includes several special listed in Schedule-I of Wildlife Protection Act of 1992, besides 13 mammalian species including wild ass and black buck and 10 species of reptiles. 48 species of algae and 78 species of flowering plants besides 76 species of zooplanktons. Fish fauna was also surveyed.

The identified source of impact were:

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- 1. Changes due to in-flow of water in the command and catchment, and
- 2. Likely changes due to release of water for habitat improvement from the SSP.

Investigators have identified all the 8 habitat types on the basis of water level and vegetation composition. Habitat preferences of water fowls have also been studied. Investigators have also pointed out that villagers from the 8 surrounding areas depends heavily upon the sanctuary area for various resources. No canal is however, passing through the area but nearest canal is about 17 km away. SSP authorities have proposed that water can be provided for improvement of the sanctuary and conservation of avi-fauna and its habitat. Investigators have made suggestions for addressing negative impacts and for enhancing positive impacts. They have also suggested creation of disturbance free sanctum sanctorum zone, regulation of fisheries and tourism, besides regulation of land use pattern. Entire catchment area of the lake falls in the command area of SSP.

Study report identified both negative and positive impacts. There is a need for assigning weightage to each of the identified impact and for identifying the limiting factor for arriving at a conclusion.

Report suggested the environmental safeguard and mitigation measures, citing examples and experiences of other similar project in the area. It seems that many of the recommendations made earlier by the NCA have been incorporated but there still remains a gap therefore, the comments on the 2nd interim report sent to the SSNNL vide this office letter No.Env- $\frac{4}{4}$ /96/39, dtd. 101.97, where gaps in the report have been identified may also be referred

The people's involvement in management of the lake may also be considered. Carrying capacity aspect of the lake with and without SSP (considering re-generation flows as well as additional supply of water) need to be considered. Water quality aspect, time-table and cost aspects may also be considered for incorporation in the final report, if possible. A clear cut management plan should emanate from the study report. The comments suggested earlier may also he kept in view while finalising the report and the management plan.

ANNEX - XXXI - 10b

No.Env-4(4)/97/

November 17, 1997.

To

Shri J.B. Shah
Officer on Special Duty
Govt. of Gujarat
Narmada Planning Group
12, Narmada Block, 3rd Floor
New Sachivalya Complex
GANDHINAGAR - 380 010
(Gujarat).

Sub: Observations on final interim report on Environmental Impact

Assessment studies on Nal Sarovar Bird Sanctuary.

Ref: Your letter No.NPG/Nal/EIA/228-I-933, dtd. 13.10.97.

Sir,

Encl: As above.

Please refer to your letter under reference and find enclosed herewith our observations on the report entitled "Environmental Impact Assessment of SSP on Nal Sarovar Bird Sanctuary" for needful action at your level.

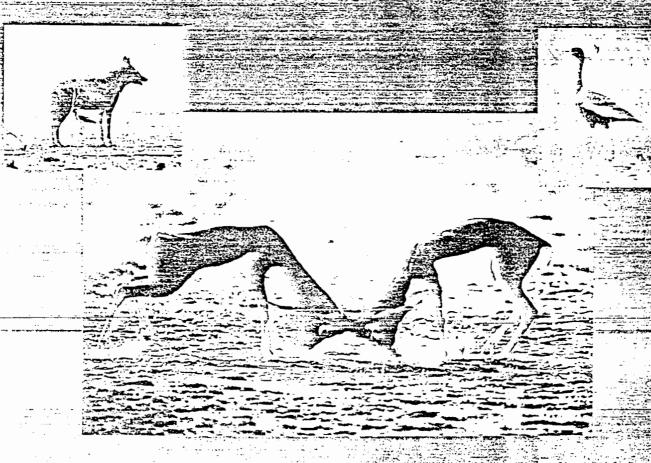
Yours faithfully,

(DR PAWAN KUMAR)
Specialist (Environment)

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Environment Impact Assessment of Sardar Sarovar Project

VOSVEGEISNESSIENES



PREPARED AND PRESENTED

GUJARAT ECOLOGICAL EDUCATION AND RESEARCH
(GEER) FOUNDATION

G-1, 194/3, Sector -30, Gandhinagar

9. IMPACT ASSESSMENT

So far we have gone through a series of baseline data collected with a view to know the various components of the environment in the question which are likely to be affected in some or other way by the proposed canal network in the area. The basic premise behind the present study is to predict the likely impacts of the project on the various components of the park ecosystem. Due to the complexiety of the interrelationships between the various components of the ecosystem, any kind of the prediction(which is a process to forecast the future environmental scenario) is a difficult task, and the predictions are to be treated as predictions only, as nothing can be taken as granted when it is being dealt with the living entity.

While presenting various findings pertaining to various components, few indications regarding likely impacts have also been attempted. However, some of them might be required to be rediscussed here, before proceeding further.

9.1 Salient features of the ecosystem

To assess the factors of impact on VNP, it is necessary to examine certain features of the ecosystem and ecological parameters in relation to the proposed canal work. These features include

- (i) The grassland of VNP is a relatively stable, secondary succession and tame ecosystem which is outcome of higher rate of evaporation, periodic droughts, flat terrain, grazing of antelopes and burrrowing hares etc.
- (ii) The grasses occurring are sod grasses, i.e. development of dense grass over the ground. Dichanthium sp. is the most dominant species which is perennial and grows from the rhizomes, while Sporobolus spp. are codominant in the area.
- (iii) Few annual grasses and herbs come up as a mixture.
- (iv) The rate of growth of the grasses depends upon the moisture availability and ultimately on the total rainfall and its pattern.
- (v) Grassland respond to grazing by changing species composition. Some grasses disappear with increased remaing. Overgrazing can cause serious deterioration to the grassland ecosystem. Lack of moisture and nutrients can cause the original plants thinnning out and may lead to disappearance of it.
- (vi) Prosopis juliflora, the exotic species, is now naturalised in the area. Its presence in the area is a threat for the grassland on one side, while it also appears to be indespensible for fulfilling habitat requirements for the wolf and also up to limited extent, to meet dietary requirements of the blackbuck.
- (vii) The park area, besides supporting the single largest concentration of blackbuck in the country, also serves as nucleus of gene pool of the species which disperses from the park into the surrounding areas which have been included as ecological zone, for the purpose of the management.

- (viii) The immigration pattern and the breeding behaviour of the lesser florican is dependent upon the grassland conditions which is ulitimately determined by quantum and pattern of the rainfall in the area.
- (ix) Straying of blackbuck into adjoining agriculture fields appears to be more in search of water than for food during most part of the year. However, they obtain their certain requirements from these areas, which cannot be denied.
- (x) Availability of water to the park animals is inadequate. There is not any perennial natural source of water, while the artificial supply of it is limited, concentrated at one place only, which is detrimental to the habitat as well as to the animals.
- (xi) Wolves, now, are intricate part of the ecosystem, whose presence is not only necessary for regulating numbers of the blackbuck, but for maintaining healthy population also. They avoid human habitation and activity, and are extremely shy.
- (xii) The large chunk of non-agriculture land surrounding the notified park area is one of the important components of the ecosystem.
- (xiii) Biotic interferences, such as illegal grazing by domestic livestock and poaching, though much under the control, are the direct threat to the ecosystem. Increasing human activity in the surrounding areas, especially salt-pans and highways are major indirect threats to the ecosystems at present.
- (xiv) People in the surrounding area practices mainly dry farming which is dependent upon the rains. Wheat, cotton and millets are the principle crops. The soils of the area are of typical nature where only supplementry irrigation can be of some use. Drought and resultant failure of crops, results into increased pressure over the park to meet domestic fodder requirements.
- (xv) The park as well as most areas in the ecological zone have water table within 5mt. As the area is close to the sea, the ground water is highly saline with TDS greater then 4000 ppm.

While making predictions for the impacts of the canal network arround the park area, above mentioned reatures are to be kept in central focus and impacts are to be weighed and revolve around these features.

Before proceeding to this, it would be necessary to look into the project proposals and criteria taken into consirderation in framing it.

9.2 Salient aspects of SSP - canal network around VNP

As per information provided by NPG, total water supply in the region would be 470 mm per annum in term of water height. About five irrigations units each of approximately 60 mm would be applied in the irrigated land whenever need would be felt. There would not be any irrigation during summer which may help in maintenance of dryness for some period.

- 1. Canal or any other structure is not passing through the VNP.
- 2. Canal network surrounding the park (within the ecological zone) consists only distributories, subdistributories and tail distributories.

- 3. Top width of canal systems (at the tail) in the area is between 3.60 to 5.20 mt with bank height of 0.60mts.
- The canal system is planned to be lined in its finally developed state to minimise seepage loss.
 Assumed losses are 2 cfs/msft for lined system and 5 cfs/msft for unlined system.
- 5. Most of the soil in the area fall under 5 and 6 irrigability class. Class-6 soils are to be kept out of the command and class-5 soils are to be reclassified and brought to 4 or 6. Field drainage will be required to be made in 100% of the area as drainage conditions are poor.
- 6. Water for irrigation is to be supplied in planned and controlled manner. Farmers' demand is for one supplementary watering for kharif crops and two or three very limited watering for rabi crops of wheat, cotton etc.
- 7. Participation of grass root organisations for water management is planned. Taking of small scale village level leaching and reclamation projects are also planned. The project also envisages support and assistance to farmers in development of ground water in conjunction with the surface water, land levelling and shaping etc. for integrated development of the command area.

9.3 Prediction of impacts

As stated in para 2.5, any direct impacts of SSP on VNP are unlikely but indirect impacts are ____ bound to take place. For predicting these impacts, it would be necessary to predict what kind of changes are likely to take place and then to examine the resultant impacts.

9.3.1 Anticipated changes due to S.S.P.

With the implementation of the proposed project in the area, certain changes are likely to take place which are listed below:-

- (i) Change in the microclimate, particularly, reduction in temperature, increase in humidity in the area, and change in soil condition.
- (ii) Change in water regime in the park area due to seepage of the water, release from escapes and water logging in the park and surrounding areas.
- (iii) Increased availability of water for irrigation resulting into change in the crop pattern.
- (iv) Change in the land use and land cover pattern in the surrounding area due to availability of water. Present fallow lands will be brought into the cultivation. Culturable wastes are also likely to be brought under plough.
- (v) Water logged conditions especially along the canal sides will bring change in the floristic composition of the area.
- (vi) Increased use of insecticides and pesticides in the region, resultanty increased quantity of residues in the drainage.
- (vii) Increased human activity in the area due to construction work, employment

generation due to intensive agriculture, development of communication etc.

9.3.2 Resultant impacts

The predictions of impacts are usually done in two categories, viz, positive impacts and negative impacts. The interrelationship between various components is such a complex that impacts of certain changes might be beneficial to one component but at the same time it may be harmful to other. However, all such impacts are required to be taken into consideration. Following the practice adopted in most EIA studies, positive and negative impacts of SSP on VNP are outlined below:-

9.3.2.1 Positive impacts on VNP ecosystems.

Ecosystem in the area is solely dependent upon vagaries of nature. Blackbuck and other wildlife of the park suffered seriously during drought ocurred in the past resulting into drastic reduction in population and degradation of the ecosystems. Pressure of livestock also increases on the park due to scarcity of fodder and water in the region during drought which further deplete the already depleted stock of resources. In background of this fact, the SSP provided opportunity to overcome this problem. Following positive impacts have been anticipated after the implementation of the project.

- (i) Canal water can be made available for wildlife in the area, which will be beneficial to park animals.
- (ii) Habitat improvement for wild ungulates by irrigating land from canal water during the pinch period, as well as during the years of severe drought.
- (iii) Increased availability of food and water to the wildlife due to increase in the AGB productivity in the ecological zone, provided land use pattern remains unchanged.
- (iv) Improvement in biodiversity in the ecological zone due to improved water regime.
- (v) Decrease in biotic interference, especially illegal grazing due to more availability of fodder outside the park subject to no reduction in the area of blackbuck habitat.
- (vi) Improvement in health condition of wild animals due to more availability of nutrient rich +fodder.
- (vii) Saline habitats and salt affected areas which are almost non-productive will become productive due to improvement in moisture level of soil.
- (viii) Opportunity to improve and create wetland habitats in the area and also likelihood of improving the exisiting such habitat due to change in soil- moisture regime. Ultimately, this will lead to increase in avifaunal diversity.
- (ix) Increase in carrying capacity of the park due to improvement in productivity and in habitat conditions with improved air and soil moisture.

9.3.2.2. Positive impacts on socio - economic enviornment

(i) Increase in agriculture production output due to increased productivity of agricultural fields.

- (ii) Increased area under agriculture. Fallows and cultivable wastes can be made productive
- (iii) Improved possibility of growing two crops instead of one in certain areas.
- (iv) Change in the cropping pattern resulting into increase in cultivation of cash crop.
- (v) Increased area under tree cover/farm forestry.
- (vi) Increased availability of fuelwood, fodder etc. due to increase in area under tree cover.
- (vii) Increased milk production and reduction in seasonal migration of domestic livestock due to qualitative & quantitative increase in avilability of the fodder for domestic livestock.
- (viii) Increased employment in the area and decrease in seasonal migration of people for employment due to the canal construction and subsequently employment in the fields.
- (ix) Adequate supply of drinking water in the area.
- (x) Rise in water level, leading to conjunctive use of ground water in some areas.

9.3.2.3 Negative impact on the park ecosystem

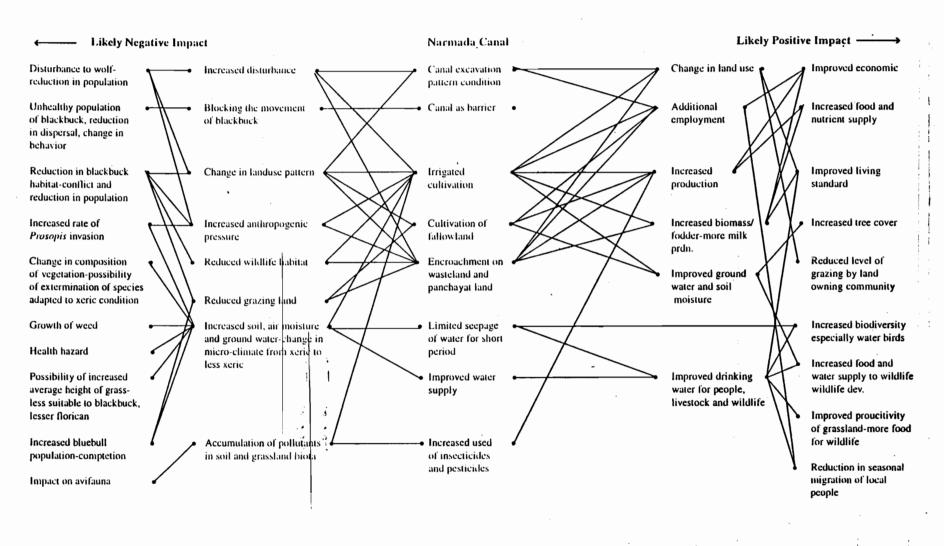
- (i) Canal structure will act as barrier and will be obstructing emmigration immigration of park animals, especially blackbuck.
- (ii) Wildlife habitats may reduce in the ecological zone due to the change in the land use and cropping pattern.
- (iii) Increased investement in agriculture will lead to increased protection to the crop which may result in poaching of animals indulged into crop raiding activity. Morever, damage to the crop by blackbuck may increase human-wildlife conflict.
- (iv) Even with the project figures, waterlogging may occur in some parts in ecological zone. According to tentative figure, about 7500 ha, area of ecodevelopment zone may be under irrigation. As blackbuck avoid waterlogged areas, the area of under waterlogging will not be available to blackbuck.
- (v) Increased use of pesticides and insecticides with change in the cropping pattern may adversely affect harriers and other avifauna.
- (vi) Although water would not be supplied in summer for irrigation but about five waterings proposed upto Rabi crop which would be equivalent to 70 % of annual rains. Average annual rainfall is about 520 mm which is added by 460 mm in cultivated land due to irrigation. Water added by the canal would be transferred in the form of soil moisture, air moisture and water in vegetation. It is anticipated that additional amount of water in one or other form would bring changes in micro-climate which in turn would change the structure and composition of biotic communities of the area. Increase in soil-moisture regime may lead to increase in weeds and unwanted growth. Area under *Prosopis* in certain parts of the park as well as within the ecological zone may increase.

- (vii) The current biotic community well adapted to the arid condition may change due to change in environment from xeric to less xeric.
- (viii) There will be competiton, in terms of growth, among the plant species, consequently some of the species of xeric condition may get suppressed.
- (ix) Increased human activity in the area will cause disturbance to the animal life particularly to wolves.
- (x) Increasing population of bluebull would be detrimental to blackbuck as changed condition may favour bluebull. Crop damage by blackbuck may become secondary when compared to that of bluebull in the years to come.

9.3.2.4 Negative impact on socio-economic environment

- (i) Some of the area will not be suitable for irrigation. If irrigated, it will cause oozing out of salts and ultimately damage may occur. Similar deterioration may occur if water is used indiscriminately, in excess to the desired quantity.
- (ii) Increase in blackbuck population may increase the damage to the crop.
- (iii) Bringing more area under cultivation will amount to reduction in grazing lands for domestic livestock, which in turn adversely affect grazier communities.
- (iv) Health hazards associated with the irrigation, canal and waterlogging, may have to be faced.

FIG. 9.1 CHART INDICATING LIKELY IMPACT OF NARMADA CANAL ON VNP



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10. ENVIRONMENTAL SAFEGUARDS AND IMPACT MANGEMENT

In the previous chapter likely impacts of the proposed canal network around VNP has been discussed, and various positive and negative impacts have been listed out. The main objective of the entire study is to identify all such impacts with a view to arrive at some trade-offs, if possible and feasible, so as to minimise the negative impacts and maximise the positive ones. Emphasis has to be put on "if possible and feasible", because the nature and kind of the area under the study is such that one may challenge any kind of trade off. However, if the negative impact can be minimised by taking appropriate mitigating measures and the positive impacts are advantageous to ecosystem, then and then only such trade offs can be considered. As compared to many other EIA studies, the resource in question pauses many complex interrelationships. Here is the case, after having listed out all kind of impacts, where it appears that if the advantges of likely positive impacts are utilised properly, it can overshoot the negative impacts after taking up mitigative measures for it. The TOR includes suggestions for preparing action plan and not the full action plan. Hence the measures for utilising the positive impacts and mitigating negative impacts are put in a suggestive manner hereinafter.

10.1 Measures for utilising positive impact.

The positive impacts of the proposed SSP canal network around VNP are centered around the availability of canal water and improvement in soil moisture regime. Following measures are suggested with a view to take advantage of it.

(i) The park area should be provided water from the canal network for different purposes. It is suggested that water should be provided through pipeline at two major points. One at Velavadar and second near the south watch tower towards Bhadbhid in the park. This is preferably by a pipeline from SD-1A and SD-3 respectively. For further distribution, it would be necessary to provide overhead tanks. Hence, it is proposed to construct two overhead tank cum watch towers where water can be stored, and the same structure can be used as watch tower also.

As the requirement of water would be during the late winter and summer, provison will the required to be made to supply adequate quantity of water during the months from February to June. Drinking water would be supplied in the neighbouring villages and arrangement has to be mad for supplying stored water at appropriate site to the park in consulation with Gujarat Water Supply & Sewerage Board and Forest Department.

The water thus made available should be used for providing drinking water to wild animals. For this purpose cemented trough or saucer pits should be made in the park area and they should be connected with the overhead water tank through pipeline and guzzlers. It is proposed that atleast 4 waterholes should be made, 2 each in northern part and southern part of the park.

Raising of green fodder by using the canal water should be taken up on experimental basis initially. Two sample plots, each of 2-3 ha, should be selected for raising fodder. Non agricultural area between park boundary and canal SD-3 can be used for fodder development and entire such area should be integrated with park management. These fodder plots are to be irrigated by using sprinklers or drip irrigation and in no

circumstances flood irrigation should be used. Within the fodder plots only grass species occurring in the park area, like *Dichathium* and *Sporobolus* is to be raised. In addition to above fodder plots, one or two plots should be experimented at suitable sites in the ecodevelopment zone.

(iii) From the canal SD-3, water should also be made available to few waterholes made outside the park area. Use of these waterholes by domestic livestock should be controlled if not possible to avoid totally, so that chances of disease transmission are minimised.

The activities suggested at above (ii) & (iii) are purely on experimental basis and they should be monitored continuously for first three years. The activity can be continued later on. if no adverse impacts are obseved and is found useful.

10.2. Measures for mitigating negative impacts.

The negative impacts, likely to occur due to the network revolves mainly around four aspects.

- (i) Water logging
- (ii) Change in the land use pattern and cropping pattern
- (iii) Wildlife-human conflict in the ecological zone
- (iv) Canal structure as an obstacle to the movement of wild life

For minimising the negative impacts, following measures are suggested.

- (i) No change in the landuse pattern within the ecodevelopment zone of the park as envisaged in the management plan should be permitted. In other words, area currently under the cultivation should not be allowed to increase. All the wastelands and grazing land as well as forest land in the area should not be diverted to other use. This will not only ensure availability of the area for wild life use, but will also ensure availability of the area for grazing of livestock. This can be best achieved by declaring some of these areas as the sanctuary as buffer zone for the park, so that certain rights and privilege of local people can be protected, simultaneously safeguarding interests of wild animals. The fallow lands are freely utilised by the blackbuck at present, especially during winter & summer. Such areas may not be available once the intensive cultivation starts with supply of canal water. This will result into drastic reduction of habitats used at present by the blackbuck. During the workshop on draft final report, it was strongly felt that the present protected area (PA) has to be expanded to compensate this loss. Forest Department should seriously explore the possibility of inclusion of Panchayat land, government waste land and forestland with the PA to provide ideal extended habitat for all wildlife. The Government should also explore the possibility of exchange/acquisition of some of the private land lying in between such selected site to enhance the conservation value of the unique national park of the country.
- (ii) Entire canal network including subminors and distributories of all types within the ecological zone should be lined right from the beginning itself. The lining work will have to be done before releasing of water and not in due course at later stage.

- (iii) As canal SD-3 is likely to obstruct movement of animals, with a view to allow movement of animals, it is suggested that at two points corridors of atleast 50 mt. width should be provided. This can be done either by providing siphons or by covering the canal from the top with gentle slopes on either sides of the canal, or by putting up pipeline of appropriate diameter, or by any other suitable structure which is technically feasible. These corridors are to be provided on routes frequently used by animals as shown in the fig. 5.1
- (iv) As the agency (SSNNL) proposes to construct all water courses including field channels, it would be appropriate to use lined system. Feasibility of lining the field channels should be worked out and if possible it should be resorted to. Moreover, precast RCC channels also should be considered in place of traditional field channels.
- (v) Prosopis juliflora has been found benificial on one hand, while it has been found to pausing a threat to the grassland. Hence it is necessary to control and regulate the area under it, i.e removal of it from certain areas as well as allowing it to grow in other area. Prescriptions made in the management plan for the area (Singh & Rana, 1995) is felt adequate in this regard. However, in addition, it would be necessary to take up removal of it in subsequent years from the areas where they have been removed once, in order to remove it completely from such areas. Moreover, there should be continuous monitoring of entire area and Prosopis should not be allowed to invade in the grassland. This invasion has to be controlled by eradicating so that grasslands are protected and improved.
- (vi) As agriculture would be more intensive with the availability of irrigation, denning areas for wolves outside the park may reduce. The shrubland habitats of the VNP will play a critical role in the continued survival of the wolves in the region. Thus, denning area of wolves in the park should be protected by retaining adequate coverage of *Prosopis* as mentioned in the management plan.
- (vii) Increased human intervention may bring negative impact on wolves because they do not tolerate disturbance. Thus, adequate care has to be taken to protect denning and breeding sites of wolves by protecting the dense *Prosopis* cover at the sites.
- (viii) For entire region-7 projected quantum of saline water to be pumped is about 0.1208 MAF. Total estimated quantity of water to be supplied for irrigation is 1.035 MAF. This irrigation includes 0.125 MAF ground water, conjuctive use of which should be made very cautiously only after ensuring its impact on soil.
- (ix) Farmers in the area should be encouraged to use sprinklers and drip irrigation instead of the flooding. This can be done by giving higher subsidy than the present, in the from of additional subsidy and low interest loans from the agency itself. This will result in reducing water logging and more efficient use of the water.
- Facilities for drinking water to wild animals should be provided in the ecological zone so as to prevent wild ungulates entering in the cultivated areas for this purpose. Moreover, it is felt that certain areas like Devalia-Paliyad zone should be managed as "satellite core" areas and management of them should be handed over to the park authorities.

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(xi) The increase in salt pans in the area pauses a threat to the ecosystem, resulting into increase in the salinity in the long run. Looking to the requirement of the society and growth potential of salt industry, it is not feasible to stop the activity in the area. Hence it is proposed that permission for new salt pans should not be given in the western part of the

- road between Adhelai and Madhia only. Attempts will have to be made to stop the existing salt pans in the area by providing alternative sites.
- (xii) Programmes for overall development of the area should to taken up. This should include propagation of bio-gas plants, cattle improvement and immunisation programme, cultivation of tree crops and horticulture etc.
- (xiii) Need is felt for raising general awareness among people residing in the ecological zone, as their attitude is hostile towards blackbuck due to damage caused by them to the crop. People should be made aware about the benefits accrued to them due to the conservation efforts. A planned awareness programme will be required and it should also include establishment of an interpretation centre with different autio-visual aids for carrying out interpretive programmes. The awareness programme should also include nature education camps for different target groups.
- (xiv) Population of bluebull should be controlled below present level to avoid crop damage and to reduce increasing competetion between the two anteloges.

10.3 Monitoring of impacts and activities

A comprehensive environmental monitoring programme is an essential component for sustainable development of water resources project because prediction of impacts cannot be made with complete certainty due to the complex interrelationships between various components. Monitoring is the continuous or periodic review and surveillance by management to oversee the impact of an activity (Kesker et al. 1993). It is also necessary to verify the assumptions made and to take corrective steps as deemed necessary. Hence monitoring of following parameters are suggested:-

- (i) Monitoring of effective implementation of mitigation plans.
- (ii) Monitoring measure of the success of the mitigation efforts and the environmental effects of the efforts.
- (iii) Various parameters related to the park ecosystem should be monitored continuously. This should include monitoring changes in the vegetation, animal population and animal behavioural pattern. Provisions will have to be made in the SSP itself for ensuring required funds and infrastructure facilities for the monitoring within the park through the park authorities only. This has been felt necessary because park authorities are the best to take up holistic approach in this regard.
- (iv) For monitoring of impacts outside the park area particularly aspects other than wildlife, it would be appropriate if the task is assigned to relevant departments or university personnels.
- (v) The entire monitoring programme should be made as a part of the action plan which is to be prepared on the basis of the EIA studies.
- (vi) Remote sensing technology is useful tool in monitoring the resources. Therefore, monitoring of land use/land cover classes should be done by using remote sensing technology at regular interval. It is suggested that temporal data of post monsoon, winter and summer, should be used at the interval of 3-5 years. Such analysis shall be done for the preceding year of irrigation.



Dr.(Mrs.) Nalini Bhat Additional Director

D.O.No.3-87/80-IA.I.

7

ANNEX - XXXI -

Telegram: PARYAVARAN, NEW DELHI

दूरभाष:

तार:

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4360478

टेलेक्स :

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भारत सरकार

पर्यावरण एवं वन मंत्रालय

GOVERNMENT OF INDIA MINISTRY OF ENVIRONMENT & FORESTS पर्यावरण भवन सी जी ओ कॉम्प्रवेक्स

पर्यावरण भवन, सी. जी. ओ. कॉम्पलेक्स
PARYAVARAN BHAVAN, C.G.O. COMPLEX
लोदो रोड, नई दिल्ली-110003

LODHI ROAD, NEW DELHI-110003

May 1, 1997.

Dear Shri Sekhar,

Enclosed please find a copy of the communication received from Shri Shekhar Singh of Indian Institute of Public Administration, New Delhi regarding list of important archaeological and historical sites which are likely to be submerged due to Narmada Sagar Project. In his letter, Shri Shekhar Singh has desired that a status report on these monuments may be discussed in the next meeting of the Environment Sub Group of NCA. I have been directed to forward these copies for further action at your end.

With regards,

Yours sincerely

(Nalini Bhat)

Shri A. Sekhar, Member (E&R), Narmada Control Authority, BG-113, Scheme No.74-C, Vijay Nagar, Indore-452 010. List of important archaeological and historical sites to be preplored in greater detail or excavated in great which are being submerged or likely to be submerged soon.

P · Premistoric EH · Early Historic M · Medieval

East Nimar Dt.

Harsud Tehsil:

Bijalpur Kalan M

Bijalpur Khand P and iron smelting

Ganor P
Gullas P
Harsud M
Jogibira M

Kukdal P, EH, M

Panghat Kalan M and inscription

Khudirmahal P. EH, M

Susarel M Gondikhera P Boribadri P

Khudra M and temple

Torniya M Bhawarli M

Ghusir Hero-stone, provenence to be recorded

Morad

Phefani Kalan

Sites in the following valleys need to be excavated:

Kāli Machak valley

Chota Tawa valley and its flood plain

Ruparel valley

Ghorapachar valley

Other sites include:

Boribandi Ghari M

Kotara E H, M

Balikeshwara important M temple. Consider relocation

Chandel

23 March 1997

Dear Professor Shekar Singh,

I am enclosing a list of archaeological and historical sites which need to be investigated and recorded before they are submerged. The list is based on reports in *Indian Archaeology - A Review*, a regular journal brought out by the Archaeological Survey of India, and on discussions which I have had with some archaeologists who have worked in the area.

I have also asked for more comprehensive lists and if these arrive in time I shall forward them to you for the meeting on 2 April.

With kind regards.

Yours sincerely,

Romila Thapar

2 On-going excavations which need to be completed: Harsud Garhi Sarasavatī kunda Balwara Khandwa Tehsil: Balwara P. Chandel P Dharikotla P P Junapani P Bijoramafi P Gulgaonmal Jamkotc P surface sculptures to be placed in custody and Bangauda precise provenance recorded Bhongani Bir Chitikhal Dharokotla Madin . Janohi Piplam ~ Richhi - Sarlia P, EH, M ~ Purni _ Balwara

Dhule Dt. Vaghoda Wadi Vadgaon Banderpadi Shulapraneshwar temple - should be relocated? 65

Archaeological Investigations in the Submergence Area of the Narmada Sagar Dam, Madhya Pradesh: A Reconnaissance Survey

S.B. Ota

Prehistory Branch
Archaeological Survey of India
Old High Court Building
Nagpur

Abstract

The Nimar District of Madhya Pradesh, forms a portion of the area to be submerged by the Narmada Sagar Dam. Preliminary explorations carried out in the area have revealed a continuous succession of archaeological deposits from Acheulian to recent historical times. This paper highlights the archaeological potential of the area so that plans can be formulated to salvage these remains before the area is fully submerged.

Introduction

The Narmada Sagar Dum is one of two major dams to be constructed on the Narmda river. This is supposed to be one of the largest river valley projects ever undertaken in the world and one anticipates a tremendous archaeological loss resulting from the vast area to be submerged.

Unfortunately no planned investigation has yet been undertaken to uncover the archaeological remains in the area except for some exploratory work which was carried out by C. Krishna (1984) in East Nimar District. It is surprising that this work has been completely ignored during preparation of the crucial report on Archaeology and Culture, which was submitted to the Department of Environment in 1984. This preliminary report, prepared by the Environmental Planning and Coordination Organization, 3hopal, states that in spite of the Narmada Valley being extremely rich in archaeological sites, only Singhji-ki-Samaahi, a late medieval structure falls within the submergence area. It would therefore, not be unreasonable to conclude that the advice of archaeologists regarding the archaeological hentage of this area has been considered of little importance in respect of the loss that will be suffered due to submergence. In addition the map of the area of submergence clearly indicates the existence of temples and deserted villages which have been overlooked in the preparation of the report. Therefore, there is an urgent need to look into the cultural past of the area and to document the endangered archaeological sites.

The Study Area

The first planned archaeological investigation was under-

taken by the author in 1988 on behalf of the Prehistory Branch, Archaeological Survey of India, with a view to ascertaining the archaeological potential of the area to be submerged. This survey was confined to the Khandwa and Harsud tehsils in the northern part of East Nimar District. Out of a total 254 villages to be affected by the dam project only 167 villages were surveyed — 113 from January to March 1988. In the course of investigations it was noticed that certain villages which were not mentioned in the list of villages to be submerged would definitely either be wholly or partially submerged. Twenty such villages have been identified and investigated.

The Environment

The area can be divided into two broad physiographic divisions: (i) the Narmada valley with the Upper Vindhyan formations and (ii) the undulating plain composed of Deccan Trap. The former constitutes the Narmada and the Vindhyan hills, with luxuriant vegetation on both banks of the river. The hills rise conspicuously at certain places to more than 400 m above msl, whereas the Deccan Trap area is mainly an erosional landscape forming an undulating surface ranging in height from 246 m to 277 m above msl. A number of seasonal and perennial streams drain the area. Due to the thin soil cover on the Trap, the growth of vegetation is poor.

The northern part of the study area is drained by the Narmada which flows in an east-west direction, and also by the river Chhota Tawa, a tributary of the Narmada.

The geological history of the area with its various formations is as follows:

Tebsil

Holocene — Surface soil and younger alluvium Pleistocene — Older alluvium
PRISTOCCIA — OTOCT MILLYNIM
Upper Cretaceous to Eocene — Deccan Trap
Upper Cretaceous — Lameta beds
Late Precambrian — Upper Vindhyan System
Archaean - Bijawar Series, Granites and Gneisses

The area experiences four major seasons (i) the winter - from December to February, (ii) the summer - from March to May, (iii) the monsoon - from June to September and (iv) a post-monsoon season during October and Novem-

The average annual rainfall is 830 mm. The hottest month is May, the average temperature being 34.55° Celsius, whereas December is the coldest month with an average temperature of 19.96 Celsius.

The vegetation belongs to the dry deciduous type and the area supports various kinds of wild faura.

Method of Survey

At the outset it may be mentioned that because of limited time, the present investigation was in the nature of a reconnaissance survey. Therefore, it has not been possible to record all the archaeological remains and many may have been overlooked. The main sampling strategy followed is the survey of archaeological sites in various ecozones. However, in spite of these limitations, the evidence brought to light during this investigation is adequate to provide a picture of the ambacological potential of this area.

Archaeological Evidence

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The following is an inventory of various archaeological ... remains brought to light from a total of 113 villages covered during the course of the first season of investigation in 1988 (Ota 1988).

Table 1: A List of Archaeological Sites in the Submergence

Tehsil	Village	Cultural Assemblage	Chhirwan Chich	Microlithic Medieval mound	
Khandwa	Balwara	Acheulian — ~	Chikhli Dewaldi	Medieval mounds (two) Medieval mound	
	Jamou	Acheulian, microlithic, and loose sculptures	Dagarkheri	Ruins of late medieval sture	
	Purni Acheulian (two localities), microlithic (two localities), early historical mound, medieval mound, and iron smelting site Chandel Temple remains (c. 12th/13th century A.D.) Abhawa Acheulian Amulni Medieval mound	Ganor	Microlithic, medieval mand from smelting site		
		medieval mound, and iron smelting site Temple remains (c. 12th/13th century A.D.)	Gehelgaon	Medicval mound	
			Gehungaon (kalan)	Medieval mound	
•			Gondikhera	Microlithic .	
•			Gullas	Middle Palacolithic (tw	
Harsud				calities), and iron smelt site	
		Medieval mound	Наприла	Medieval site	

Village To Cultural Assemblage Baihari (Bir) Medicual mound - 7 Balri Remains of a Siva temple (c. 12th/ 3th century A.D.) locally licown & Barkeshwar Mahades mardir, and medicval structural remains Medieval mound Barnangaon Bandariya Medieval mound Barg:xon (Mal) Medievai mound Medieval mound Barur Belwari Microlithic (two localities), and medieval site Beriya Medieval mound Bhawarli Medieval mounds (two), late medieval brick temple, and remnants of a stone temple Bijaipus Khurd Acheulian (Seus Israelisias), microlithic, early historical mound, loose sculptures, sati memorial stones, and iron smelting site Bijalpur Kalan Medieval site with fortification locally known as 'Kotra', late medieval structures, remains of a temple (c. 12th/13th century A.D.) Billod Microlithic Medieval mound Billod (Mal) Medieval mound Elurari Bonbandri Microlithic, and medieval mound

Boribandri

Charkhera

(Kherkheda) Chalpa Kalan Early historical mound Microtithic (two localities), and medieval mound

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Archaeological Investigations in Narmada Sagar Dam

Cultural Assemblage	Tehsil	Village	Cultural Assembluge
Late medieval structural	<i>i</i> 1	Singaji	Medieval sises (five), and a
remains	•		late medieval structure
Remains of a Vishnu temple (c. 12th/13th century A.D.)	! !		known as 'Singhji-ki- samadhi'.
with loose sculptures, and	•	Saktapur	Medieval mound
medieval mound	. •	Sarai	Acheulian (two localities)
Medieval mound		Semur (Mal)	Medieval mound
Microlithic **		Sodia	Microlithic and medieval site
Medieval mound		Sonpura	Medieval mound
Medieval mound		Susarel	Remains of a brick temple
Medieval mound		Tomiya	Microlithic and temple re-
Remains of a Siva temple		•	mains
(c. 12th/13th century A.D.).			

The Acheulian localities are confined to the southern fringe of the Vindhyan hills on the left bank of the Narmada. These are all open-air localities and are primary to semiprimary in nature. These localities occur in clusters and the artefacts are found mostly on the surface. The locations of sites vary, with some situated on hilltops (for example Bijalpur Khurd, 339 m above msl), some along the foothills (for example Balwara village), while others cover vest, forested areas. The distribution pattern and the contextual occurrence of the Acheulian localities discovered so far suggest the possibility of similar occurrences on the right bank of the Narmada. The site within the jurisdiction of the . villages of Balwara and Bijalpur Khurd occurs in a stratified context and forms a substantial cultural deposit. The typotechnological features noticed in the assemblage suggest that the industry belongs to the Late Acheulian cultural phase. The assemblage comprises cleavers, handaxes, discoids, choppers, a variety of scrapers and a large number of simple utilized artefacts (Fig. 1). The locally available quartzite served as the principal source of lithic raw material. The

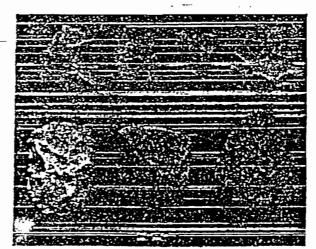


Fig. 1: Late Acheulian artefacts from the site near the village of Balwara and Bijalpur Khurd

anurd :al)

> medieval mounds (three), loose sculptures, and sati memorial stones Medieval mound Microlithic Microlithic and medieval

bnuong Medieval mound

Middle Palaeolithic, medieval mound, two late medieval Siva temples (of stone), and a late medieval brick temple Medieval mound Middle Palaeolithic, remains of a temple with a Vishnu sculpture (c. 12th/13th century A.D.) and medieval mound

Medieval mound Medieval mound Medieval mound Microlithic, and medieval

Microlittic

Microlithic and medieval Microlithic, and sau memorial stones Medieval mound Acheulian

Microlithic and medieval mound Middle Palacolithic, micro-

lithic, early historical mound, loose sculpture of Vishnu Medieval site

auan) Sculpture of Ganesa and an inscription in Devanagari script

errita tanà taori uninena XVII (1) - 1992 }

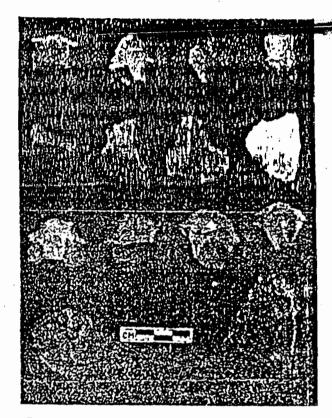


Fig. 2: A representative sample of Middle Palaeolithic artefacts from the Decean Trap area, East Nimer District

most significant aspects of these localities are the differences in the size of the areas that they cover, the context of occurrence, variation in artefact density and variation in assemblage composition.

The Middle Palaeolithic sites are all surface occurrences and are located mostly in the Deccan Trap area which
is characterized by rocky ridges and hillocks. The industry is
characterized by a diminution in the size of artefacts compared with the preceding Acheulian industry and forms a
distinctive assemblage (Fig. 2). The finished artefacts mostly
comprise a variety of scrapers. Utilized flakes also occur in
large numbers. Quartzite is the main raw material used in the
manufacture of artefacts, although the locally available
material, like chert, has also been utilized.

The area is rich in microlithic sites which mainly occur on the surface and close to perennial or seasonal streams. They are mostly confined to the undulating Decean Trap region. The assemblages (Fig. 3), comprise finished artifacts such as points, lunates and backed blades, apart from a large number of simple artefacts. Blades and blade products occur rarely. Chalcedony is the major raw material while chert and other cryptocrystalline materials are present in smaller quantities.



Fig. 3: Examples of Microliths from Docean Trap area East Nimer District

The most noteworthy feature observed around the villages of Gondikhera, Boribandri (Kherkheda), and Charkhera is that microliths, mostly of milky quartz, occur in association with some kind of structural remains, such a platforms, which probably formed the floors of buts. These platforms or floors are rectangular in shape, with rubble arranged along the periphery. None of these sites yielded any pot-sherds. However, pieces of broken bangle and copper objects belonging to the Historical period have been picked up from the structural remains at Boribandri (Kherka, hada). The microliths and associated structural remains may be ascribed to communities contemporary with but less technologically advanced than those of the Historical period. However, further investigations are required in order to test this assumption.

Four Early Historical mounds have been located at the villages of Bijalpur Khurd, Purni, Newalkhera, and Chalpa 👞 Kalan. To ascertain the probable antiquity of these sites and of the associated cultural remains, a trial trench measuring 4 2.0 x 1.0 m was dug at the site of Bijalpur Khurd. A cultural. deposit of a maximum thickness of about one metre was observed overlying the black soil. The ceramic industry of this period comprises Black-and-Red ware, Black Slipped ware, Black Polished ware, Plain Red ware and Red Slipped ware. Other antiquities belonging to this cultural period include a legged saddle quem, grinding stones, anvils, a burnisher, hop-scotch (a flat round stone/terracotta/pot-sherd used in a game played by children) and shell objects. Iron slag and corroded iron objects occur in all the occupational levels. A large number of animal bones, mostly of Bos sp., are common in all the levels. Successive lime plastered floors have also been encountered in the excavation. On the basis of a comparative study of the antiquities with the Early

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instorical remains at Maheshwar and Navdatoli (Sankalia et lal. 1958), the site at Bijalpur Khurd may be dated to about the 2nd-3rd century A.D.

As far as the medieval remains of the area are concerned, a large number of settlements in the form of mounds have been located in close proximity to the present-day villages. At some of these ancient sites rubble fortifications have been noticed. The significant aspect of these prolific archaeological remains in the area is that they might be said to corroborate the evidence for the occurrence of a severe famine during Shah Jahan's reign. This has been described by Abdul Hamid Lahori in the Badshahnama, a contemporary text of that period, describing the intensity of the calamity which desolated the Deccan, including the area under consideration. The high density of these settlements and their location in relation to the present-day settlements are suggestive of large-scale describing at that time. This could be ascribed to the natural calamity mentioned above.

Of the medieval remains, mention may be made of a fortified site located on a hilltop near the village of Bijalpur Kalan and locally known as 'Kotra'. The fortification is of undressed rubble and mud and follows the contours of the hill. This fortification encompasses an elaborate, well-planned settlement with lanes that cut across each other at right angles. A cemetery area and a rain-fed tank with a bund on one side have been located on the south and east respectively, of this settlement. Antiquities collected from the size include a brick on which the outline of a game board has been engraved, and stone objects like saddle querns, grinding stones, stone potter's wheels, and stone lamps. The metal objects found at the size are represented by an iron nail, a bangle and a copper ring. Cowries, glass bangles and beads of both lac and stone have also been collected.

A large number of remains of temples have been brought to light during the course of the investigation. On the basis of architectural style, material used and sculptural remains therein these remains can be tentatively divided into three successive phases of construction. The temples belonging to the earliest phase are all brick constructions such as the Barkeshwar temple at Balri (observation made during

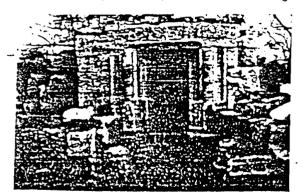


Fig. 4: Barkeshwar temple at Babri, East Nimer District

excavation carried out by the Excavation Branch, Nagpur in 1988) and the temple at Susarel. The second phase of temple construction is characterized by stone with elaborate carvings and fine sculptural remains as observed at Barkeshwar temple (Fig. 4) (Vyas 1989: 167-168), and at the shrines in Chandel, Jogibida, Kukdal, Bijalpur Kalan and Harsud. On the basis of iconographic features and architectural styles, the temples belonging to this phase can be ascribed to the 12th-13th century A.D. Temples of the third phase are made of brick as well as of stone, for example the ones at Khudia (Mal) (Fig. 5), Torniya, Bhawarli, etc. These are all plain constructions without any carvings, and they belong to Late Medieval times. Almost all these temples are in a poor state of preservation and have been robbed of many of their architectural components.

Of the loose sculptures noticed in the area, mention may be made of images of Vishnu at Bhilgarh in village Jamoti, and at Kukdal, and Newalkhera, in addition to statues of Ganesa at Bijalpur Khurd, Panghat (Kalan) and Jogibida. The temple at Jogibida has a number of magnificent sculptures of Ganesha, Siva, Narasimha, Brahmani, Vaishnavi, Maheswari, Kaumari, Indrani and Chamunda. The Saraswati kund at Harsud contains two beautiful images of Vishnu which have been fitted into the brick wall of the kund (Shah 1979: 67-69). On the basis of iconographic and stylistic features, these icons can be dated to c. 12th/13th century A.D. A Devanagari inscription, probably of 13th/ 14th century A.D., has been noticed in a modern shrine at Panghat (Kalan). Images of Hanuman in bas relief are among the sculptures that are commonly associated with these medieval sites.

A number of tombs, houses, wells and some unidentified structures belonging to Late Medieval times have been noticed in the area. These structures are constructed of dressed stones or *lakhauri* bricks, and lime has been used as mortar.

A number of iron smelting localities, both with and without habitational debris, have been located. These localities, represented by heaps of iron slag, occur in isolation as well as in clusters. At certain localities, smelting

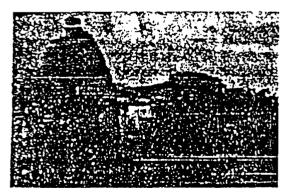


Fig. 5: Temple at Khudia (Mal), East Nimer District

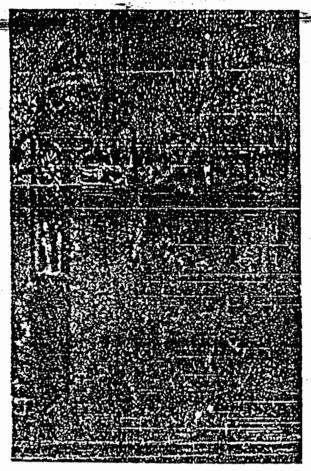


Fig. 6: Sati memorial stones at the village Bijalpur Khurd, East Nimer District

furnaces have been noticed in association with the slag heaps. All these sites are mostly confined to the Vindhyans where iron-ore deposits have been located. Due to lack of further information, it is difficult to determine the antiquity of iron smelting activity in the area. However, as suggested by evidence from the Early Historic site at Bijalpur Khurd, it may be tentatively dated to the early centuries of the Christian era.

Memorial stones, square in plan, have been found standing upright at Bijalpur Khurd (Fig. 6), Nagpur and Jogibida. Figures of horse-riders, the sun, the moon, sati, etc. suggest that these are sati memorial pillars: One of the memorial stones at Bijalpur Khurd contains an inscription in Devanugari.

Recommendations

In spite of this survey being a preliminary one, it has revealed that the area to be submerged under the Narmada Sagar Project has great archaeological potential. Based on the present survey, the following recommendations have been made in order to facilitate multidisciplinary researce and salvage operations to be undertaken in future.

- (a) An intensive survey to document all the archaeological sites.
- (b) Since the present area has great scope for prehistoric research, it is suggested that a long-term plan for investigations, including excavation must be undertaken to elucidate the geogrephaeology of the area.
- (c) Excavations of both Early Historic and Medieval sites are strongly recommended in order to ascertain the cultural succession of the area both in terms of time and space. It is also essential to carry out some horizontal excavations at selected sites belonging to different cultural periods in order to understand the subsistence-settlement patterns, social organization, demography and patterns of land-use.
- (d) The relocation of the temples located within the jurisdiction of the village of Balri, Chandel, and Jogibida
 must be undertaken, in addition to the excavation and
 documentation of certain other temples and structural
 remains.
- (e) Some of the iron smelting sites should be excavated and studied scientifically in order to gain further insight into the ancient technique of producing iron in this area.
- Loose sculptums and memorial stones may be shifted to the local museums.

The Attitude of Archaeologists to our Cultural Heritage

An overall view of government policies and the attitude of archaeologists to the destruction of our archaeological beritage due to the rapid modification of the landscape is quite disheartening. Neither the government nor nongovernment archaeological organisations are paying any serious attention to the fate of our heritage in spite of knowing fully well the extent and rate of destruction that has taken place during recent years. Every year new projects for archaeological research are taken up by various organisations, mostly in the areas where archaeological sites are not in danger of being destroyed. Instead the argency of salvage operations should be stressed, especially in areas where our archaeological heritage is being threatened. Unfortunately wherever any salvage operation is undertaken, priority is given to the standing structural remains rother than to prehistoric sites, mounds, etc. This clearly suggests that we are more concerned with protecting structures than with gaining a wider knowledge of our past. We prefer to relocate the structural remains but do not care to preserve buried and surface archaeological sites which are less impressive but equally or more important for providing information about our earliest cultures.

Archaeological Investigations in Narmada Sazar Dam

Finally, it may not be out of place to quote an extract from the 'draft universal declaration on indigenous rights' prepared by the Working Group on Indigenous Populations which states, "The right to preserve their cultural identity and traditions and to pursue their own cultural development... the right to the manifestations of their cultures, including archaeological sites, artifacts, designs, technology, and works of art, lie with the indigenous peoples or their members" (Alfredsson 1989: 258).

Acknowledgment

I am grateful to my colleagues, N.G. Nikoshey, N. Taher, J.S. Dubey, R.K. Dwivedi, N.K. Nimje, C.L. Yadav and P.S. Pashine, for their co-operation during our investigations. I am also grateful to the people of the study area who were not only extremely helpful but also showed a keen interest in learning about their cultural heritage.

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STATUS NOTE ON MONUMENTS UNDER NARMADA SAGAR PROJECT

Ref: MOEF D.O. No. 3-87/80-I.A.I dtd. lst May, 1997.

S.No.	Villages where need for detailed survey was pointed out in the letter mentioned above.	Status of Monuments/villages as per the findings of Deptt. of Archaeology & Museum, GOMP & GOM.	Remarks
1	2	3	4
	MADHYA PRADESH		
1.	Bijalpur Kalan	No important monuments	
2.	Bijalpur Khand	- do -	
3.	Ganor	No monuments were found	
4.	Gullas	- do -	
5.	Harsud	- do -	
6.	Jogibira	- do -	
7.	Kukdal	- do -	
8.	Panghat Kalan	No important monuments	
9.	Kudirmahal	- do -	Named as Khudiyamal in GOMP Action Plan.
10.	Susarel	- do -	Named as Chhcharel in GOMP Action Plan.
11.	Gondikhera	- do -	
12.	Boribadri	- do -	
13.	Khudra	Not listed in the impacted village (254) by GOMP.	
14.	Torniya	No important monuments	
15.	Bhawarli	No monuments were found	
16.	Ghusir	- do -	
17.	Morad	- do -	
18.	Phefani Kalan	No important monuments	Named as Phefaria Kalan in GOMP Action Plan.
19.	Balikeshwara	- do -	Named as Badkeshwar in GOMP Action Plan.
20.	Chandel	- do -	
21.	Dharikotla	- do -	
22.	Junapani	No monuments were found	
23.	Bijoramafi	- do -	
24.	Gulgaonmal	- do -	
25.	Jamkote	- do -	
26.	Bangauda	- do -	
27.	Bhongani	No important monuments	
28.	Bir	- do -	
29.	Chitikhal	No monuments were found	

30.	Dharokotla Madin	No important monuments	Dharikotla & Dharokotla Madin is assumed to be the same.
31.	Janohi	Not listed in the impacted village (254) by GOMP	
3 2.	Piplam	No monuments were found	Named as Piplani in GOMP Action Plan
33.	Richhi	No important monuments	Named as Richhimafi in GOMP Action Plan.
34.	Sarlia	No monuments were found	Named as Siralia in GOMP Action Plan.
35.	Purni	- do -	
36.	Balwara	No Important monuments	
37.	Kotora	No monuments were found	
38.	Boribandi Ghari	Not listed in the impacted village (254) by GOMP.	
	MAHARASHTRA		
1.	Vaghoda	No monuments were found	
2.	Wadi	- do -	
3.	Vadgaon	- do -	
4.	Banderpali	- do -	
	EXCAVATION SITES		
1.	Chota Tawa Valley	Not under the project area	
2.	Kali Machak Valley	One excavation site in N.S.P. &	
3.	Ruparel Valley	five excavation sites in S.S.P	
4.	Ghorapachar	Mehta Kheri site has been excavated from Anthropological consideration	

ANNEX - XXXI - (14)

Phones: 802014,802015,802028 802226,802511,802513 802812,802816,802825

Grams: CEWAPORES Telex: 0145-7390 Fax: 0212-802004

Government of India Ministry of Water Resources Central Water and Power Research Station PO: Khadakwasla, Pune 411 024

No. 351/104/97-5tats/67

Dated: 11.04.1997

Dr. Pawan Kumar Specialist (Env.) Narmada Control Authority Indore

Sub: Qualification of loss/gain of water in Mandleshwar - Rajghat reach of Narmada river

Ref: (1) No.ENV-4(7)/96/1714 dated 04.12.1996

(2) No.ENV-4(7)/96/161 dated 24.1.1997

Sir,

With reference to your letters cited above, I am to inform you that I am in agreement with the views expressed by Frof. S. Ramasheshan. Regarding comment No.6, I want to mention that on page 13 of Report No.3229, the catchment area of Kundi river upto Kogan site should be taken as 2731 km 2 ., so that area of subbasins will agree with total area of sub-reach <u>i.e.</u> 4865 km 2 (6.3% of total area). The results, however, are not affected by this correction.

Looking forward to hearing from you regarding further studies.

Thanking you,

Yours sincerely

an 3 2 ray (()

(K.S. Rajagopalan)
 Joint Director

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ANNEX - XXXI-(15).

No. Env-4(6)/97///73

June 25, 1997.

By Rigd. Por

Τo

Shri Suresh Chandra,
Member (E&F),
Narmada Valley Dev.Authority,
Narmada Bhawan, Tulsinagar,
Bhopal (M.P.)

Sub: Observations of 'Indian Council of Medical Research' on 5th six monthly report of Gandhi Medical College, Bhopal, SSP - regarding.

Sir,

Kindly refer to the 5th six monthly report of Gandhi Medical College, Bhopal received from NVDA during 30th meeting of the Environment Sub-group. A copy of the report was made available to Indian Council of Medical Research for a review. We have now received their observations on the report which we are enclosing herewith for further needful action at your level. These comments shall be put up for a discussion during the next meeting of the Environment Sub-group proposed to be convened shortly.

thanking you

End: Hs chane.

Yours faithfully,

₽__

(DR.PAWAN KUMAR) Specialist (Env.)

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Meylas

दूरभाष/TEL..: 667136 6963980 6962794 6962895 तार : विज्

GRAM : SCIENTIFIC टेलेक्स/TELEX. : 031-73067

फैक्स/FAX : 011-6868662



भारतीय आयुर्विज्ञान अनुसंधान परिषद INDIAN COUNCIL OF MEDICAL RESEARCH

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ANSARI NAGAR. POST BOX 4911. NEW DELHI-110029

BY SPEED POST

No.64/1/93-ECD-II

Dated: 10.6.1997

Τо

Dr. Pawan Kumar, Specialist (Env.), Narmada Control Authority, 113-BG, Scheme No.74, Vijay Nagar, Indore - 452 010 (M.P.)

Subject: 5th six monthly report of Gandhi Medical College, Bhopal, Sardar Sarovar Project - reg -

Sir,

This is in reference to your letter No.Env-4(6)/97/694 dated 25th April, 1997 regarding the above mentioned report of the project undertaken by Deptt. of Preventive and Social Medicine, Gandhi Medical College, Bhopal on 'Health aspects" sent to the Council for comments. Kindly find enclosed our comments for your kind perusal.

Yours faithfully,

57 grai

(Dr. Rashmi Arora) Deputy Director General for Director General Comments on Fifth six monthly report on "Study on health aspects in project impact area of Narmada Sagar through epidemiological surveillance"

This is the fifth sixth monthly report of the study carried out by Gandhi Medical College, Bhopal in the pre and post impoundment area of the project on Narmada Sagar.

The cohort which was fixed in the earlier phases of the study was followed for epidemiological surveillance in this fifth phase also.

The project aims to study the morbidity and mortality pattern in Narmada project area and to compare it with the health situation. The study also aims to elucidate any change in the health situation in due course of time, but from the report enclosed it is not clear what the P.I. wants to achieve.

The first phase of the study was done in July'92 to Dec'92. The second phase was carried out in April, May & June, 1993. The third phase of the study was from November to April, 1994. The report of the fourth phase of the study has not been sent to the Council and the fifth phase of the study was carried out between 1st Jan., to 30th June, 1996.

However it is not clear from these reports that what is the duration of the study? Is this the final report and was there any change in the health situation in due course of time.

It was noted in all the previous phases that there has been a significant and consistent rise in the morbidity pattern of vector borne diseases, gastro-intestinal diseases and respiratory diseases. However it is not clear whether any intervention measures were taken during last 3 years to check the rise in the morbidity pattern of the diseases.

Further no details have been given regarding what is preimpoundment area and what is post impoundment areas that why there was a significant rise in the morbidity pattern during this phase sexwise and at extremes of age.

It needs to be clarified that what co-relation F.I. wants to indicate by repeatedly doing surveys on rise in prevalence of chronic diseases in post impoundment areas. Similarly with immunization pattern, type of treatment obtained i.e. allopathy and the type of delivery conducted.

In the tables given no reference chart has been given indicating the names of the diseases from I to VIII. In all the tables age specific morbidity 0-1 and 1-4 has been added e.g. in 1 A morbidity from 0 to 1 i.e. 22.51 and morbidity from 1 to 4 i.e. 15.06 has been added with total of 37.57%. This is not correct. These figures are not additive and needs to be rectified.

No discussion has been given at the end of the report thereby specifying what significant change has been noted during each phase and what are the factors responsible.

The future plan of work has not been given.

Finally the whole report appears to be very confusing.

दूरभाष/TEL.: 667136 6963980 6962794 6962895 ANNE (-116).

तार : विज्ञानी

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भारतीय आयुर्विज्ञान अनुसंधान परिषद INDIAN COUNCIL OF MEDICAL RESEARCH अन्सारी नगर. पोस्ट वाक्स 4911, नई दिल्ली-110029.

ANSARI NAGAR. POST BOX 4911. NEW DELHI-110029

t e

Dated: 21.8.1997

Τo

The Member Secretary, Narmada Control Authority, 43-B9, Scheme No.74-C, Vijay Nagar, Indore - 452 010 (M.P.)

No. 64/1/93-ECD-II(Part-III)

Attention: Dr. Pawan Kumar Specialist (Env.)

Sub: - Health aspects of Sardar Sarovar Project -

Sir,

The Council is in receipt of the report of above mentioned project vide your letter No.Env.4(6)/97/1181 dated 30th July, 1997. This is to inform you that the report is under consideration of the Council.

However to enable us to provide detailed technical comments on the report we would need a modified report with following additional information:-

 $ec{\gamma}$ - Rational and objectives of the phase II study,

 Detailed methodology and the activities undertaken alongwith the objectives achieved, during Phase-II,

- Results alongwith their discussion (Phase-I vs. Phase-II),

- Proposed plan of work in phase II.

Further action would be taken by the Council on receipt of above information.

Yours faithfully,

Signia

SP (E)

(Dr. Rashmi Arora)
Deputy Director General
for Director General
-80-

RECTORATE OF HEALTH SERVICES [GOVERNMENT OF MAHARASHTRA] Si George : Hospital compound Cova Denial College : Uniting . Telephones : Office 262 10 31 36 Director (Personal) 262 10 06 Office 3 in Light dilla Foor Bombay (0000) (NDA) Jt. Director (_,, _) (Med) : 262 11 86 ______ elegrams: Jt. Director (,,) (PDE) : 262 09 25 Jt. Director (,,) (Opth) : 262 08 65 HEALTH SERVICES BOMBAY No. DHS/PDE/Sardar Sare o Dr. A.K.Malhotra, 2nd April 1997. Member(E. & R.), 2nd fleer, 27-Press Complex, Nxm Narmada Control Authority, A.B. Road, INDORE-452 008 (M.P.) Subject: - Status Report on Envirement Safe Guard - Measures for the quarter ending Reference your letter No.Env-4/(C)/96/902 dtd:10/7/ In continuation of this Directorate letter of even No. dtd.24th January 1997 on the above subject matter. The Health Schemes are in Sardar Sarovar Project have been santioned by Government of Maharashtra vide Govt.Resolution No. 1) PHC-1593/2038/CR-268/93/PH-4, dtd. 4-4-1994 and No.MISC-1895/5, CR-I/PH-4, dtd.15th November 1995. These are functoming preperly. The position of staff is as follows:-Ne.of Ne.of Ne.ef past schemes pest filled in sanctie- sanct-Sr.Np. Name of Scheme ned. Total ened Transferred of P rimary Health Centre from Bamni to Vallheri- One 13 13 Gavthan Tal. Taloda Sanction Laboratory facilities One in Primary Health Centre of a One 1 catchment area. Establishment of Sub-Centre Dispensaries..... 3 Disp. 1 Dispensaries.... Establishment of Floating Dispensary One for Director of Health Services, Mumbai.

P. t.o.

Copy submitted to the Secretary to Govt.of Maharashtra, (Envirement), New Administrative Building, Mumbai-400 021,

for information.

Copy submitted to Shri P.B.Kadve, Desk Officer(PH-4)m Public Health Department, Mantralaya, Bex Mumbai-400 032, for information.

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ANNEX - XXXI - (18).

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MINUTES OF THE FOURTH MEETING OF THE HIGH LEVEL EXPERT GROUP ON FISHERIES DEVELOPMENT AND CONSERVATION HELD ON 11TH JULY, 1997 AT 2.30 P.M. AT BHOPAL, M.P.

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MINUTES OF THE FOURTH MEETING OF THE HIGH LEVEL EXPERT GROUP ON FISHERIES DEVELOPMENT AND CONSERVATION HELD ON 11TH JULY, 1997 AT 2.30 P.M. AT BHOPAL, M.P.

The 4th meeting of the High Level Expert Group on Fisheries Development and Conservation was held on 11th July, 1997 under the Chairpersonship of the Additional Secretary, Ministry of Agriculture & Cooperation, Govt. of India, at Bhopal. List of participants is enclosed at Annex-IV-Min.1.

Member (E&R), NCA, on behalf of the Chairperson, welcomed the members and invitees to the meeting.

Specialist (Env.), NCA explained in brief the background of the meeting, regulatory regime and issues under consideration of the expert committee.

Discussion on agenda items was taken up thereafter.

Item No.IV-1(9): Confirmation of the minutes of the IIIrd meeting.

Minutes of the 3rd meeting on Fisheries Development & Conservation held on 10th March, 1996 at New Delhi were circulated to all the members and invitees vide letter No.Env-4(10)/96/703-21, dated 22.4.96. Comments received from NVDA were discussed. Minutes were confirmed with the following modification:

"On page-5, under Item No.III-2(8)-D-2, first para last sentence the word 'Consultant GOMP' was replaced by the word 'Advisor (Fisheries), NVDA'.

Item No.IV-2(10): Review of action taken on the decision of previous meeting.

(A) Nomination of Member(s) & Invitee(s) to the expert group.

It was informed that the document received from Shri Chatterjee, Expert Member forwarded to Dr. Y.S.Yadav, Fisheries Development Commissioner, Ministry of Agriculture for providing Ministerial inputs was under scrutiny and action would be expedited before the next meeting.

(B) Scope of the Expert Group.

On the issue of enlarging the score of this high level expert group to include Narmada Sagar Project also, it was clarified that conservation of aquatic ecosystem is required within the meaning of the environmental clearance given to the Sardar Sarovar and Narmada Sagar Projects during 1987 and that these two projects are very closely linked in their operation. Considering this, expert group had desired that issues related to conservation and development of fishes in Narmada. Sagar Project may also be discussed in this expert committee.

It was informed that this issue is proposed to be discussed in the NCA and the outcome $z\bar{\tau}$ the deliberations in NCA may be awaited.

(C) Status of the studies & action plans on fisheries development and conservation.

The information was presented in the status note annexed with the agenda papers. Topies of the CICFRI reports titled (1) "Sociological Survey of the Fishing Families of the Narmada River by CICFRI, 1991" and (2) "Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream by CICFRI" referred to in the status paper, requested by Gujarat officials were supplied to them during the meeting. It was agreed that GOG would go through these reports and would put up their views, if any, before the next meeting.

Chairperson invited presentation of the plan by each State for a review.

Govt. of Madhya Pradesh

Shri S.N.Chatterjee explained in brief the salient features of the plan prepared by GOMF and informed that the plan prepared required an investment of Rs. 5 crores of which Rs. 0.31 crores would be the recurring expenditure annually. The proposed plan included carrying out further studies on limnological aspects for which a sum of Rs. 0.44 crores was allotted.

Chairperson stated that the plan prepared by GOMP identifies the action points to be taken up in a given time-frame and budget and appreciated the efforts made for preparing this plan. She further suggested that involvement of NGOs in development of fisheries may be useful.

Govt. of Gujarat

Addl. Chief Secretary; GOG highlighted the salient features of the plan prepared by GOG and the efforts made by his Deptt. for improving the plan further. He was of the view that the action plan on fisheries development and conservation should be implemented at the earliest so that benefits start flowing to the people. Asstt. Director, Fisheries, GOG summarised the plan annexed with the agenda papers. The plan prepared by GOG was in five parts covering in the first two part general background and environmental studies. The third part covered fisheries development in the main reservoir. The fourth covered fisheries development in the irrigation command area of the SSP. Part five was devoted to fisheries development in the estuarine areas.

The plan prepared by GOG included establishment and monitoring cell in the Commissionarate of Fisheries.

Regarding budgeting, part two of the plan required Rs. crores for a period of five years. The cost estimates the reservoir fisheries development was Rs. 7.4 crores which Rs. 2.12 crores for development of rearing space and Rs. 2.62 crores for seeds operational cost. Besides a provision of Rs. 1.25 crores was kept for incentives to be supplied through the identified institutions. The cost estimates for the part four was Rs. 26.4 crores for five years. This included major-carp hatchery (Rs. crores), pilot farm (Rs. 0.5 crores), water-logged areas (Rs. 10 crores), aquaculture pond (Rs. 10 crores), borrowpit development (Rs. 2 crores), etc. Part-five of the plan was estimated to cost Rs. 24.6 crores. The major component of Rs. 20 crores of this was kept for shrimpculture and Rs. 1.1 crores for hilsa-hatchery and Rs. 1 crore for mangrove plantation.

Shri S.N. Chatterjee stated that the plan prepared by GOG appeared realistic and that the requirement and the benefits have been properly worked out. He however, suggested that as per the plan 2% of the command areas seems to be water-logged and this may have to be checked up from the records of the project authorities.

There was some discussion on the use of borrowpit areas for developing aquaculture in Madhya Pradesh. Jt. Commissioner, Ministry of Agriculture informed that while the matter was already taken up by the Ministry of

Agriculture, a decision however was yet to be taken. Chairperson suggested that in case GOMP feels some difficulty in utilising borrowpit areas they might like to take up their difficulty with facts and figures for consideration of the Ministry of Agriculture.

Addl. Chief Secretary, GOG informed that the plan of the GOG included scampi culture for which they are negotiating with a foreign concern and an agreement was already signed. The project was estimated to cost Rs. 5.6 crores of which 47% would be invested by GOG and the balance by the foreign agency.

In response to a question, Jt. Commissioner, Ministry of Agriculture informed that the French Technology for scampi culture was already examined and recommended by MOA. Chairperson suggested that the technology for the scampi culture might have to adhere to the requirement of environmental control especially in view of the recent Supreme Court decision and if required might have to be modified accordingly.

Shri Chatterjee sought the opinion of the expert committee on system of monitoring of stocking of seeds as nefelt that due to substantial increase in requirement, this is really an important issue.

Commissioner, Fisheries, GOG informed that seeds in Gujarat were stocked in presence of departmental officials and the beneficiaries besides other agencies. In case of SSP, officials of the SSP were also involved. In reply to another question, he informed that the fingerlings of appropriate size being stocked in 400 ha. area near the reservoir. However, as not much of the transportation was involved, no difficulty was foreseen in stocking these in the reservoir. Shri Chatterjee, however, suggested that pen cage culture may help overcome difficulty of getting more space for hatcheries.

Govt. of Maharashtra

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The plan prepared by GOM was submitted earlier and was annexed with the agenda papers for the 3rd meeting. The outlay for this plan was Rs. 1 crore. This plan was discussed earlier and it was agreed that GOM may have to revise this plan keeping in view the recommendations of the studies being carried out by CICFRI. Specialist (Env.), NCA pointed out that the main concern was the possible change in the chemical composition of water resulting from bacterial action and feeding of aquatic fauna and the issues related with eutrophication, organic loading of the reservoir from peripheral townships and industries. Chairperson suggested that such studies related to preparation of plan were required not only in Maharashtra but also for the reservoir as a whole. She however cautioned that as large number of

studies had been completed for the SSP earlier there was a need for careful indexing and scrutiny to avoid duplication.

- Dy. Secretary, GOM informed that the study results from CICFRI were awaited. He agreed to inform his Govt. on the need for updating and expediting of the plan and studies at the earliest.
- (D) Guidelines for development and conservation of aquatic ecosystem of Sardar Sarovar Reservoir.
- 1. Short term strategies and guidelines.
- (Fisheries), Commissioner, MOA informed that Development Commissioner and DDG, ICAR were Fisheries preoccupied. they could not make a field visit as yet. Chairperson : agreed that she would request these officials to expedite the field visit to the dam site for an on-the-spot assessment as suggested by the expert committee, earlier.
- 2. Long term strategies and guidelines.
- a) Report of the working group(s).

On the issue of long term strategies and guidelines, expert committee was informed that the three working groups had submitted their reports. The third report was submitted very recently. These were being studied in the Ministry and a detailed discussion on these would be possible during the next meeting. It was expected that by that time Fisheries Development Commissioner and DDG, ICAR would have completed their visit to the dam site. On the request of the members, it was agreed that the draft guidelines prepared by the three working groups would be circulated to all the members for their observations and recommendations. Guidelines are annexed and placed at Annex-IV-Min.2,3,4.

Chairperson suggested that draft guidelines may be scrutinised by the members within a month's time and their observations should be forwarded through NCA to the Ministry.

Chairperson proposed the formation of a small working group with the following composition:

- 1. Addl. Chief Secretary, GOG
- 2. Fisheries Development Commissioner, MOA
- 3. Dr. S.N.Chatterjee, GOMP,
- 4. Specialist (Env), NCA.

The main task of the group would be to compile the draft guidelines after incorporating all the necessary recommendations of the State Govts. of Gujarat, Maharashtra & M.P. and that of the experts. She suggested that this

group may review and put up the draft guidelines before the next meeting and this was agreed to by all the members.

It was explained that aquatic ecosystem of which fish is an important indicator is required to be conserved in terms of the clearances issued by the MOEF and to that extent the guidelines were to be directional and have to be adopted by the State Govts. It was also pointed that the internal rate of return from the Development of fisheries was estimated to be of the order of 26% and that some lending agency might be willing to finance the proposal, provided it is implemented economically. In order to keep the development of fishes in the SSP viable it was essential that there should be one plan for the development of fishes in the SSP as a whole to avoid expenditure not considered necessary from economic considerations. It was explained that the formation of Inter-state Fisheries Development Board to be a joint venture of three States would finally take up the of development and conservation of fishes. However, till such time an agreement is reached amongst the party-States, this expert group may have to ensure that lake's environment is not degraded.

Shri S.P.Ayyar clarified that it was essential to take certain necessary steps immediately to avoid a possibility of the reservoir getting filled up with trash and inferior species. He pointed out that once the reservoir is occupied by such species, fishing in the Sardar Sarovar would be difficult in terms of economic viability and for this reason the expert group has bigger responsibilities.

Chairperson desired that it would be in the interest of the project that an agreement is reached early for formation of joint body where all the States and NCA are represented. After some discussions she requested GOG and GOM to expedite their observations on the alternative suggestions sent to them by Secretary, Fisheries, GOMP, earlier, so that it could be further discussed in NCA.

b. Clearfelling of trees from the reservoir bowl,

Regarding clear felling from the reservoir bowl, Member (E&F), NVDA informed that the felling plan for the areas getting inundated in M.P. was available and was under execution.

Addl. Chief Secretary, GOG informed that except for some 246 ha. area which was subjudice, entire area was already cleared of the vegetation. It was pointed that the part forest area, though little in extent, was submerged earlier and with the proposed raising of the dam, more areas were likely to be inundated. These were to be clear felled before the submergence. Therefore there is an urgent need for quick follow up of marking and felling the trees from the submergence area in Maharashtra.

On the need for reconciliation of figures for the areas getting submerged by the SSP in Maharashtra, Member (E&R), NCA informed that the issue of the extent of forest area getting submerged by the SSP was resolved recently by a committee chaired by Inspector General of Forests, Govt. of India on 4th July, 1997. By Secretary, GOM informed that he would get back to the expert group soon after obtaining current status of felling in Maharashtra. Chairperson requested GOM and GOMP to provide detailed information on the current status of felling in their respective territories.

c. Stocking of the reservoir during it initial impoundment.

There was some discussion on the norms for stocking of the reservoir, Commissioner (F), GOG informed that there were no strict norms for the same in Gujarat. The figures presented in the Annexure-IV-1 of the agenda under the Item-8.1 were the actual raised by GOG. Specialist (Env.), NCA pointed out that stocking norms of 500 fish/hec./year for that year for large reservoirs available in the literature on fisheries management may be referred.

Regarding funding of the stocking efforts, it was explained that these were being drawn from the States' budget under the head SSP and that this was being done as a sectoral adjustment pending a decision on cost sharing issue.

(E) TOR for the studies {Item-I(4)}.

Dy. Secretary, GOM informed that the study results from CICFRI were awaited. He agreed to pursue his Govt. for expediting the studies at the earliest.

Chairperson summed-up the discussions & stated that a large number of studies have been conducted at the instance of the project authorities with special reference to SSP. Plans for fisheries development have also been drawn up by the State Govts. of M.P. & Gujarat reflecting the studies in plans. She stated that massive efforts implementation of these plans, in time, were required. expressed the opinion that if we delay the implementation any further, there might not be any actionable plan left. She observed that GOM had not really completed the action plan and suggested that if there was any difficulty, might be brought to her notice. Besides problem of coordination in Maharashtra was also to be sorted out. She agreed to offer Ministry level help in resolving the issue. She directed that the working group constituted above should submit a draft guideline before the next meeting. emphasised that these draft guidelines should address phasing of the activities to be taken up annually,

commensurate with the progressive filling of the reservoir. She directed that inspection of the site by Fisheries Development Commissioner and Dy. Director General, ICAR should be completed within one month's time, if required they can call the States representatives for further discussion and finalise the recommendations. She emphasised the need for creating awareness as to what was being done to avoid pressure of social and environmental groups and to remove the perception that all that was required to be done was not being done. She stated that such doubts should be cleared. She suggested further that if possible we should also associate the representatives of the NGOs and beneficiary groups in implementation of the plans.

The meeting ended with a vote of thanks to the chair.

Item No.IV-3(11): Any other item.

DATE AND VENUE OF THE NEXT MEETING

The next meeting is proposed to be held at Kevadia Colony, District Bharuch, Gujarat during September, 1997 to be followed by a visit to the Dam site.

Date and venue shall be announced separately.

केवल सरकारी प्रयोग के लिए FOR OFFICIAL USE ONLY



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

वर्धावरण उपदल Environment Sub-Group

इकतीसवी बैठक का कार्यवृत्त Minutes of the 31st Meeting

20 जातवरी 1998 को पर्यावरण भवत गई दिल्ली में हुई Held at Paryavaran Bhawan New Delhi on 20th January, 1998

> इन्दौर फरवरी 1998 INDORE February, 1998

MINUTES FOR 31ST MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 20TH JANUARY, 1998 AT PARYAVARAN BHAWAN, NEW DELHI.

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MINUTES OF THE 31ST MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 20TH JANUARY, 1998 AT PARYAVARAN BHAWAN, NEW DELHI.

INTRODUCTION

The 31st meeting of the Environment Sub-group of Narmada Control Authority was held at Paryavaran Bhawan, Ministry of Environment & Forests at New Delhi on January, 20th 1998. A list of participants is enclosed at *Annex-XXXI-Min.(1)*.

Secretary, Ministry of Environment & Forests and the Chairman of the Sub-Group welcomed the participants wishing them a Happy New Year. Discussion of the agenda items was taken up thereafter.

Item No.XXXI-1(145): **CONFIRMATION OF MINUTES OF THE 30TH MEETING.**

Member-Secretary stated that the minutes of the 30th meeting of Environment Sub-group of the Narmada Control Authority were circulated to all the Members and invitees vide letter No. Env-34(31)/97/368-402 dt. 11.3.97. Comments were received from Jt. Commissioner (R), SSNNL and Dr. Shekhar Singh, Faculty Member, IIPA.

The points raised by Dr. Shekhar Singh vide his letters placed at Annex-XXXI-2 of the agenda were noted for discussion under any other item.

The minutes were confirmed with the amendments suggested by SSNNL.

Item No. XXXI-2 (146): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

- Submission of Catchment Area Treatment (CAT) plans for freely draining critically degraded sub-watersheds [Item No. XXII-2(112)].
- a) Submission of micro watershed plans for freely draining critically degraded sub-watersheds by Govt. of Maharashtra and Madhya Pradesh.

It was informed that 16 micro watershed schemes received from GOMP were reviewed in NCA and forwarded to MOEF with observations. Only one scheme was received long back from GOM which also, after detailed review, was forwarded to MOEF alongwith observations.

Regarding submission of balance schemes by the two states, it was clarified that even though these are submitted to the funding agency for approval viz. Ministry of Agriculture/MOEF, copies of the schemes should also be submitted to the NCA for it's scrutiny and onward transmission to MOEF. Member (E&F), NVDA and PCCF, GOM agreed to expedite submission of the balance schemes to NCA at the earliest.

Regarding increasing the duration of treatment from the present three years to five years, Member (E&F), NVDA informed that they had already approached Ministry of Agriculture on this issue and were informed that as Ministry of Agriculture had to follow the guidelines approved by GOI for soil conservation in catchment of river vailey projects, it was difficult to increase the period of catchment area treatment from the present three to five years. Representative of the States, therefore sought the assistance of the Environment Sub-group for taking up the issue with the Ministry of Agriculture.

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After some discussion, the Chairman suggested that Agriculture Ministry be approached by NCA for convening a meeting of the concerned officers of the States for taking a view on this issue.

b) Funds for treating critically degraded, directly draining subwatersheds in Madhya Pradesh.

Member (E&F), NVDA informed that the catchment area treatment works this year had received a setback due to prolonged rainy season. However, efforts were being made to achieve the maximum progress. He further informed that there were, in all, 12 field units deployed for catchment treatment of SSP having capacity to treat nearly 25000 ha annually.

c) Silt Monitoring

Addl. Director, GOMP informed that NVDA was making efforts and one officer was already deputed for training to Hazaribagh. Besides, Hirakud reservoir was also visited by the state officers for studying the German technique of measuring silt outflows being adopted there. A detailed plan was under preparation for establishing silt monitoring stations before the monsoon of 1998.

Officers of the Central Soil & Water Research & Training Institute, Vasad, made a presentation on the silt monitoring being done by them in Gujarat areas of Narmada catchment. A summary finding of their presentation is placed at *Annex-XXXI-Min-(2)*.

It was also informed that, silt outflow from forest lands encroached by the tribal(s) for agriculture, was very high due to primitive agricultural methods and therefore these areas needed attention. M.D., SSNNL assured to look into this aspect by encouraging agro-forestry and/or other suitable practices.

After some further discussions on the subject, the Chairman desired that results of silt monitoring exercises should be looked into by the NCA.

2. Cost Estimates for preparations of Action plan and implementation of environment safeguard measures [Item No.XXII-2(112){2}].

The Sub-group noted the information presented in the Agenda. Executive Member, NCA requested the state govts that, in order to make the comparison of estimate and expenditure realistic the expenditure being incurred on various parameters should be furnished alongwith the updated estimates. Member Secretary added that the SSNNL was updating the project cost at 1996-97 price level and accordingly the updated estimates for environmental safeguard measures were also needed. He requested the states to furnish regularly the expenditure statements to NCA.

Updated information on the estimates and expenditure as available during the meeting, is placed at *Annexure-XXXI-Min-3*.

In response to a query from the Chairman on cost of command area development works, the Sub-group was informed that the studies on command area development works were nearing completion and it would be possible to frame the cost estimates for action plan after completion of these studies.

3. Establishing a separate authority for coordinating Environmental works in Maharashtra [XXVIII-3(136){1}].

Director (Env.), GOM informed that a proposal in this regard had been submitted to the State Govt. and a decision was expected within a month's time. However, he further informed that the State Govt. was of

the view that as environmental works on SSP are nearing completion, terms of reference for the proposed authority would be needed.

The Chairman stressed the need for establishing an agency for better inter-departmental coordination and desired to address the Chief Secretary, GOM for expediting the issue.

4. Publication on Environment [XXVIII-3(136)]

CCF, SSPA presented a copy of a GOG publication on 'Birds of Shoolpaneshwar Sanctuary and Narmada Catchment, Gujarat'. He further informed that the Gujarati translation of the publication was also being finalised. The Sub-group was also informed that the work on publications in other thrust areas like bio-diversity was making progress.

The Chairman, while appreciating the efforts of GOG, urged the other two states also to bring out needed publications to inform the public at large about the conservation measures taken up in the project areas.

5. Parameters for reviewing pari-passu Compliance of the environmental safeguard measures for SSP & NSP [XXX-3(140)].

The information presented in the agenda was noted and status of implementation of environmental safeguard measures was reviewed under agenda item-XXXI-3(147).

6. Catchment area treatment in Maharashtra - Cost aspect [XXX-2(123){7}].

The issue of cost aspect of CAT works in Maharashtra was discussed and it was agreed that the cost depended upon topography,

menu of treatment, soil type, wage rates etc. and had to be viewed accordingly by NCA while comparing cost estimates of CAT works in the three States.

Member (E&F), NVDA informed that they had already sent the detailed estimates for CAT works in M.P. to the NCA a few days back. Similar details from GOG were awaited.

7. Monitoring of R&R aspects of Narmada Sagar Project [XXV-2(123){3}]

Member (E&F), NVDA read out the discussions of the 50th & 51st NCA meeting on this subject. However, after review of information presented in the agenda, the Chairman expressed the opinion that the environmental clearance accorded to the Narmada Sagar Project in June, 1987 clearly enjoins the monitoring of the R&R aspects of the project by the NCA. There was thus no reason why GOMP should have objection to this. He ruled that R&R Sub-group of NCA would monitor the same for NSP also.

8. Catchment Area Treatment of Bargi Reservoir (XXX-2(143) [6]]

After review of the information presented in the agenda, the Chairman stated that, in order to have a cumulative impact assessment of the SSP & NSP, data from Bargi would be needed and therefore GOMP should provide data as required by NCA for this purpose. This was agreed to by the GOMP.

Item XXXI-3(147): PRESENT STATUS OF STUDIES, SURVEYS AND ENVIRONMENTAL ACTION PLANS.

The information presented in the agenda was noted by the Sub-Group. A presentation on the pari-passu compliance on Sardar Sarovar Project was made by Specialist (Env.), NCA.

i) & ii) CATCHMENT AREA TREATMENT AND COMPENSATORY AFFORESTATION

It was explained by Specialist (Env.) NCA that with regard to catchment area treatment works the progress till 1997 was 57.66% against the submergence of 15.57% at current level of dam. As regards compensatory afforestation, a progress of 99.62% had been achieved against submergence of 15.57%.

iii) COMMAND AREA DEVELOPMENT

Regarding command area development it was explained that a large number of studies had been commissioned on various aspects. Most of the studies were completed while a few others were under progress and were expected to be completed soon. It was further clarified that command area development works were to be synchronised for *pari-passu* compliance with the commencement of irrigation which would be possible only after dam attains 110 m. level and therefore there was enough time on hand for implementation of the environmental safeguard measures. However, the Chairman desired that available basic data on various aspects of command area development works might be looked into for developing a frame-work on compliance.

iv) FLORA, FAUNA AND CARRYING CAPACITY

On the issue of flora & fauna, Specialist (Env.) NCA explained, in detail, the steps taken by the project authorities in regard to survey, studies, preparation of action plans and their implementation.

It was pointed out that the report of the University of Pune on the status of Flora and Fauna in Maharashtra was circulated to all the members during August, 1997 and with submission of this report all the required studies on this aspect were completed by all the three states.

Specialist (Env.), NCA alluded to the discussions in the meeting of experts on fiora & fauna convened by NCA in September, 1996, where it was agreed that in view of the Action Plan prepared by GOG for development of Shoolpaneshwar Sanctuary located at the border of Gujarat & Maharashtra and also keeping in view that GOMP shall be bringing part areas of Narmada Sagar impact zone under protected areas/sanctuaries, there was no need for establishing separate sanctuaries/national parks within MP & Maharashtra.

In reply to a query from the Chairman, it was informed by the Specialist (Env.), NCA that as the areas getting inundated by the SSP in Maharashtra were a small part of a big chunk of contiguous forest therefore experts were of the opinion that there was no need for establishing a separate sanctuary and only certain measures for improving the carrying capacity of the adjoining forest for accommodating wildlife moving out from the submergence area would be needed for which GOM was to prepare an Action Plan.

It was further clarified by the Specialist (Env.), NCA that considering that the forest areas getting submerged in M.P. were

fragmented and contained no major wildlife and also keeping in view that the catchment area treatment was intended for improving the carrying capacity, the experts suggested no special measures for the areas in M.P.

Member (E&R), NCA pointed out that the Action Plan expected from GOM and GOMP might have to be linked to intermediate stages of the construction programme also (85 m, 90 m and so on in steps of 5 m) as decided in Review Committee of NCA. The State Govts. of M.P. and Maharashtra were requested to submit the needed action plan(s) urgently.

v) ARCHAEOLOGICAL AND ANTHROPOLOGICAL STUDIES

Specialist (Env.), NCA explained in brief the status of implementation of the relocation/excavation of archaeological monuments/mounds getting affected by the submergence of SSP. It was explained that there was no monument identified for relocation in Maharashtra. However the Shoolpaneshwar temple which was on the border of Gujarat & Maharashtra had already been relocated by GOG. For the remaining temple (Hampheshwar) whose plinth level is 105 m., GOG informed that more than 50% of work had been completed and even though the target for relocation was May, 1997, since the construction work on the dam had made no progress in the last almost 3 years, ,the relocation work had slowed down. Efforts were being made to complete the work soon.

In reply to a query from the Chairman, it was informed that the regular monitoring of the relocation works was being done by NCA. The status of the excavation works was also explained.

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On the issue raised by Dr. Shekhar Singh in his letter (annexed with the agenda) concerning monuments of Narmada Sagar Project, it was explained that status of the monuments, as retrieved from the Survey reports prepared by State Deptt. of Archaeology & Museum, M.P. and other related documents, had been presented in a tabular form in the agenda. Member (E&F), NVDA informed that the State Deptt. of Archaeology & Museum, Bhopal have already reviewed the earlier action plan and have proposed relocation of 10 monuments besides identifying 5 sites for excavation. It was also informed that 134 sculptures were already retrieved and displayed in the museum at Hoshangabad, Dewas and Khandwa. Information furnished by the GOMP during the meeting is placed at Annexure-XXXI-Min-(4). However on the issue of taking a fresh look on the desirability of attaching importance to any of the monuments from the ASI point of view, the Chairman suggested that Director, ASI may visit Bhopal office of ASI / NVDA or NCA office at Indore and may refer to the needed reports.

Director, ASI brought to the notice of the members that proposals submitted by ASI for protection of north bastion of Joga Fort at a cost of Rs. 40 lakhs was pending with NVDA since May, 1997. He requested the subgroup to look into the matter. Member (E&F) NVDA informed that the report from the ASI on the assessment of impact of backwater on Joga Fort was received and was under scrutiny.

After some discussions, the Chairman suggested that a committee consisting of representatives of ASI, NVDA and State Deptt. of Archaeology & Museum, M.P. & NCA may be formed for undertaking necessary field visit to sort out the issues raised by Prof. Shekhar Singh, Prof. Ramaseshan & ASI. Report of this Committee may be submitted for a review by the sub-group.

vi) SEISMICITY AND RIM STABILITY

As regards seismicity it was explained that the seismic design of the Sardar Sarovar Dam had been done by CWC with the help of national agencies like Dept. of Earthquake Engg. University of Roorkee, NGRI, GSI etc. and a maximum credible earthquake of 6.5 on Richter Scale had been considered with epicenter near the dam. For regular monitoring of the seismic data in the vicinity of the reservoir, out of the 9 stations planned, 8 had been completed and work was making progress for the remaining station.

It was further explained that Rim Stability Studies for the areas in Gujarat & Maharashtra had already been completed. However on the suspected water loss in M.P. area, detailed studies were entrusted to CWPRS and their recommendations were discussed earlier by the Environment Sub-Group. On the advice of Prof. Ramaseshan that no further studies were needed, CWPRS was approached to advice on the need for continuing further studies and that CWPRS have corroborated the opinion of Prof. Ramaseshan. The Sub-group discussed the issue and it was agreed that since there was no loss of water, no further studies were needed.

vii) HEALTH ASPECTS

On the issue of the health aspect, Specialist (Env.) explained that the studies on Malaria, Filaria, Schistosomiasis etc. were conducted with the help of experts from World Bank, WHO, NICD as early as 1986. State Govt. of M.P. & Gujarat had developed action plans during the period 1986-1988. Govt. of Maharashtra plan was made available in

1990. These plans were updated a number of times and were under implementation.

Long term epidemiological surveillance studies were entrusted by the State Govts, to various agencies after 1992/93 on the directions of the Sub-group. These studies have been completed by SCHMS, Gujarat for areas in Gujarat. A copy of the draft health management plan developed on the basis of the recommendations contained in the report was submitted by GOG representatives during the meeting.

Dr. Shekhar Singh pointed out that on perusal of the report submitted by Gandhi Medical College, Bhopal, who were conducting the epidemiological studies for M.P. areas, it was observed that the morbidity rate especially among children was reported to be higher in post impoundment areas. DDG, ICMR presented their observations on the draft report received from Gandhi Medical College, Bhopal, She desired that a complete set of reports may be made available to ICMR for a comprehensive review. It was explained by Specialist (Env.), NCA that on the issue of high morbidity rate, it was observed earlier by ICMR that this may be due to non-availability of registration facilities for birth and death.

The Sub-Group was also informed that the Phase-I epidemiological surveillance studies for the areas in Maharashtra were completed recently by the T.N. Medical College, Mumbai. The proposal for phase-II study received from GOM was annexed with the agenda papers for observation of the Members. However, the proposal could not be discussed in the absence from the concerned officers of GCMs. On the issue of pari-passu compliance, for the impact areas of the submergence at 110 m, it was explained that except for slow proposal on establishing a 30 bed hospital at Nisarpur in M.P., all other works.

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appeared to be in order. Member (E&F), NVDA informed that the estimate for establishing the hospital was sanctioned and a suitable site for the hospital was being located. In reply to a query by the Chairman, it was explained that under the existing provision of the National Health Policy, every citizen was entitled to certain health facilities. However, the incremental facilities due to the project which includes both preventive and curative aspects like immunisation were a part of the action plan(s) prepared by the State Govts.

Summing up the discussions, the Chairman stated that for detailed discussion on the issues raised above and for assessing the adequacy of both preventive and curative measures being planned by project authorities, a meeting of the experts on health may be convened soon with field visit as necessary, and outcome of this meeting may be put up for a review by the sub-group during it's next meeting. The Chairman desired that a representative of the ICIVIR may also be included in the team.

viii) FISHERIES

On the issue of the conservation and development of fisheries in the SSP & NSP reservoir, it was informed that the issue was being looked into by a High Level Expert Group under Addl. Secretary (Fy.), MOA, constituted on the recommendations of the Environment Subgroup, by the NCA. The fourth meeting of this group was held on 11th July, 1997. It was informed that during this meeting draft reports, for laying down guidelines on conservation and development of fisheries, to be applicable widely, submitted by the Werking Groups were discussed and a small committee was formed to an algemate the findings of the three Working Groups for preparing a final document after undertaking necessary field visits.

Item No.XXXI-4(148): ANY OTHER ITEM: PARI-PASSU, CONTEXT & COMPLIANCE

Specialist (Env.), NCA referred to the decision of the 18th meeting of the Environment subgroup where it was decided that submergence would be the criteria for assessing the pari-passu compliance. It was also pointed out by him that during the 22nd meeting Chairman had ruled that fall the works which adversely affect the environment steps for their mitigation have to proceed on pari-passu basis whereas certain other works can be done on a different scheduling" (item xxii-2(112) page 4 para 3 of the minutes).

Reacting to the presentation on *pari-passu* compliance as given in the agenda papers, Dr. Sheknar Singh stated that working out the percentages for the various environmental action plan may not be a precise criteria for judging pari-passu compliance.

The Chairman pointed cut that the percentages have been worked out only in case of catchment area treatment and compensatory afforestation. However, on the other issues like flora & fauna, archaeology, seismicity etc. efforts have been made in the agenda to show pari-passu compliance quantitatively as well as qualitatively. He, however, suggested that in case, Dr. Singh desired to improve the presentation further, he may come forward with concrete suggestions.

Prof. Katti cautioned that as the Sub-group had already taken a decision that pari-passu compliance would be with reference to the submergence and therefore this basic philosophy and confect chook not be changed.

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The NR care country cost in the imprecious by the country to be in the mode on the which a local forcedes have been done for SSP and many base on the participassu aspect appears reasonably causilactory.

The Chaim. In, while agreeing with this desired that MiS may be developed to keep the decision makers well informed on the important leaves. He desired that good vorks may be documented.

It was decided to meet again during the next quarter.

Meeting ended with a vote of thanks to the chair

W. J. J. Commission and Market Conference of

ANNEXURES

ANNEX-XXXI. Min-(1).

LIST OF PARTICIPANTS OF THE 31ST MEETING OF ENVIRONMENT SUB-GROUP HELD ON 20TH JANUARY, 1998 AT NEW DELHI.

GOVERNMENT OF INDIA

Ministry of Environment & Forests

- Shri Vishwanath Anand, Secretary, Ministry of Environment & Forests, New Deihi
 CHAIRMAN
- 2. Dr. Nalini Bhat, Addl. Director, MOEF, New Delhi.
- 3. Shri V.P. Singh, CCF (Central), R.O., MOEF, Bhopai.

Ministry of Water Resources

1. Shri B.S. Ahuja, Commissioner (PP), MOWR, New Delhi.

Narmada Control Authority

- 1. Shri R.S. Prasad, Executive Member, NCA, Indore
- 2. Shri A. Sekhar, Member (E&R), NCA, Indore
- 3. Dr. Pawan Kumar, Specialist (Env.), NCA, Indore.
- 4. Shri A.K. Jha, Dy. Director (Env.), NCA, Indore.
- 5. Shri Joginder Singh, Dy. Director (L), NCA, New Deihi.

Sardar Sarovar Construction Advisory Committee

1. Shri Suresh Chandra, Asstt. Secretary, SSCAC, Vadodara.

Indian Council of Medical Research

1. Dr. (Mrs.) Rashmi Arora, Dy. Director General, ICMR, New Deini.

Archaeological Survey of India,

1. Dr R.S. Bisht, Director, ASI, New Delhi.

Ministry of Agriculture, Central Soil & Water Conservation Research & Training Institute.

- 1. Dr. P.S. Pathak, Asst. Director General (A.F.), ICAR, New Delhi.
- 2. Dr. Virendra Kumar, Head, Research Station, Vasad.
- 3. Dr. R.S. Kurothe, Sr. Scientist, Research Station, Vasad. Indian Council of Agricultural Research

GOVT. OF MADHYA PRADESH

- 1. Shri Suresh Chandra, Member (E&F), NVDA, Bhopal.
- 2. Shri K.N. Dubey, Addl. Director (AG-N.F), NVDA, Bhopal
- 3. Shri R.R. Singh, Director, Archaeology, Bhopai.

GOVERNMENT OF GUJARAT

- 1. Shri L. Mansingh, M.D. SSNNL, Gandhinagar.
- 2. Shri V.K. Babbar, Commissioner & CEO, SSPA, Vadodara
- 3. Dr. S.A. Chavan, CCF, SSPA, Gandhinagar.

GOVERNMENT OF MAHARASHTRA

- 1. Shri Jagir Singh, PCCF, Nagpur
- 2. Shri V.S. Dhongade, Director (Env.), Mumbai
- 3. Shri Shalendra Bahadur, Nodai Officer, Nagpur,
- 4. Dr. D.R. Shirke, Principal Investigator, Botany Deptt., University of Pune.

GOVERNMENT OF RAJASTHAN

1. Shri N.K. Mathur, Addl. Secretary (Env.), Jaipur.

EXPERT MEMBERS

- 1. Dr. R.K. Katti, Prof., UNEECS, Mumbai
- 2. Dr. S. Ramaseshan, Prof. (Retd.), (IIT, Kanpur), Chennai & Expert (Hydrology).
- 3. Dr. Shekhar Singh, IIPA, New Delhi.

ANNEX - XXXI-Min.(2).

For official use only

EVALUATION OF SOIL AND WATER CONSERVATION MEASURES IN SARDAR SAROVAR CATCHMENT

Sponsored by
Sardar Sarovar Plantation Project, Forest Department,
Gujarat State

INTERIM REPORT 1996-97

Central Soil & Water Conservation Research & Training Institute,
Research Centre, VASAD 388 306 Dist. Kaira (Gujarat)

Project Team

Central Soil & Water Conservation	Sardar Sarovar Project		
Res. & Trg. Institute, Dehardun	Gujarat Forest Department		
Leader	Leader		
Dr. J.S. Samra, Director, Central Soil & Water Conservation Research & Training Institute, Dehradun, U.P.	Dr. D.P.S. Verma, IFS Chief Conservator of Forests, Sardar Sarovar Plantation Project, Vadodara, Gujarat		
Associates	Associates		
Dr. Virendra Kumar, Pr. Sci. & Head, CSWCRTI, Research Centre, Vasad	Sh. K.S. Goel, IFS Conservator of Forests, SSP Project, Vadodara		
Er. R.S. Kurothe, Sr. Sci.(Engg), Vasad	Sh. U.D. Singh, Dy. Conservator of Forests (Monitoring) SSP, Vadodara		
Dr. S.P. Tiwari, Sci. 'SS' (Soils), Vasad Sh. K.T.N. Nambiar, Sci. 'SS' (Forestry), Vasad Dr. H.B. Singh,	Sh. U.D. Singh, Dy. Conservator of Forests Div. I, Vadodara Sh. K. Paparao, Dy. Conservator of Forests Div. Il Vavadia		
Sr. Sci. (Agro), Vasad Sh. G.L. Khatik, Sci. (Extn.), Vasad Sh. V.C. Pande, Sci. (Eco.), Vasad	Div. II, Kevadia Sh. P.S. Valvi Dy. Conservator of Forests Div. III, Rajpipla		

CENTRAL SOIL & WATER CONSERVATION RESEARCH & TRAINING INSTITUTE

(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
RESEARCH CENTRE, VASAD: 388 306 (DT.ANAND) GUJARAT

EVALUATION OF SOIL AND WATER CONSERVATION MEASURES IN SARDAR SAROVAR CATCHMENT IN GUJARAT STATE

INTERIM REPORT - 1996-97

Gujarat Forest Department has taken up massive treatment of the Narmada catchment area by afforestation and other soil conservation measures to minimize silt flow with runoff water into Sardar Sarovar reservoir during rainy season. Central Soil & Water Conservation Research & Training Institute, Research Centre, (CSWCRTI) Vasad initiated a study in 1994 with the help of Forest Department in the Sardar Sarovar Catchment. Seven microwatersheds in Rajpipla, Kevadia and Baroda forest divisions were identified to represent varying conditions of soil, slope, vegetation rainfall and soil conservation measures adopted there. Gauging stations to measure rainfall, outflowing water and runoff sampling were setup at each micro watershed for assessment of silt load heading towards the reservoir from the catchment. Large number of Forest Department personnel were trained for observation and collection of water samples and field data during rainy season. Systematic analyses of rainfall, runoff water samples and runoff data would lead to computation and assessment of sediment flow rate into the reservoir. The study being in the initial phase and available data very meagre, it is difficult to draw conclusions or make recommendations at this stage. However, the observations indicated that:

Soil in the catchment area vary considerably with respect to depth, texture, structure stoniness, reaction and nutrient con tent etc. This is very well reflected in growth of vegetation and erodibility parameters also.

Most of the inhabitants in the catchment are of tribal origin who practice primitive agriculture and collect minor forest produce for their livelihood.

Afforestation and soil conservation works have increased vegetation cover in some areas. This welcome feature will reduce silt load in the runoff water.

All micro watersheds were surveyed to quantify their area, average slope and other land, vegetation features. The micro watersheds range from 2.9 to 19.05 ha in size and their uneven slopes vary from 20 to 48 per cent. Annual rainfall varied from 923 to 1278 mm. Full runoff and sediment loss quanties could not be worked out due to omission of measurements on many events from all watersheds. However, sediment yields were quite low in the catchments except Dharsimal. The high sediment load in Dharsimal is attributed to untreated hilly slopes under regular cultivation farmers. Growth of trees and grasses is rather poor in afforested area also. A Policy decision needs to be made to treat the fields owned by the farmers in the catchment area. Selection of erosion resisting crops and adoption of proper conservation cultivation techniques by farmers will go a long way in curbing erosion.

Forest personnel posted at micro watersheds could not regularly collect and furnish the data from the micro watershed. If data had been collected, analysis of rainfall, runoff and water samples could lead to exact computations and assessment of water discharge and sediment flow rate into the reservoir. However, based on the limited, disjointed information available on rain fall, terrain, vegetation and soil conditions it is felt that it will be possible to get adequate clean water in reservoir from the catchment in normal rainfall years with minimum adverse affect, on its useful life.

The project is of great national importance. The study needs to be extended for atleast three years to get meticulous continuous field information for analysis and interpretation of data and arriving at definite conclusion leading to further course of action.

ENVIRONMENTAL COST OF SSP

RELATED TO UNIT-LDAM:

1.7

A) Expenditure by project authorities

i) Cost of Survey & Studies (in Rs. lacs)

					LILLIAN		GURNEN		fotal	
being the play of the sale and the sale and the book	Estimate	Exp.	Estimate	Ехр	Estimate	Exp.	Estimate	Exp.	Total Estim.	Total Exp.
CAF	4 52	4.52	5.29	5 29	2.44	2.44			12.25	12.25
CAT	8 77	8.77	7	7	3.28	2.8			19.05	18.57
F&F	101.84	80.47	38	16	20.33	20.2	15.27	15.3	175,44	131.94
Health	. 2.5	2.5	10	.2.5	29.63	27.84			42.13	32.84
Arch./Anth.	1.3	0.6	N.A.		59	36.33			60.3	36.93
Seismicity	5.05	5.07	N.A.		23	12.5	1.98	1.93	30.03	19.55
CAD	11 25	11.25					NA.		11.25	11.25
							fotal (i)		350.45	263.33

ii) Cost of Implementation (in Rs. la lacs)

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	Estimate	Exp.	Estimate	Exp.	Estimate	Enp.	Estimate Es	φ. Total Estim.	Total Exp.
CAF	1809 10	1722.82	2116.00	1650.27	1800.00	907.90		5725.10	4280.99
CAT	3509 00	2776.67	2894.67	2218 27	8835,05	4002.76		15238.72	8997.70
F&F	75.31	64.42	117.00	2335 26	NA			192.31	2399.68
FISH			102.10					102.10	-
HEALTH	3890 00	192.28	546.60	9 26	1354.63	521.20		5701.23	722.74
ARCHA	NT 156 00	95,55			7()(),()()	12.97		856,00	108.52
SEIS.	219 57	318,55						219.57	318.55
CAD	NA						NA		
							Total (ii)	23035.03	16828.18
							Total (i & ii)	28385.48	17091.51

N.A. Not available

ANNEX- XXXI-Min.(4).

द्भंतरा जागर परियोजना

इंदिरा तागर परियोजनांतर्गत डूब में आने बाले कुल मामों के पुरात्त्वीय तर्देश का गर्म विभाग द्वारा पूर्ण कर लिया गया है एवं उत्तमें विखरी पुरात्त्विया के पुरात्त्विया के पुरात्त्विया के पुरात्त्विया के पुरात्त्विया के पुरात्त्विया के पुरात्त्विया विश्वा गया है तत्तुवार इंदिरा तागर परियोजना के अंतर्गत मात्र पुरात्त्विया का डाक्यूमेंदिशन प्रतिवार संकलन तथा हेड़ीमा त्थित पुरात्त्वीय दीले का उत्त्वन तथा हम्डवा में लंगालय का निवर्गण कार्य त्रिमालित था अत्रवय वर्तमान में हेडीनेमा त्थित दीले का उत्त्वन क्या गया एवं हम्बन तथा हम्बन दीले का उत्त्वन क्या गया एवं हम्बन दीले का उत्त्वन क्या गया एवं हम्बन क्या गया एवं हम्बन हम्बन हम्बन हम्बन हम्बन के इय देन ने प्रतिवारण कार्य कार्यकान कार्यकान कराया गया है तंजलित प्रतिवार्ण निम्नानुतार है:-

जिला होशंभाखाद

ं ग्राम उचाँ, विछीला, देड्निमा, तथा टण्डिया

25 प्रतिमारं

क लिया देवाय

गाम राजीर, नेमापर, खातेगांव, नवाडा, निमनपुर, वैप्यत ४९ प्रतिमार

3. जिला सम्बद

ग्राम धार। जो उला,जगोटी,जवगांब,वडवेशवर, आसागुर,नयघाट,वाति

60मृतिगारं

134 प्रतिगाएँ

दात प्रकार संग्रहित प्रतिमाणं किया संग्रहाण्य होशंगावाय,येवात गणा किया पुरातत्व संघ संग्रहालक खण्डमा में संग्रहित हैं ।

देविशा तागर परियोजना के अंतर्गत द्वा में आने बाने कुल गामों में विक्री पुरात देविया के तंक्या में प्राप्त भारतीय लोक प्रशासन तंत्र्यान के तक्या में प्राप्त भारतीय लोक प्रशासन तंत्र्यान का अन्य संदेश कराया गया है। नर्म्या नियंत्रण प्राप्तिकरण के 31 बी बैठक के स्थेण्डा के तंत्रम गिम्म्थल - 12 क्ष्मुंबर 61-62 पर तथा पृष्ठ 63-64 पर दी गयी पुराह करों एवं स्थारकों की तूनी बस्तुतः भारतीय पुरास तब तर्वेथम प्राप्तिक क्षिण करायो गये तर्वेदम के आधार पर तैमार का गयी है। जो तही है। उस तंत्रम में भारतीय में पर तक्या भी तक्षी है। जो तही है। उस तंत्रम में पर तेमार का गयी है। जो तही है। उस तंत्रम में पर तेमार का गयी है। जो तही है। उस तंत्रम में पर तेमार का गयी है। जो तही है। उस तंत्रम में पर तेमार का गयी है। जो तही है। उस तंत्रम में पर तेमार का गयी है। जो तही है। उस तंत्रम में पर तेमार का गयी है। जो तही है।

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केवल सरकारी प्रयोग के लिए



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल **ENVIRONMENT SUB-GROUP**

बत्तीसवीं बैठक की कार्यसूची AGENDA FOR THE 32ND MEETING

स्थान: पर्यावरण भवन, नई दिल्ली

VENUE: PARYAVARAN BHAWAN,

NEW DELHI

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दिनांक: 14.10.1998

DATE: 14.10.1998

समय: 3.00 **बजे**

TIME: 3.00 P.M.

इन्दौर **INDORE** अक्टूबर, 1998

October, 1998

AGENDA FOR THE 32ND MEETING OF ENVIRONMENT SUB-GROUP OF NCA

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AGENDA FOR THE 32ND MEETING OF ENVIRONMENT SUB-GROUP OF NCA

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Item No.XXXII-1(149): CONFIRMATION OF MINUTES OF THE 31ST MEETING.

Minutes of the 31st meeting of Environment Sub-group of Narmada Control———Authority were circulated to all Members and invitees vide letter No.Env-3(31)/98/324-57 dated 2nd March, 1998.

Comments received from Dr. Shekhar Singh, IIPA, New Delhi vide his letter dated 9th April, 1998 addressed to the Chairman, Environment Sub-group are placed at *Annex-XXXII-1* (page-1).

The minutes are put up for confirmation.

Item No.XXXII-2(150): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

- 1. Submission of Catchment Area Treatment (CAT plans for freely draining critically degraded sub-watersheds [Item No.XXII-2(112).
- A) Submission of micro watershed plan for freely draining critically degraded sub-watersheds by Govt. of Maharashtra and Madhya Pradesh.

i) FORMULATION OF SCHEMES

As per the decision of Govt. of India of June, 1992, the project authorities were required to submit Action Plan for treatment of balance of the critically degraded sub-watersheds within the freely draining catchment.

Govt. of Gujarat

There is 29,157 ha of catchment in Gujarat. Govt. of Gujarat have almost completed the treatment of the entire freely draining catchment within the Narmada basin.

Govt. of M.P.

Govt. of M.P. were required to submit schemes for treatment of subwatersheds covering both forest and non-forest areas spread to 3,52,089 ha.

So far Govt. of M.P. have submitted 16 no. of schemes spread to 38,324.28 ha. area. Out of this 10 no. of schemes spread to 20,844.01 ha pertains to SSP and 6 no. of schemes spread to 17,480.27 ha pertains to ISP. All these schemes are approved by the funding agencies under RVP scheme and are under implementation.

According to the information received from Govt.of M.P., about 3,730 ha. area from these schemes in SSP was treated up by the end of June, 1998. Latest progress may please be appraised by Govt. of M.P.

Govt. of Maharashtra

Govt. of Maharashtra were required to submit schemes for treatment of subwatersheds spread to 80881 ha. area covering, both forest and non-forest land.

Forest Areas

In pursuance of the discussions of 31st meeting, 35 no. of schemes for treatment of forest areas covering 41,973.15 ha. were received from Govt. of Maharashtra. These reports were reviewed in NCA office & observations thereon are presented at *Annex-XXXII- 2* (page-3). Govt. of Maharashtra may submit the schemes with full details on treatment of forest areas.

Non-Forest Areas

GOM, informed that 13 schemes have already been approved under RVP However only one schemes for sub-watersheds Na7a was submitted and it was reported that a total 7,027 ha. of forest non-forest land was treated up by the end of March, 1998. Balance schemes are yet awaited.

GOM may please inform the status of progress on preparation & submission of schemes

ii) POLICY ISSUES

Env Subgroup, while reviewing the progress of catchment area treatment works desired to explore the possibility of increasing the duration of treatment from the present three years, to five years, on the request by the representatives of the states for taking up this issue with the MOA. It was informed that NCA & NVDA had approached the MOA for a consideration. Jt. Commissioner, MOA was requested to convene a meeting to review this issue. Response is yet awaited.

B) Silt monitoring:

During the 31st meeting, Sub-group was informed by NVDA that a detailed plan for establishing silt monitoring stations was under preparation and that the monitoring station would be established before the monsoon of 1998.

Progress made in this regard may please be presented by GOMP for a review by the subgroup.

During 31st meeting, GOG presented a report on silt monitoring exercises being carried out by CSWRTI. The report highlighted that due to primitive agriculture methods, silt outflows from forest lands encroached by the tribal(s) for agriculture, were very high. GOG assured to look into this aspect by encouraging agro-forestry and/or other suitable agricultural practices.

Progress made in this regard may please be presented by GOG for a review by the Sub-group.

2. Cost Estimates for preparation of Action plan and implementation of environmental safeguard measures [Item No.XXII-2(112)(2)].

During 31st meeting of the Sub-group the state Govts, were requested to update the estimates for environmental safeguard measures at 1996-97 price level. Information in this regard is yet awaited.

Information as available in NCA is placed at *Annex-XXXII- 3(Page-4)*. This may please be updated/confirmed by the State Govts.

3. Establishing a separate authority for coordinating Environmental works in Maharashtra [XXVIII-3(136)(1)].

Sub-group during its 31st meeting recognising the need for better interdepartmental coordination stressed establishing an agency, like NVDA in M.P. and SSNNL in Gujarat, in Maharashtra also . A letter in this regard was addressed by the Chairman to GOM.

GOM desired having a model TOR for the needful. NVDA & SSNNL were approached by NCA to provide a copy of their TOR to GOM. These are yet awaited. However, draft TOR for the proposed authority in Maharashtra was drafted by Environment Wing of NCA and sent to GOM copy placed at Annex-XXXII-4 (Page-5) Members may like to discuss.

4. Publications on Environment (XXVIII-3(136)ii):

electricities and the entrice of the

During 28th meeting of the Sub-group, it was suggested that the project authorities should identify thrust areas on environmental issues and make suitable scientific and popular publications on the good works being done by them. During 31st meeting, Sub-group, reviewed the progress made by GOMP and GOG and observed that thrust areas have been identified and work was making progress.

Further progress may please be reported by GOG and GOMP.

No information is yet received from GOM. Earlier, Chairman had suggested that highlight of plantation activities in Maharashtra may be published. Detailed information may please be presented by the GOM for a review by the Sub-group.

5. Catchment area treatment works in Maharashtra - cost aspect [XXX-2(123)(7)]

Narmada Control Authority during it's 55th meeting held on 13.11.1996 desired that the cost norms for treating catchment area in Maharashtra may be looked into by the ESG. Sub-group discussed the issues during 28th to 30th meeting and it was agreed that the cost estimates for treatment works varies with features like topography, soil type, menu of treatment etc. have to be viewed accordingly.

Comparative cost estimates of CAT works in MP & Maharashtra based on the plans were considered. A brief note on comparison of estimates (for CAT in Forest Area) is placed at *Annex-XXXII - 5* (page - 14) for information of the members.

NVDA, SSNNL & GOM were requested to send their expenditure statement on CAT works to NCA. This is yet awaited.

6. Monitoring of R&R aspect of Narmada Sagar Project (XXV-2(123)(3)

During 31st meeting held on 20.1.98, the Chairman ruled that R&R Subgroup of NCA would monitor the R&R aspect of Narmada Sagar Project also. In the light of the decision of Environment Sub-group, this issue was discussed during 41st meeting of R&R Sub-group of NCA held on 28.4.98 where it was agreed to refer the matter to NCA for a final decision. The matter was discussed during 57th meeting of NCA held on 1.7.98. During discussion, Additional Secretary, MOWR stated that the Narmada Water Scheme stipulated that NCA was responsible for overall coordination and direction of the implementation of all the projects in the basin including rehabilitation aspects. Jt. Secretary, MOEF stated that under the Environmental (Protection) Act, 1986, clearance had been given for both Indira Sagar project and Sardar Sarovar project with the stipulation that NCA on behalf of MOEF will ensure that Environmental Safeguard Measures are implemented paripassu with the progress of work on the project. Member (E&R), NCA pointed out that environmental clearance had been accorded by MOEF jointly for SSP and ISP and therefore the same set of stipulation for monitoring will apply to both projects. He further stated that Environment Sub-group of NCA was already monitoring the other environmental safeguard measures like CAT, compensatory afforestation, health aspect etc. on ISP and on the same analogy, R&R Sub-group of NCA should also monitor the resettlement aspect of ISP. Further the Secretary, MOSJ&E also expressed the opinion that no separate Sub-group was required for ISP and the existing R&R Sub-group could discharge the functions of monitoring of R&R of ISP also. NCA agreed to amplify the TOR of the R&R Sub-group to include ISP also. R&R sub-group of NCA during its 42nd meeting held on 6th August, 1998 amplified its TOR to include monitoring of ISP. A draft TOR as proposed by the R&R Subgroup is placed at Annex-XXXII - 6 (page - 21). A revised notification from NCA is expected soon. This is for information of the Members.

Item No.XXXII-3(151): PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS.

The present status of studies, surveys and action plans in brief is presented below for a review by the Sub-group. A copy of the status report for the quarter ending June, 1998 is placed at *Annex-XXXII* - 7 (page -23)

1) PHASED CATCHMENT AREA TREATMENT

Narmada Sagar Project

Government of Madhya Pradesh

As per the information available in the office, against a total target of 62,975 ha an area of 39,983 ha was treated by the end of June'98. Out of 39,983 ha area treated so far, 1561 ha area was treated during 1997-98.

Sardar Sarovar Project

The cumulative progress by all the three states reported so far is 1,11,636 ha (62%) against the total target of 1,79,180 ha..

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh had planned to treat 1,25,725 ha area, out of which an area of 60,878 ha was treated up by the end of June, 1998. The cumulative progress reported so far is 49% of the total targets.

Govt. of Gujarat

Govt. of Gujarat had taken up the entire catchment area upstream of the Sardar Sarovar Project, in Gujarat, for treatment. By the end of June, 1998, against a target of 29,157 ha. an area of 28,995 ha was treated up The cumulative progress reported so far is 99.44% of the total targets.

Govt. of Maharashtra

GOM had planned to treat 24,298 ha covering forest and non-forest areas. By the end of June, 1998, works on an area of 21,763 ha were completed. The cumulative progress reported so far is 89.56% of the total target. Further progress, if any, may please be reported by GOM.

ii) COMPENSATORY AFFORESTATION

Narmada Sagar Project

Govt. of Madhya Pradesh

Compensatory afforestation works over an area of 67,133 ha against a target of 80,945 ha were reported to have been completed by the end of June, 1998. Progress of plantations during 1997-98 was reported as 3,305 ha.

• Sardar Sarovar Project

Govt. of Madhya Pradesh

By the end of June, 1998, Govt. of M.P. had completed plantation works over an area of 8,433 ha against a final target of 8740 ha. This works out to be 96.5% of the total targets.

Govt. of Gujarat

By the end of September, 1994, Govt. of Gujarat had completed plantation works in the entire planned area of 13,950 ha. (including both non forest and degraded forest areas).

Officers from NCA during 1st week of February, 1998 visited compensatory afforestation site in Distt. Bhuj, a copy of the observations is placed at Annex - XXXII - 8 (page - 57). GOG may like to indicate the action taken on the suggestions offered.

Govt. of Maharashtra

Out of a total area of 19,468 ha planned for treatment in lieu of the areas undergoing submergence, an area of 19,303 ha were reported to have been planted up by the end of June, 1998. However detailed location map of some of the districts where compensatory afforestation works are progressing is yet awaited.

A preliminary report on the suggestion given during the 27th meeting for taking up scientific observations concerning improvement of the area planted up was annexed with the minutes of the 28th meeting, further report may please be presented.

iii) COMMAND AREA DEVELOPMENT

• Narmada Sagar Project

Programme and progress of works on construction of canal networks as per the information available in this office is presented in Annex - XXXII - 9 (page-61). This may please be confirmed by the NVDA.

Outlines of the terms of references (TOR) for the integrated development of the command area of NSP annexed with agenda papers of the 27th meeting were reviewed by the sub-group during 28th meeting & it was suggested that detailed terms of reference may be drafted by the NVDA on the lines of TOR framed by the GOG for the command area of SSP. Copies of the TOR for the studies on integrated development of the command area in Gujarat were made available to NVDA. Draft TOR for integrated development of the command area may please be presented for a review by the Sub-group.

During the 27th meeting, it was informed that an allocation of Rs.24.5 lakhs had been made by NVDA for the work on collection of data for study on use of insecticides, pesticides in the Command of NSP. During the 30th meeting, it was informed that NVDA had constituted a committee to monitor the progress of works periodically. Results of the monitoring may please be presented.

• Sardar Sarovar Project

Govt. of Gujarat

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Progress of works on construction of canal networks as per the information available in this office is presented in Annex-XXXII - 10 (page-62). This may please be confirmed by GOG.

During the earlier meetings, Sub-Group noted that a number of studies were commissioned by the Govt. of Gujarat on the Command Area Development. These reports were required to be categorised on the basis of issues addressed in each report. Accordingly, a list of the relevant studies giving details of the issues addresses in each report was sent to the Members vide this office letter No.Env-4(5)/98/ dated 3.9.98 for their observations.

Regarding, preparation of plan for integrated development of the command area, it was suggested that the Planning Commission had prepared certain maps which may be useful in this endeavor. Govt. of Gujarat was requested to get in touch with DDG, ICAR to expedite the issue.

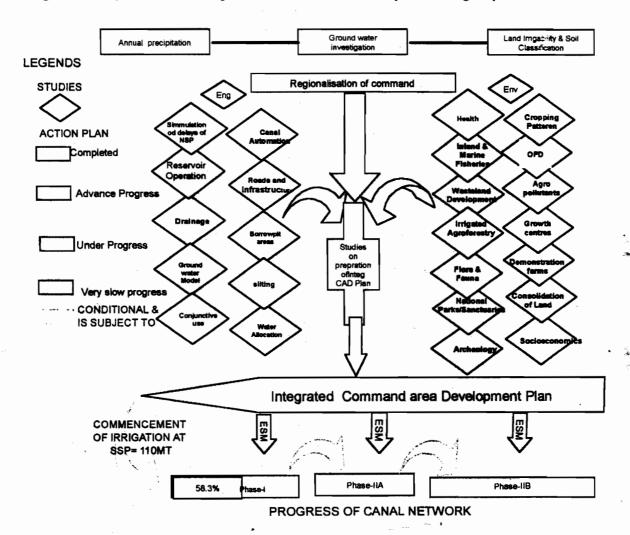
On the issue of Irrigated Agro-forestry in SSP, during 31st meeting SSNNL proposed to prepare a draft plan for the scope of Agro-forestry development in first phase of command area of SSP and a meeting was arranged with Scientists of Gujarat Agriculture University & State Forest officials. Further progress in this regard may please be reported.

Govt. of Rajasthan

Progress of works on construction of canal networks as per the information available in this office is presented in Annex- 11 (page 64). This may please be confirmed.

Environmental impact assessment studies for Sardar Sarovar Project were entrusted to WAPCOS and draft final report was in the process of approval by the State Govt. Further progress may please be reported by Govt. of Rajasthan.

During 31st meeting on 20.1.98 the Chairman of the Sub-group desired that available basic data on various aspect of command area development works is to be looked into for developing a frame work on compliance. Accordingly, a diagrammatic presentation is given below for a review by the Sub-group.



As shown above, 58.3% of the work on canal network of Phase-I was completed by the end of June, 1998. Commencement of the irrigation through Phase-I is subject to implementation of required environmental safeguards in Phase-I command of the SSP in Gujarat. Detailed progress on preparation of the plan and it's implementation may please be reported by GOG.

iv) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

A) Narmada Sagar Project

A large number of studies completed for the Indira Sagar Project (NSP) were reviewed by the Committee of experts convened by NCA for indicating the actions needed for protection of flora & fauna. Key recommendations were reviewed by the Sub-group during its 31st meeting held on 28.01.1998. NVDA agreed to process the declaration of prime areas of ISP (NSP) catchment as national park/sanctuaries as recommended by the experts. The Chairman stressed the need for spirited follow-up of the process leading to the declaration of National park/sanctuaries. He desired that current status of notification may be reported to the Sub-group. This is yet awaited.

B) Sardar Sarovar Project

Govt. of Madhya Pradesh

EIA report on Impact zone of SSP in M.P. was submitted by SFRI in 1993. This report was reviewed during the 2nd meeting of the Expert Committee on Flora & Fauna held on 26th September, 1996. Expert group in view of the enlargement of Shoolpaneshwar sanctuary in Gujarat border in Maharashtra & proposal for creation of Park/Sanctuaries for ISP in M.P. recommended that there was no need for creation of none Park/Sanctuaries in M.P. or Maharashtra, even though recommended in the study reports. Action taken by GOMP on other recommendations of the study group may please be reported.

Govt. of Gujarat

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Action plan on Development of Shoolpaneshwar Sanctuary was reviewed by the sub-group during its last meeting held on 28.01.1998. Progress on implementation of action plan may please be reported.

Govt. of Maharashtra

The issue of flora & fauna was reviewed during the 2nd meeting of experts convened by NCA during September, 1996. During the meeting it was suggested that GOM should adopt only certain measures for increasing the carrying capacity of the adjoining forest for accommodating wildlife moving out from the submergence area. The final report of the University of Poona was also made available to all members, by NCA during August, 1997. GOM was requested to draw up an action plan based on-recommendations of the study group and that of the experts. Progress in this regard may please be reported by GOM.

During 31st meeting held on 20.1.98 it was decided that action plan expected from GOMP and GOM should be linked to intermediate stages of the construction programme i.e. 85m, 90m and so on in steps of 5m. The needed

action plan from GOMP and GOM are awaited. GOMP and GOM may please report the progress.

v) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Narmada Sagar Project

Govt. of Madhya Pradesh

During 31st meeting held on 20.1.98, NVDA informed that protection/ relocation of 10 monuments besides excavation of additional 5 sites have been included in the revised Action Plan.

While reviewing the issues related to the protection of intake well of Joga fort, Sub-group formed a Committee which was notified vide NCA letter No. Env-4(11)/98/409 dated 10th March, 1998 for undertaking field visit and for making suitable recommendations.

The first meeting of this committee was held on 20.5.1998. The committee agreed in principle that only representative monuments need to be protected. On the issue of Joga Fort, the committee suggested to have an on-the-spot assessment of Joga Fort with all engineering details to ascertain its submergence due to ISP and method of its protection. Field visit was undertaken on 20.7.98. During the visit, it was observed that

- The main body of the Joga fort at EL + 274.00 m was much above the FRL, however north bastion, top at EL + 263.00 M., was enclosing a well within. The top of this well was having an EL +261.00 M.
- At FRL 262.10 M, the north bastion would get surrounded by the reservoir water and well would get submerged. The well therefore was considered as affected by the ISP.
- It was observed that the bastion did not bear any sign of scouring action of river. The outer plaster, which might have been used for maintenance, had fallen at two patches. It was suggested that shotcreting around the wall on both the side might be adequate measure. A copy of the inspection note is placed at Annex-XXXII -12 (page -65)

Observations during the field visits were discussed during the 2nd meeting convened on 1st September 1998. Bhopal office of ASI, proposed construction of retaining wall around the north bastion in receding tiers at a distance of 5 meters upto 1 m above the FRL. details of the proposal are awaited from ASI. During the meeting it was also suggested to get the wall reconstructed. Director (Exploration) of ASI agreed to bring available alternatives to the notice of the DG,ASI for a final view. Progress may please be reported by the ASI, for a review by the members.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Sub-group reviewed the compliance status of the monuments affected by SSP during its 31st meeting. Accordingly seven monuments were to be relocated by GOMP. Temples located at Semalda and Barda were required to be relocated before the dam height could be raised to 110m. NVDA may please present the current status of the works.

Govt. of Gujarat

Out of the two temples proposed for relocation, one temple viz. Shoolpaneshwar temple was already relocated. Regarding 2nd temple, GOG informed during the 31st meeting that 50% work on relocation of Hampheshwar temple was already completed and it was likely to be completed by the end of this year.

Further progress may please be reported by GOG.

Govt. of Maharashtra

No work was proposed in Maharashtra

ANTHROPOLOGY

CONTRACTOR CONTRACTOR

• Sardar Sarovar & Narmada Sagar Projects

On the issue of providing benefits and privileges to the SC and ST categories being resettled in Gujarat, it was informed that the issue was under consideration of the Govt. of India, Ministry of Social Justice & Empowerment. It was also informed that in the meantime, Govt. of Gujarat have made arrangements for providing the benefits to ST PAFs of M.P. Progress in this regard may please be reported by the Govts.of Gujarat and Madhya Pradesh.

Progress on procurement of the balance publication related to Tribals of Narmada from An.S.I. may also please be reported by the NVDA.

vi) SEISMICITY AND RIM STABILITY OF RESERVOIR

Narmada Sagar Project

Govt. of Madhya Pradesh

NVDA during the 31st meeting informed that supply of seismic instrument had commenced. GOMP may present the status of its establishment.

Sardar Sarovar Project

Govt. of Gujarat

For regular monitoring of the seismicity in the vicinity of the reservoir, a total of 9 seismic stations have been planned. Out of 9, works on 8 stations have been completed. GOG may please present the status of the functioning of the seismic monitoring network.

vii) HEALTH ASPECTS

To assess the adequacy of preventive and curative measures being planned by project authorities, & to review their implementation , a meeting of experts on health from Premiere institutes and officers of the Health Deptt of all the three states namely Gujarat, Madhya Pradesh & Maharashtra was held on 22.5.1998. Following emerged from the discussions.

Narmada Sagar Project

- NVDA submitted a detailed statement on costing for providing the facilities as proposed in the Health Plan submitted during 1990. The estimated cost is valued at Rs.748.73 lakh.
- The issues addressed in the draft reports on Epidemiological Surveillance Study, Gandhi Medical College, Bhopal were discussed during the meeting of experts on health convened by NCA on 22.5.1998 and suggestions regarding desired focus of studies & the need for reviewing the reference baseline data were offered.

Sardar Sarovar Project

- GOMP agreed to provide detailed phasing of the incremental facilities proposed in the plans. GOM also agreed to provide the details of their action plan before the next meeting of the Environment Sub-group.
- It was informed by GOMP during the meeting that water quality data would be collected for 10 years and agencies were being identified to take up this work. It was also agreed by GOMP to provide the details of water quality monitoring stations on the Narmada river within M.P. from where data was being/would be collected. Progress may please be reported. It was agreed that GOG & GOM would also collect and compile the data on water quality on the suggested parameters for developing action plan.
- During the meeting, it was decided that GOG would arrange a visit of experts from MRC, Delhi to project areas for on-the-spot assessment and suggestions on the need for a geographical reconnaissance survey and efficacy of lining etc. to address the preventive aspect of Malaria.

- it was suggested that there was a need to inform the public to the possible health risk that may be generated by the project and suggested remedial actions through mass communications methods like screening of video films, distribution of pamphlet etc. in the local languages. The committee discussed the steps being taken by project authorities to make people aware on health aspects.
- It was suggested that there was a need to include schemes for motivation like income generating and service delivery schemes in the health programme. It was also suggested that keeping in view of the fact that the project area were mostly inhabited by tribal, there was a need for sensitising the officer to the difficulties of working in such areas and their training to the new development in the field of medical sciences.

GOMP, GOG and GOM may please present the progress on all the above aspects for a review by the Sub-group.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR

restricted to the tent of the tent to the

A meeting of a small working group, constituted by the High Level Expert Group on Fisheries Development & Conservation was held on 6.8.98 to amalgamate the draft guidelines for conservation & development of fisheries in the reservoir, streams, revulets & the command area. This was followed by the field visit of the experts from Ministry of Agricultural, I.C.A.R., Govt. of Gujarat & NCA. The recommendations of the group shall be discussed during 5th meeting of High Level Expert Group to be convened soon. Progress shall be reported during the meeting.

Item No. XXXI-4(152): Strengthening of Environment Wing of NCA

To adhere to the requirement of necessary clearances on Environmental Control, granted by Ministry of Environment & Forests to the SSP & NSP, a large number of studies for the twin projects have been completed and Action Plans are under advance stage of planning and implementation. Voluminous data is generated for the SSP and NSP on a basin-wide approach, extending throughout the basin in Madhya Pradesh, Maharashtra and Gujarat and outside it to the command in Gujarat and Rajasthan. It is necessary to have interactive rational data base.

Chairman of the Sub-group, while reviewing the implementation of Environment Safeguard Measures during the last meeting of the Environment Sub-group, desired that the Information Technology system should be strengthened.

Action has been taken to acquire, computer hardware and GIS software in NCA. It is desirable that the NCA should be strengthened to meet the requirement of environmental planning, research & monitoring of SSP & NSP areas.

Item No. XXXI-4(149): ANY OTHER ITEM:

DATE & VENUE OF THE NEXT MEETING

AMNEXURE



Dr.(Mrs.) Nalihi Bhat Additional Director

D.O.No.3-87/80-IA.I.

ANNEX - XXXII (1)

तार:

Telegram: PARYAVARAN,

NEW DELHI

दूरभाष

Telephone : 4360478

टेलेक्स :

Telex: W-66185 DOE IN

FAX: 4360678

भारत सरकार

पर्यावरण एवं वन मंत्रः चय GOVERNMENT OF INDIA MINISTRY OF ENVIRONMENT & FORESTS पर्यावरण भवन, सी. जी. ब्रो. कॉम्पलेक्स PARYAVARAN BHAVAN, C.G.O. COMPLEX लोदो रोड, नई दिल्ली-110003

LODHI ROAD, NEW DELHI-110003

April 29, 1998.

Dear Dr. Pawan Kumar,

Enclosed please find a copy of letter dated 9th April, 1998 from Shri Shekhar Singh, Member, Environment Sub Group of NCA on the Minutes of the 31st meeting of the Sub Group which were circulated by NCA on 2nd March, 1998.

2. You may like to analyse the letter and include it in the agenda for the next meeting of the Sub Group.

With regards,

Yours sincerely,

(Nalimi Bhat)

Dr. Pawan Kumar, Specialist (Environment), Narmada Control Authority, 113-BG, Scheme No.74-C, Vijay Nagar, Indore452 010 (M.P.).



भारतीय लोक प्रशासन संस्थान

इन्द्रप्रस्थ एस्टेट, रिंग रोड़, नई दिल्ली-110 002 • दूरभाष : 331 7309 (9 लाइन)

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION

INDRAPRASTHA ESTATE, RING ROAD, NEW DELHI-110 002 GRAMS: ADMNIST • FAX: 011-331-9954 • PHONES: 331-7309 (9 LINES)

589

9 April, 1998

Dear Shri Anand,

Kindly refer to the minutes of the 31st meeting of the Narmada Control Authority's (NCA) sub-group on environment, circulated vide NCA letter of 2 March, 1998. On page 15 of the said minutes it has been stated, in relation to the presentation made by the Narmada Project authorities on compliance with the pari passu clause, that the Chairman 'suggested that in case, Dr Singh desired to improve the presentation further, he may come forward with concrete suggestions.' In the meeting I had disagreed with the interpretation of the pari passu clause that the project authorities had put forward. You had agreed that the question of satisfactory compliance should be left open till I have had an opportunity of communicating my objections and reasoning to the sub-group. Accordingly, I am enclosing a note on the pari passu clause, for the consideration of the sub-group and of your ministry.

In this context, the second para on page 16 of the said minutes is not correct. As stated earlier, you had agreed to leave the question of compliance with the *pari passu* clause open and <u>had not</u>, as reported in the minutes. agreed with the assertion of the MD, SSNL, that compliance with the *pari passu* clause was reasonably satisfactory. The minutes may accordingly be amended.

I might also point out that on page 2 of the said minutes it is stated that the points raised be me in my letters placed at Annex-XXXI-2 of the agenda would be taken up under any other item. However, these were not discussed and, as such, may kindly be included in the agenda for the next meeting.

Finally, I would be grateful if the earlier practice of fixing the date of the next meeting in the last meeting is again revived. Whenever this is not possible, at least two weeks notice must be given for a meeting. The notice usually given for the meetings is so short that it is often difficult to cancel all prior commitments in order to attend.

With regards,

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ULP

Yours sincerely

Shekhar Singh

Member

NCA sub-group on the environment

Shri Vishwanath Anand, IAS

Secretary, Ministry of Environment and Forests

Government of India

New Delhi

Encl. aa

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ANNEX-XXXII-(2).

CENTRALLY SPONSORED SCHEMES FOR SOIL CONSERVATION INDIRECTLY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS - TREATMENT AREA AND COSTS MAHARASHTRA

					GROSS LAN	DAREA (HA.)				·	······································		THEA	TABLE LAND AR	EA			IREAIMENT C	OSTS (LAC RS)
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		FOREST	AGRICULTURE	WASTE	TOTAL	FOREST	AGRICULTURE	WASTE	TOTAL	FOREST	AGRICULTURE	WASTE	TOTAL	FOREST (PHY)	FOREST (FIN)	NON FOREST(PHY)	NON FOREST(FIN)	FOREST	NON FOREST
1	Ma7g	408	738	131	1275	537	NA	NA	_	250	NA	NA		N/A	N/A	N/A	NVA	22	N/A
	NoTY	1289	243	0	1512	1200	N/A	NA		795	N/A	NA		N/A	N/A	NA	N/A	59 13	NVA
1	Netha	770	844	N/	ina:	ננח	NA	184		Who	164	IWA.		the	144	100	100	40 In	100
•		1433	361	79	1062	1246	NA.	N/A		984		NA			, NA	N/A		63 //	184
5	NeSq	2083	1450	49	3562	2033	N/A	. NA		1117	N/A	NA		N/A	NA	N/A	. NA	97 05	N/A
	Nulls	1297	824	54	2175	1351	N/A	N/A		635	NA	NA		N/A	N/A	N/A	N/A	55 13	NA
	Hallf Seesakat acamericisis	751	1894	155	2600	906	N/A	, N/A		170	NA	N/A		N/A	N/A	NA	N/A	14 51	
		590	1286	10	1875	229 77	N/A	NA		216 77	1511		1804 77	NVA		1312	513	17.07	79 19
	Medv	903	1432	91	2125	625	N/A	N/A		441	NA	NA		NA	N/A	NA	N/A	38 22	N/A
10	Netr	520	548	140	1225	677	NA	N/A		NII .	N/A	N/A		N/A	N/A	NA	N/A	N	NA
_!1	Me2n	1214	1792	74	3080	2411	NA	N/A		1284	NA	N/A		N/A	N/A	. NA	N/A	103 17	NA
12	Note	1776	732	117	2625	1879	N/A	N/A		1500	378	12	1989	NA	N/A		15 52	125 94	17 55
13		1199	921	- 80	2200	1279	N/A	. NA		1229	850	11	2090	NA	NA	390	23 56	98.8	35 48
	AH 10.398 Samura AM LOSS II	1341	1472	24	2837	1500	N/A	N/A		291 66	729	0	1020 88	NA	NA	463	27 21	22 98	34.01
15	Half	1959	116		2075	1959	NVA	N/A		1783	N/A	N/A		N/A	NA	NA	N/A	. 153 34	N/A
16	MeZe	1745	507	- 11	2263	1518	N/A	N/A		415	N/A	N/A		NA	NA	N/A	N/A	36	NA
_17	Neith	984	1218	720		984	. NA	N/A		NI	N/A	N/A		NA	N/A	NA	NA.		
18	Heading	1658	242		1900	1296	N/A	N/A		1234	N/A	NA		N/A	N/A	NA		106 84	NA
19	Madk	591	661	73	1325	400	NVA	N/A		27	N/A	NA		. NA	N/A	N/A	N/A	4 05	N/A
20	Netk	462	1957	31	2450	862	N/A	N/A			N/A	NA		N/A	N/A	N/A	N/A	4 49	NA
21	Nulls	1119	624	169	2112	1288	. N/A	N/A		664	NA	NA		N/A	NA	N/A	N/A	57 55	
_22	Helly	446	1719	60		632	NA	N/A		130	NA	NA		N/A	NA				NA
23	Made	1913	400	80		1399	N/A	N/A		508	N/A	N/A		N/A	N/A	N/A	N/A	44 08	NA
_24	Nežp	881	2551	18	3450	2593	N/A	NA		596	N/A	N/A		NA	N/A	, N/A	N/A	51,91	NA
25	Na2h	1485	2077	38	4400	2036	NA	NA		956		NA		N/A	NA		Maria Contractor	83 18	
_26	Nailp	748	506	146	1400	809	N/A	N/A		536	NA	N/A		N/A	N/A	NVA			N/A
27	Nest	746	954		1700	541	NA	N/A		317	N/A	NA		N/A	N/A				NA
28	Ne7d	1640		6	2312	1846	N/A	N/A		1487	, NYA	N/A		N/A	NA	NA		127.67	
_29	· Nw7)	1204	1885	208	3175	1490	N/A	NA		935	NVA	N/A		N/A	NA			81.36	
30	Massq	2282	577	18	2875	2298	. NA	N/A		745	N/A	_N/A		N/A	N/A	NVA		54.86	N/A
_31	Me7h	1314	1056	105	2475	1418	NA	N/A		919	NA			NA					NA
10	Neden	679		42	1637	711	N/A	NA		. 451	NA	NA		N/A	NA	N/A	NA.	39.00	, NA
33	NeSd Tarangayanghorau	695	905		1900	095	WA			5/4	N/A	, NA		N/A	N/A	NVA	NY.	494	N/A
_34		1211	1541	473	3225	790 38	N/A	NA		NR.	1686	73	1759	N/A	NA	814	34 48	. No	84 35
35	THE REAL PROPERTY.	1580	773	54	2387	N#	N/A	N/A		NII	910	1580	2490	N/A	N/A	1132	44 98	NJ	84 55
	TOTAL	40819	30949	3313	60861	41973 15				21865 63	6084	1853				4401	197 03	1890 49	335 14

[:] Total 13 sub watershed project reports for the non forest areas are approved, but not received in NCA.

illustribitis. Details of these 6 sub watershed projects under progress are available "Total progress upto 3/98 is reported as 7/027 hecteres in the approved projects

NCA has no far received all 30 acts water discissions so deleting estimates of breathers of forest areas only, other details are said available.

NA : Not Available/Not Reported

ANNEX - XXXII - (3).

ENVIRONMENTAL COST OF SSP

RELATED TO UNIT-I DAM:

A) Expenditure by project authorities

i) Cost of Survey & Studies (in Rs. lacs)

= 1	GOG		GOM		GOMP		GOR/NCA		Total	
	Estimate	Ехр.	Estimate	Exp.	Estimate	Ехр.	Estimate	Ехр.	Total Estim.	Total Exp.
CAF	4.52	4.52	5.29	5.29	2.44	2.44			12.25	12.25
CAT	8.77	8.77	7	7	3.28	2.8			19.05	18.57
F&F	101.84	80.47	38	16	20.33	17.63	15.27	15.27	175.44	129.37
Health 🐼	2.5	2.5	10	2.5	29.63	27.84			42.13	32.84
Arch./Anth.	1.3	0.6	N.A.		59	36.33			60.3	36.93
Seismicity	5.05	5.07	N.A.		23	12.5	1.98	1.98	30.03	19.55
CAD.	11.25	11.25					N.A.		11.25	11.25
							Total (i)		350.45	2 60. 7 6

ii) Cost of Implementation (in Rs. lac lacs)

	GOG		GOM		GOMP		GORINGA	Total	
STATE OF THE STATE	Estimate	Exp.	Estimate	Exp.	Estimate	Exp.	Estimate	Exp. Total Estim.	Total Exp.
CAF	1809.10	1722.82	2116.00	1650.27	1800.00	831.16		5725.10	4204.25
CAT	3509.00	2776.67	2894.67	2218,27	8835,05	3008,53		15238.72	8003.47
F&F	75.31	64.42	117.00	2335.26	NA			192.31	2399.68
FISH			102.10					102.10	
HEALTH	3800.00	192.28	546.60	9.26	1354.63	521.20		57 01. 2 3	722.74
ARCH\ANT	156.00	95.55			700.00	12.97		856.00	108.52
SEIS.	219.57	318,55						219.57	318.55
CAD	NA						NA		2
							Total (ii)	28035.03	15757.21
\$976.DA	Allerines Principal Straight Res	the received in the special configuration and		ACCOUNT OF THE PARTY OF THE PAR	CHARACTAP TO CH	CITY OF STATE STAT	Total (i & ii)	28385.48	16017.97

ANNEX-XXXII-(4).

Juma 18, 1998.

No.Env-3(31)/98//658

Τo

Shri V.S. Dhongde
Director (Environment)
Environment Department
New Admn. Bldg., 15th Floor
Madam Cama Marg, Mantralaya,
MUMBAI - 400 032.

Sub: Formation of the State Level Authority for Coor@inating Environmental works of SSP in Maharashtra.

Ref: Your letter No.NCA/1098/46/CR-2/T.C.1/247, dt. 20.4.98

Sir,

Please refer to your letter under reference and find enclosed herewith a copy of the suggested draft terms of references for the formation of a State Level Authority for Co-ordinating Environment and R&R works of Sardar Sarova: Project in Maharashtra. It may please be noted that these guizelines are only suggestive and shall be put up for a review by the Eubgroup during it's 32nd meeting to be convened shortly. We are also enclosing a copy of the terms of references of Environment Sub-group whereas terms of references from M.P. and Gijarat would be sent no sooner these are received in this office.

Hope that the enclosed terms of references would help you to frame the terms of references of the suggested authority in Maharashtra.

Thanking you,

Yours faithfully.

DR. PAWAN KIMAR

(DR.PAWAN KUMAR)
Specialist (Environment)

Encl: As above.

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NARMADA ENVIRONMENT AUTHORITY, MAHARASHTRA

An Act to provide for the establishment of an Authority for effective implementation of the environmental safeguard measures including resettlement & rehabilitation of the Sardar Sarovar Project area in Maharashtra.

It is hereby enacted as follows:

PART-I

INTRODUCTORY

1. Short title, extent and commencement

- (i) This Act may be called the Narmada Environment Authority Act, 1998
- (ii) It extends to the Narmada river basin areas in Maharashtra.
- (iii) It shall come into force on such date as the State Govt. may, by notification in the official Gazette, appoint in this behalf.

~2. Interpretation:

In this Act, unless the context otherwise requires:

- a. "Authority" means the Narmada Environment Authority established under semion-3;
- b "Fund" means the Narmada Environment Fund constituted under section 12:
- c "Members" unless the context otherwise requires, means of Member of the Authority and includes the Vice-Chairman of the Authority;
- d "Environmental Safeguard Measures" include among other key aspects like CAT.

 Compensatory Afforestation, Flora & Fauna (terrestrial & aquatic), Health, R&R.

 Seismicity, Rim-stability, Archaeology, Anthropology and Water Quality;
- e. "Prescribed" means prescribed by rules made under this Act;
- f. "Regulations" means regulations made by the Authority under this Act;
- g "Rules" means rules made by the State Govt. of Maharashtra under this Act.

PART-II ESTABLISHMENT OF THE AUTHORITY

3. Incorporation:

- (i) With effect from such date as the State Govt. may, by notification in the official Gazette, appoint in this behalf, there shall be established an Authority by the name of the Narmada Environment Authority.
- (ii) The said Authority shall be body corporate by the name aforesaid, having perpetual succession and a common seal with power, subject to the provision of this Act, to acquire, hold and dispose of property, both movable and immovable and to enter into contract and agreements and shall by the said name sue and be sued.

4. Constitution of the Authority:

- (i) The Authority shall consist of following members namely:
- 1.(i) a Vice-Chairman, not below the rank of Addl. Secretary to the Govt. of India to be appointed by the State Govt.
- (ii) a Member each (two in all), not below the rank of Joint Secretary to the Govt. of India, to represent respectively the Environment and Rehabilitation to be appointed by the State Govt.
- 2. No act or proceedings of the Authority shall be invalid by reasons only to the existence of any vacancy amongst it's member or any defect in the appointment of a member thereof.

5. Conditions of service of Members

- (i) Every member shall be a full-time member of the Authority.
- (ii) The remuneration and other conditions of service of the members shall be as applicable in the State of Maharashtra.

- Appointment of officers and staff
 - (i) The Authority shall have an Administrative Officer and a Chief Accounts Officer to be appointed by the Vice-Chairman of the Authority.
 - (ii) The Authority may appoint such other officers and staff as it considers necessary for the efficient performance of it's function.
- 7. Conditions of service of officers and staff:

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The pay and other conditions of service of the officers and the staff of the Ambority shall be as applicable in the State of Maharashtra.

PART-III

FUNCTIONS AND DUTIES OF THE AUTHORITY

- 8. The Authority shall perform such of it's duties, functions and such of it's powers within the project area as the State Govt. may, by notification in the official Gazette specify from time to time.
- 9. Subject to the provisions of this Act and rules framed thereunder, the Authority shall carry-out and perform the following functions:
 - I. The Authority shall act as the principal co-ordinating agency for preparations of various plans and their implementation by different departments of the Govt. of Naireashtra.
 - II. The Authority shall gause various studies to be completed for the formulation of plans.
 - III. The Authority shall cause various environmental data to be collected by a number of agencies, compile the same for preparation of Environmental Management Plan.
 - The Authority shall cause the plans to be implemented by various departments of Govt. of Maharashtra.
 - V. The Authority shall cause to implement, after due formulation of regulations. for water management within the jurisdiction of State of Maharashtra.

VII. The Authority shall keep a record of all meetings and proceedings, maintain regular accounts and have a suitable office where documents, records, accounts shall be kept open to inspection by NCA or it's representative.

VIII. The Authority shall deal with any matter which is supplemental incidental or consequential to the above functions or to the conditions of MOEF's clearance of projects or to the recommendation of NCA.

IX. The Authority shall enter into such contracts and agreements as may be necessary and essential to the full and proper performance of the functions and duties conferred.

X. The Authority shall ensure pari-passu compliance on various environmental safeguard measures like CAT, Compensatory Afforestation, Flora & Fauna, R&R and Health.

XI. The Authority shall get the cost estimates prepared for various environmental sanguard measures and get it approved by NCA.

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PART-IV

POWER

- 10. The Authority shall have the power to do anything which may be necessary or expedient for the purposes of carrying out it's functions under this Act.
- 11. Without prejudice to the generality of the foregoing provision, such power shall include the power:
- to prevent pollution of Narmada river under it's jurisdiction and to take all necessary measures to prevent discharges into such water effluents which are harmful to water supply, irrigation, public health or aquatic life;
- to undertake resettlement of the population displaced by the project, acquisition of land of reservoirs protection of watersheds and development of fisheries in the reservoirs,
- to undertake measures for the prevention of vector borne and water borne diseases.

PART-V

FINANCE, ACCOUNTS AND AUDITS

- 12. The Authority shall have it's in own fund namely Narmada Environment Fund to be provided by State Govt, out of it's budgetary allocations and all receipts of the Authority shall be credited thereto and all payments by the Authority shall be made therefrom.
- 13. The fund shall be applied to:

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- For meeting the salary, allowances and other remuneration of the Vice-Chairman, officers and other employees of the Authority and other administrative expenditure of the Authority.
- For meeting the expenditure on surveys, investigation, consultancies and other activities undertaken by the Authority.
- For meeting the cost of construction, operation and maintenance activities undertaken by the Authority.
- For meeting other expenses of the Authority in discharge of it's functions under this Act.

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- 14. The Authority shall prepare in a such format and at such a time as may be prescribed it's budget for the next financial year. Showing the estimated expenditure and shall place the same before the Authority for approval. Thereafter, it shall be transmitted to the relevant department.
- 15. The Authority shall maintain detailed and accurate accounts of all receipts and disbursements and shall after the close of each financial year, prepare an Annual Statement of Accounts and submit it to State Govt. The form of the Annual Statement of Accounts shall be such as may be prescribed.
- 16. The accounts maintained by the Authority shall be audited by the Comptroller and Auditor General of India or his nominee, who shall certify subject to such observations, as he may wish to made on the Annual Accounts of the Authority.

Ancey-III

ENVIRONMENT SUB-GROUP COMPOSITION AND FUNCTIONS

(-)	Outros divine				
Ja)	Composition -		•	(b)	Functions
ر ب ر ر ر	Secretary to the Government of India, Ministry of Environment and Forests	Chairman	· c '	i) 	To work out the environmental safeguard messures to be planned and implemented for the entire Narmada. Basin so that environmental safeguard measures are executed and remain fully in consonance with the
ر ه.	Executive Member,NCA	Member			clearance accorded to the Narmacia Sagar and Sardar Sarovar Projects.
ريز ر	/ice-Chairman, Narmada Valley Development Authority. GOMP	Member		ii)	To determine the terms of reference of required surveys and studies necessary for implementation of
(* (Secretary (Env.) GOM	Member			environmental safeguard measures inclusive of data base required, the methods by which the data base is
<u> </u>	Secretary (R&R), Narmada Development Department, GOG	Member			to be prepared and also to identify the institutions/individuals to undertake the precaration of such documents.
(6.	Secretary, Env. Department, GOR	Member		iii)	To get prepared for clearance by the Ministres and NCA the action plans with regard to all emacumental safeguard measures and the assessment criteria thereof.
7 7.	Commissioner (PP), MOWR	Member			
€8.	Deputy Director General. ICAR	Member		iv)	To devise a suitable monitoring and evaluation mechanism so that the action class are effectively implemented in consonance with simulations at the time
C 9.	Deputy Inspector General, MOE&F	Member			of clearance of the projects.
	•			v)	To assess the necessary organisation with
10.	Director, Wild life institute Dehradun.	Member		••	management capability being set up for adequate implementation of environmental safeguard measures.
11.	Dr.S. Ramaseshan, Professor, Indian Institute of Technology, Kanpur.	Member			
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		and the same of th	and the second of the second o	ng man makka
12.	Director General, Anthro- pological Survey of India.	Member / vi)	To undertake all sees —necessary to assis: Nam	
13.	Dr. Shekhar Sing 7. Faculty Member, IIPA, New Delhi.	Member	Control Authority in planning and implemental safeg	the
14.	Dr. Ashok Khosla, President, Development Alternatives,New Delhi. or		measures.	
	Dr. R.K. Katti, Retd Prof. I.I.T. Bombay	Member		•
15. •	Director Archaeological Survey of India	Member	-	
16.	Expert on Health, National Inst. of Communicable Disease (NICD)	Member		
17.	Expert on Flora	Member		,
18.	Member (E&R),NCA	Member - Secretary		
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A Note on Comparison of Costs of CAT works in Maharashtra, Madhya Pradesh & Gujarat.

As per guidelines of MOWR the state Govts. were required to prepare project reports/Action Plans for the Catchment Area Treatment works for Directly Draining subwatersheds as their treatment costs being charged to the project. Accordingly the State Govts. of M.P, Maharashtra & Gujarat prepared the action plans for catchment area treatment.

Statement-I (A&B)contains the cost norms adopted by GOM & GOMP of various heads of CAT works for first to fifth year of operations for different models and Statement-II contains the standard cost norms. The cost norm adopted by GOMP & GOM for CAT works were examined. A review of the comparative cost norms is presented below.

Observations:

Character and the state of the

CAT -II of GOM, & Model- II of GOMP being similar in prescription were compared & it is observed that the catchment area treatment cost in Maharashtra is Rs 15,718 per ha. and Rs 9,434 per ha. in M.P

Action plans were studied in detail for ascertaining the reasons for differences in the cost estimates of the two states & following observations are made.

- The plantation density is about five times more in subwatersheds in Maharashtra than that proposed for Subwatersheds in Madhya Pradesh.
- In Madhya Pradesh coppice growth is available in the CAT areas. This was considered in their CAT plan. This require less expenditure as compared to fresh plantations.
- In the GOM plans the provision is made for new nurseries whereas no such provision is being made in Madhya Pradesh ,possibly due to nurseries already existing in M.P.
- Subwatersheds in Maharashtra may have mulching material and consequently debris require slash burning, whereas there is no such mulching material in the areas under treatment in M.P.
- Expenditure on contingencies/ labour welfare is 7% in Maharashtra whereas 5% in
- In addition to provision made for labour welfare in the estimates in Maharashtra. daily wages rates are also higher in Maharashtra resulting into higher costs for all manual operations
- Cost of nursery & transportation is more in Maharashtra owing to difficult terrain.

- In Maharashtra more than 50% of the treatment area is covered with steep slopes. More/larger engineering structures, (Nalla bunds, gully plugs etc.) are therefore proposed for soil conservation work, requiring more expenditure (about 10 times) as compared to M.P.
- Additional item of Trench Cum Mound is provided in the treatment measure of CAT works in Maharashtra.
- In Maharashtra most of the catchment is facing north and is cooler as compared to south facing hillocks. This may require more costs for insecticides weeding etc., under treatment measures.
- Apart from the expenditure involved in CAT works the establishment costs per hectare in relatively more for Maharashtra, being Rs.1900/- as against Rs.1215/for Madhya Pradesh.
- In addition, it is proposed in Action Plan of Maharashtra for creating New Forest circle with four divisions. A provision is therefore made in the Action Plan of Maharashtra towards purchase of new vehicles & construction of staff quarters, which adds to the per hectare cost of treatment as against Madhya Pradesh.

The Action Plan for Gujarat state pertains to the year 1990 and per hectare treatment costs are much less about Rs.5,900/- per hectare. (for Soil & Moisture conservation works, with plantation of 2000 plants/ha.).In absence of breakup of costs estimates they were excluded from comparison statement.

Different CAT models were proposed in the Action Plans for different categories of land depending upon the, location, extent, topography, terrain, scope, soil cover, vegetative cover, type of land etc. existing in the subwatersheds.

CONCLUSION:

The cost norms framed by the GOM & GOMP appears to be in line with the standard cost norms & practices prevalent in respective States.

COST OF CATCHMENT AREA TREATMENT (FOREST AREA): Rs./ HECTARE (ESTIMATES OF APRIL 1993)

I PYO/PPO

S.N. ITEM		G	DM :					GOMP			REMARK
:	CAT-I	CAT-H	CAT-III	Total for GOM	AFFORESTATION	M-1	M-2	M-3	SILVIPASTURE	Total for GOMP	
1 Survey & Demarcation of Areas	15.5	13.5	13.5		50 .00	50	50	50	50.00		
Demarcation by trench 0.45X0.10X10 in some areas	60.75	60.75									
	76.25	74.25	13.5		50.00	50	50	50	50.00		
2 Site clearance					70.00	70.00	70.00	70.00	70.00		
3 Preparation of treatment Map	14.8	10	10		10	10	10	10	10		
4 Closure :											
(a) Houndary Pillars					125	125	125	125	125		
(b) CPT/CPW					1200	1200	1200	1200	1200		
			, , , , , , , , , , , , , , , , , , , ,		1325	1325	1325	1325	1325		
5 Alignment of pits		94.50									
Pit digging (30 cm3),in M.P 500 no., in Mah. 2500 no.		1,755.00					250.00		250		
		1,849.50					250.00		250		
6 Contour trench (3300) or Pit digging (2200) 500 No. 45 cm3	1,122.66		243.00		2200	1,100.00	1,100.00	1,100.00	1,100.00		
7 Excavation of TGM		1,071.10	1,122.66								
8 Soil Conservation Works					500	500.00	500.00	500	500		
Nalla Bund & Gully Plug		1,053.00	1,080.00								
C/s bunds - (earth & loose boulders) i/c 278 pits of .6X.6X.6	5,310.00										
	5,310.00	1,053.00	1,080.00		500	500.00	500.00	500	500		
9 Cut Back operations						400.00	400.00	400			
10 Nursery cost	606.2	1355.8	143.5		900	450	440		440		
11 Preperation of grass beds (8X1.75X1.15 M @100 G.B /Ha)			810.00						700		
12 Purchase of seeds for sowing on G.Bs			500.00								
13 Burning of rabs		310.50									
14 Inspection road/Approach Road	135.00	135.00	27.00								
sub-total	7,264.91	5,859.15	3,949.66		5,055.00	3,905.00	4,145.00	3,455.00	4,445.00		
15 Contingencies @ 3 %	217.95	175.77	118.49		230.00	165.00	176.00	141	118.00		
16 Labour welfare @ 4%	290.60	234.37	157.99								
Grand Total	7,773.45	6,269.29	4,226.14		5285	4,070.00	4,321.00	3596	4563		
SAY	7,773.00	6,270.00	4,226.00		5,285.00	4,070.00	4,321.00	3,596.00	4,563.00		

II FYO

S.N ITEM		GOM					GOMP		REMARKS
	CATH	CAT-II	CAT-III	AFFORESTATION	M-1	M-2	M-3	SILVIPASTURE	
1 Nursery costs		855	87.48	450	225.00	220		220	
2 Transportation	164.16	450	57	659	240.00	95.00		95.00	
3 Refilling of pits / trenches,500 nO. ,45CM3		810	135						
4 Sowing of seeds	301.6	104.00	283.50	508	220	220.00	390	330	
5 Reburning of rabs		54.00							
6 Planting								185	
(a) Agave in TCM		32.40	21.60						
(b) Khus					263				
(c) Polypots 500 No.						185.00			
2500 No.		510.00	36.50						
		542.40	58.10		263	185.00			
7 Weeding & casualty replacement		1,913.50	117.45	639	220	300.00	500	300	
8 Purchase of fertilizers		116.00	4.50	130	0	-		50	
9 Watch & ward		291.60	291.60		288	288.00	288	288	
10 Fire protection/tracing	14.80	27.00	14.58	10	10	10.00	10	10	
11 Cost of insecticides i/c application		17.42							
12 sub-total	480.56	5,180.92	1,049.21	2,388.00	1,466.00	1,318.00	1,188.00	1,293.00	
13 Contingencies @ 3 %	14.42	155.43	31.48	115.00	70.00	65.00	60	44.00	
14 Labour welfare @ 4%	19.22	207.24	41.97						
Grand Total	514.20	5,543.58	1,122.65	2503	1,536.00	1,383.00	1248	1337	
Add 15% for difficult terrain	77.13								
	591.33								
SAY	591.00	5,550.00	1,123.00	2500	3,570.00	3,821.00	3096	1522	

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III_C S.Y.O

S.14	ITEM		GOM					GOMP		REMARK
į		CAT-I	CAT-II	CAT-III	AFFORESTATION	M-1	M-2	M-3	SILVIPASTURE	
1	Nursery costs		85		150	75.00	72		72	
2	Transportation		79.95		25	30.00	13.00		13.00	
3	Wooding & casualty replacement		1,512 00	68.85	315	110	150.00	250	150	
4	Purchase of fortilizors									
5	Watch & ward	394.20	394.20	394.20	288	288	288.00	288	288	
6	Fire protection/tracing	14.58	27.00	14.58	10	10	10	10	10	
7	Singling operations					250	250.00	250	:	
	sub-total	408.78	2,098.15	477.63	788.00	763.00	783.00	798.00	533.00	
8	Contingencies @3%	0.00	62.94	14.33	40.00	40.00	40.00	40	16.00	
9	Labour welfare @ 4%	0.00	83.93	19.11						
	Grand Total	408.78	2,245.02	511.06	828	803.00	823.00	838	549	
	Add 15% for difficult terrain	61.32								
		470.10	2,245.00	511.00	828	803.00	823.00	838	549	
	SAY	470.00	2,245.00	511.00	828	803.00	823.00	838	549	

III T.Y.O

S.N	ITEM		GOM						GOMP		REMARKS
		CAT-I	CAT-II	CAT-III	AF	FORESTATION	M-1	M-2	M-3 ·	SILVIPASTURE	
1	Weeding		337.50	20.25						150	
2	Watch & ward	394.20	394.20	394.20		288	288	288.00	288	288	
3	Fire protection/tracing	14.58	27.00	14.58		10	10	10	10	10	
4	Singling operations										
5	sub-total	408.78	758.70	429.03		298.00	298.00	298.00	298.00	448.00	
6	Contingencies @3%	0.00	22.76	12.87		15.00	15.00	15.00	10	16.00	
7	Labour welfare @ 4%	0.00	30.35	17.16							
	Grand Total	408.78	811.81	459.06		313	313.00	313.00	308	464	
	Add 15% for difficult terrain	61.32									
		470.10	811.81	459.06		313	313.00	313.00	308	464	
	SAY	470.00	811.00	459.00		313	313.00	313.00	308	· 549	,

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V FOURTH.Y.O

S.N	ITEM	~	GOM						GOMP		 REMARKS
		CAT-I	CAT-II	CAT-樹		AFFORESTATION	M-1	M-2	M-3	SILVIPASTURE	
1	Weeding										
2	Watch & ward	394.20	394.20	394.20	· ·	288	288	288.00	288	288	
3	Fire protection/tracing	14 50	27 00	14 58		10	10	10	ţo	10	
! [sub-lolal	408.78	421.20	408.78		298.00	298.00	298.00	298.00	298,00	 <u> </u>
	Add 15% for difficult terrain/contingencies	61.32				15	15.00	15.00	15	10	
		470.10	421.20	408.78		313	313.00	313.00	313	308	
	SAY	470.00	421.00	409.00		328	328.00	328.00	328	308	<u> </u>

VI FIFTH.Y.O

S.N	ITEM		GOM						GOMP		 REMARKS
		CAT-I	CAT-II	CAT-III		AFFORESTATION	M-1	M-2	M-3	SILVIPASTURE	
1	Weeding										
2	Watch & ward	394.20	394.20	394.20		288	288	288.00	288	268	
3	Fire protection/tracing	14.58	27.00	14.58		10	10	10	10	10	
	sub-total	408.78	421.20	408.78		298.00	298.00	298.00	298.00	298.00	
	Add 15% for difficult terrain/contingencies	61.32				15	15.00	15.00	15	10	
		470.10	421.20	408.78	1	313	313.00	313.00	313	308	
-	SAY	470.00	421.00	409.00		328	328.00	328.00	328	308	

SUMMARY OF TREATMENT COST

ITFM		GOM						GOMP			REMARK
PYO/PPO	CAT-I	CAT-II	CAT-III	Total GOM	AFFORESTATION	M-1	M-2	M-3	SILVIPASTURE	Total for GOMP	
COST / HECTARE	7773	6270	4227		4785	3570	3821	3096	4063		
AREA OF TREATMENT	3800	11200	5000	20000	9652	6232	6232	6232	9652	38000	
TOTAL COST OF TREATMENT (LAC RS.)	295.37	702.24	211.35	1,208.96	461.85	222.48	238.12	192.94	392.16	1,507.56	
FYO											
COST / HECTARE	591.00	5,550.00	1,123.00		2500	3,570.00	3,821.00	3096	1522		
AREA OF TREATMENT	3800	11200	5000	20000	9652	6232	6232	6232	9652	38000	
TOTAL COST OF TREATMENT (LAC RS.)	22.46	621.60	56.15	700.21	241.30	222.48	238.12	192.94	146.90	1,041.75	
S.Y.O											
COST/HECTARE .	470.00	2,245.00	511.00		828	803.00	823.00	838	549		
AREA OF TREATMENT	3800	11200	5000	20000	9652	6232	6232	6232	9652	38000	
TOTAL COST OF TREATMENT (LAC RS.)	17.86	251.44	25.55	294.85	79.92	50.04	51.29	52.22	52.99	286.46	
T.Y.O											
COST / HECTARE	470.00	811.00	459.00		313	313	313	308	549		
AREA OF TREATMENT	3800	11200	5000	20000	9652	6232	6232	6232	9652	38000	
TOTAL COST OF TREATMENT (LAC RS.)	17.86	90.83	22.95	131.64	30.21	19.51	19.51	19.19	52.99	141.41	
FOURTH.Y.O											
COST / HECTARE	470.00	421.00	409.00		328	328	328	328	308		}
AREA OF TREATMENT	3800	11200	5000	20000	9652	6232	6232	6232	9652	38000	
TOTAL COST OF TREATMENT (LAC RS.)	17.86	47.15	20.45	85.46	31.66	20.44	20.44	20.44	29.73	122.71	
EIETH.Y.Q											
COST / HECTARE	470.00	421.00	409.00		328	328	328	328	308		
AREA OF TREATMENT	3800	11200	5000	20000	9652	6232	6232	6232	9652	38000	
TOTAL COST OF TREATMENT (LAC RS.)	17.86	47.15	20.45	85.46	31.66	20.44	20.44	20.44	29.73	122.71	
GRAND TOTAL OF COST OF TREATMENT (LAC RS.)	389.27	1,760.42	356.90	2,506.59	976.59	555.40	587.93	498.19	704.50	3,292.25	
	,					٠	- 7				
TOTAL COST /HECTARE (Rs.)	10,244.00	15,718.00	7,138.00	12,532.94	9,082.00	8,912.00	9,434.00	7,994.00	7,299.00	8,663.82	

RESETTLEMENT & REHABILITATION (R&R) SUB-GROUP COMPOSITION AND FUNCTIONS

COMPOSITION		FUNCTIONS
Secretary to the Govt. of India Ministry of Social Justice & Empowerment	- Chairman	i) To monitor the progress of land- acquisition in respect of submergence land of Sardar Sarovar Project and Narmada Sagar Project.
2. Executive Member, NCA	- Member	ii) To monitor progress of implemen-
3. Addl. Chief Secretary (R&R), Narmada Development Deptt., GOG	- Member	tation of the plan of rehabilitation of affected villages at the selected sites
4. Addl.Chief Secretary Vice Chairman, NVDA, GOMP	- Member	in concerned States. iii) To review the initial or first phase
5. Principal Secretary (Revenue & Relief), Govt. of Maharashtra, Mumbai	- Member	plan from time to time in the light of results of the implementation.
6. Principal Secretary (R), Govt. of Rajasthan	- Member	iv) To finalise details of the subsequent phases of resentlement and renabilitation of the villages.
7. Commissioner (PP), Ministry of Water Resources	- Member	v) To review the reports of the agencies entrusted by each of the States in
8. Member (Reh.), NVDA, GOMP	- Member	respect of monitoring and evaluation
Secretary, Tribal Development, Govt. of Maharashtra, Mumbai	- Member	of the progress in the matter of resettlement and rehabilitation.
10. Commissioner, Tribal Welfare Development, GOMP.	- Member	vi) To monitor the progress of land acquisition at the subsequent phases.
11. Commissioner (R) & CEO, SSPA, GOG	- Member	vii) To monitor and review implemen- tation of resettlement and rehabili-
12. Director, Tribal Research & Training Institute, Gujarat Vidyapeeth	- Member	tation at the subsequent phases.
13. Dr. V.J. Patel, Jivarajbhai Agro Forestry Centre (JAFC), Gujarat	- Member	co-ordination amongst States/ Agencies in the matter of Resettle-
14. Dr. Vimal P. Shah, Head of Sociology Deptt., Gujarat University, Ahmedabad	- Member	ment and Renzbilitation pertaining to SSP & NSP.
15. Shri K.R. Datye, Consulting Engineer, Mumbai.	- Member	
16. Smt. Kanta Tyagi, Director, Kasturba Mahila Ashram, Niwali, Distt. Khargone (M.P.)	- Member	
17. One expert from JNU	- Member	
18. One expert from Delhi University/Social Science Institution in Delhi (Woman Representative)	- Member	
19. One more NGO from GOMP	- Member	4,4
20. Member (E&R), NCA.	- Member Secretary	

LIST OF INVITEES TO THE R&R SUB-GROUP

- 1. Additional Secretary, Ministry of Environment & Forests, Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi-3.
- 2. Vice Chairman, Sardar Sarovar Narmada Nigam Ltd., Govt. of Gujarat, New Sachivalaya Complex, Gandhinagar-382 010.
- 3. Managing Director, Sardar Sarovar Narmada Nigam Ltd., Govt. of Gujarat, New Sachivalaya Complex, Gandhinagar-382 010.
- 4. Joint Secretary/Deputy Secretary (TDB), Ministry of Social Justice & Empowerment, Shastri Bhawan, Dr. Rajendra Prasad Marg, New Delhi-110001.
- 5. Secretary, Sardar Sarovar Construction Advisory Committee, Narmada Bhawan, A-Block, 4th Floor, Indira Avenue, Vadodara.
- 6. Director (Rehabilitation), Narmada Control Authority, Indore.
- 7. Chief Engineer, Irrigation Department, North Maharashtra Region, Trayambak Road, Nasik-2.
- 8. Additional Commissioner (SSP), Dhule, Maharashtra.

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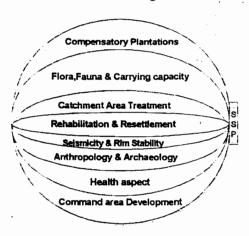
- 9. Dy. Secretary (SSP), Revenue & Forest Department, Govt. of Maharashtra. Mantralaya, Mumbai-400 032.
- 10. Director (R/TW), NVDA, Narmada Bhawan, Tulsi Nagar, Bhopal.
- 11. Director (R), Narmada Sagar Project, NVDA, Govt. of Madhya Pradesh, Narmada Bhawan, Tulsi Nagar, Bhopal.
- 12. Director (Field), NVDA, 380 Saket, Indore.
- 13. Collector, Khandwa District, Madhya Pradesh.
- 14. Deputy Commissioner (R), SSPA, Vadodara.

STATUS REPORT

SARDAR SAROVAR PROJECT (SSP) ENVIRONMENTAL ASPECT June, 1998

The action plans and status of studies and implementation of Environmental Safeguard Measures upto quarter ending June, 1998 is summarised in this report.

The parameters: The suggested environmental safeguard parameters are indicated in the fig below:



While resettlement and rehabilitation is dealt with separately, current status of other suggested parameters is presented hereunder.

1. CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

- more detailed surveys for prioritisation of the sub-catchments in the SSP area should be undertaken;
- a phased CAT programme should be prepared and implemented ahead of reservoir filling.

GOI issued a directive in June 1992 that, for the SSP, the project would bear the costs of the treatment of all critically degraded sub-watersheds draining directly into the reservoir. These watersheds were identified amongst those classified as either very high or high-priority categories by the All India Soil and Land Use Survey (AISLUS). The project would also be responsible for the treatment of those areas of the catchment which are directly damaged by the project activities.

In addition, plans are required to be prepared for the treatment of the balance of the critically degraded subwatersheds but the cost of this will be met from other orgoing schemes and in a timeframe to be determined.

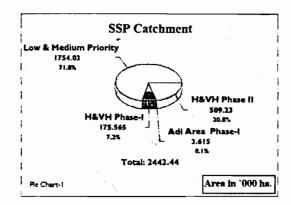
Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the SSP catchment. They are

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), 1985.
- Report on Priorisation of Subwatersheds in Subcatchments of Narmada Catchment, 1991 by AIS & LUSO, New Delhi.

Planning:-

The total catchment area of Sardar Sarovar Project below Narmada Sagar Dam is 24,42,440 ha. Out of this, 500 sub-watersheds spread to 6,88,410 ha. area are identified as



critically degraded sub-watersheds. These sub-watersheds have silt yield index 1,200 and above. Project authorities were required to prepare the plans for treating those of the above sub-watersheds which are

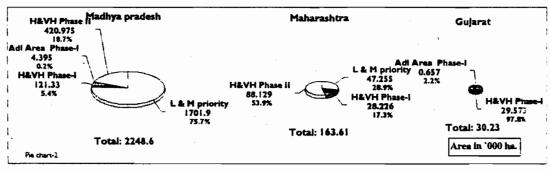
directly draining into the reservoir, as phase-I programme.

Pio Chart-I Exhibits status of

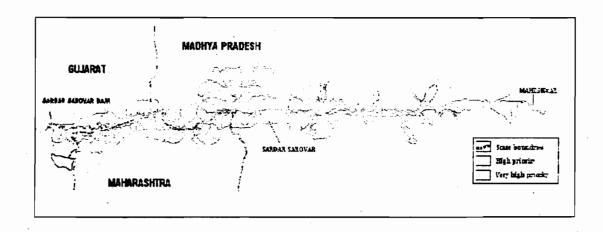
Pie Chart-1, Exhibits status of degradation in the SSP catchment

I. PHASE-I FREELY DRAINING (Directly draining sub-watersheds)

As per the data furnished by AIS&LUSO 1,75,565 ha was required to be treated at the cost of the project. Project authorities have however prepared the plan for treating additional area of 3615 ha. also. Trus an area of 1,79,180 ha. is being treated at the cost of the project and pari-passu with the project works. Fie chart-2 depicts position in the basin states of MP,Gujarat & Maharashtra



Map: Showing critically degraded directly draining sub watersheds of S.S:P

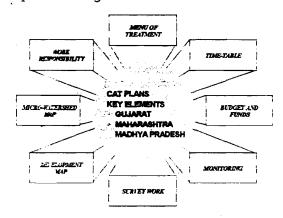


Action Plans:

The project authorities have submitted the action plans in varying stages of completeness. These plans contained information related to survey work, management options, monitoring & phased programme of treatment besides provisions for annual budget. The various stages in planning for each item of the plan is given in the Fig.-1.

→ Fig.-1. Flow chart of CAT planning by Gujarat, Madhya Pradesh and Maharashtra.

ELEMENTS OF ACTION PLAN :Key elements of the action plan received from GOG, GOMP & GOM are depicted in Fig.-2.



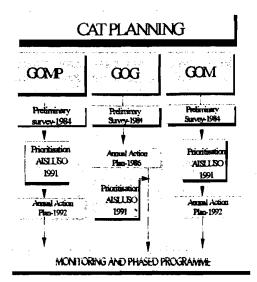


Fig.2: Action plan components

Implementation:

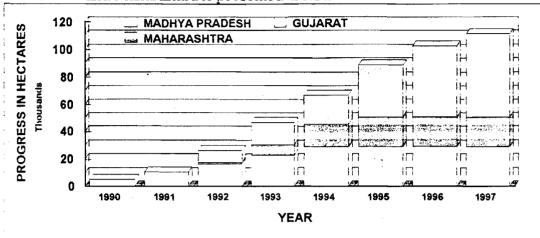
Project authorities have prepared the plans for treating 1,79,180 ha. area in about 10 years Govt of Gujarat started the time. treatment works w.e.f. monsoon of 1990 whereas Govt. of Maharashtra and Govt. of Madhya Pradesh could start the work in the year 1992. The progress of treatment works is detailed in the table and the bar chart-I drawn below:

♣ Table -1: Implementation of CAT plans:

Area under treatment = 1.79.180 ha Progress = 1.11.636 ha. Balance = 67.544 ha.

YEAR	GOG, FA	GOG N FA	TOTAL	GOM, FA	GOM N FA	TOTAL	GOMEP FA	GOMP N FA	TOTAL
1990	4,26.00	698.00	5,426.00	0 00	0.00	0.00	0.00	0.00	0.00
1991	4,770.00	230.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1992	6,014.00	336.00	- 6,350.00	960.00	0.00	960.00	0.00	8,800.00	00.003,8
1993	6,000.00	286.00	6,286.00	6,514.50	321.71	6.836.20	966.00	6,246.00	7,212.00
1994	5,730.00	168.00	5,898.00	6,541.97	2,686.17	9,226.14	4,263.00	594.00	4,657.00
1995	. 0.00	35.00	35.00	4,735.00	3.98	4,738.98	N/A	N/A	17,021.00
1996	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	14,482.00
1997	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	8,506.00
Total	27.042.00	1.953.00	28,995.00	18,751.47	3,011.86	21,763.32	N/A	N/A	60,878.00

Bar Chart-1: Cumulative progress of the CAT works in the State of MP, Gujarat and Maharashtra is presented below

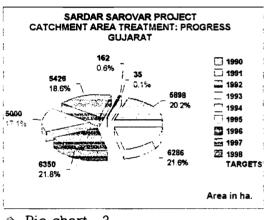


Govt. of Gujarat:

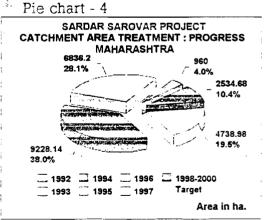
As the Catchment area of Sardar Sarovar was little in Gujarat, GOG accepted the recommendations of Diwan Committee and commenced the work of treating entire catchment area in the year 1990. By the end of 1994 forest area of 27 042 ha. & non forest area of 1951 ha. were treated. Treatment work is almost completed except for 162 ha. of non-forest area. Graphic representation of the progress is given in the pie chart-3.

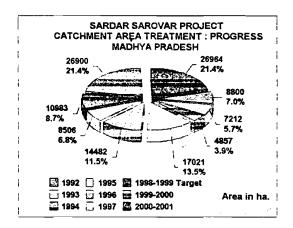
Govt. of Maharashtra:

Treatment works in Maharashtra could commence in the year 1992. By the end of March, 1998 forest area of 18,751 ha, and non-forest area of 3,011.86 ha, were treated. It is planned to treat the balance area by the end of 1999-2000 as given in the table-2. Graphic profile of the progress is given in pie chart-4.



Pie chart - 3.





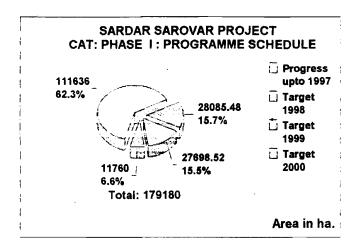
Govt. of Madhya Pradesh:

Treatment works in Madhya Pradesh could commence after submission of the revised work plan in 1992. By the end of June. 1998 a total of 60.878 ha area including both, forest & non forest areas was treated-up. The schedule to achieve the balance targets is given in the table-2 and progress is depicted in pie chart-5.

- Pie chart - 5

Balance Targets:

Against the planned target of 179,180 ha of CAT works for the SSP as a whole, an area of 1.11,636 ha was treated up by the end of June1998. It is proposed to treat the balance area in a three years period as shown in the pie chart-6 and detailed in the table-2.



Pie chart - 6

Table-2: Showing schedule for treating the balance areas.

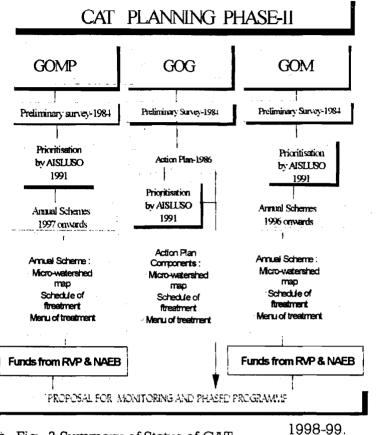
YEAR		GUJARAT		GUJARAT MAHARASHTRA			AS	MADHYA PRADESH		
	FA	IIFA	TOTAL	FA	HFA.	TOTAL	FA	NFA	TOTAL	
1997-98	162.00	0.00	162.00	450.00	165 00	515.00	N/A	N/A	10 983 00	
1998-99	0.00	0.00	0.00	798.52	0.00	798.52	N/A	N.A	26,900.00	
99-2000	0.00	0.00	0.00	1,121.46	0.00	1.121.48	ìŵA	N.A	26,964.00	
Γotal	162 00	0.00	162 00	3,370.00	165 00	2 535.00	NA	NA	64 847 01	

II PHASE-II Freely draining subwatersheds:

Project authorities were required to prepare plans for treating balance of the critically degraded subwatersheds. State Govts. Madhya Pradesh Maharashtra and plans.The have submitted the summary of the plan is given in the Fig.-3. The funds for treating these

areas have been promised by the RVP Scheme of Planning Commission, National Afforestation and Ecodevelopment Board etc. The plans are being revised in a phased manner in accordance with the guidelines of the funding agencies. Some of these plans have been approved by the RVP and NAEB. Works have commenced.

reconstruction of the state of



Planning Commission has agreed for inclusion of Narmada river catchment for treatment under its programme of River Valley Project Scheme. Funds are also promised by MOE&F from National Affor-& estation Eco-Development Work board. on 6 commenced schemes Maharashtra & others few Madhya Pradesh. Further 7 more schemes approved durina 1997-98. Work on these areas shall be taken up during

 Fig -3 Summary of Status of CAT Planning

A. Madhya Pradesh:

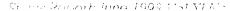
area Catchment Of Sardar Sarovar Project below Narmada Sagar in Madhya Pradesh is 5,46,702 This area includes the freely draining area attributable to Jobat, Maheshwar. Man. Omkareshwar Projects also as per the details given in the table-3. After subtracting such areas, the gross area of critically degraded Subwatersheds is 4,77,814 ha. Out of this, Govt. of Madhya Pradesh have prepared plans for treating 1,25,725 ha. area under directly draining category at the cost of the project. Therefore, the net area for which plans are required to submitted for Phase-II programme is 3.52,089 ha...

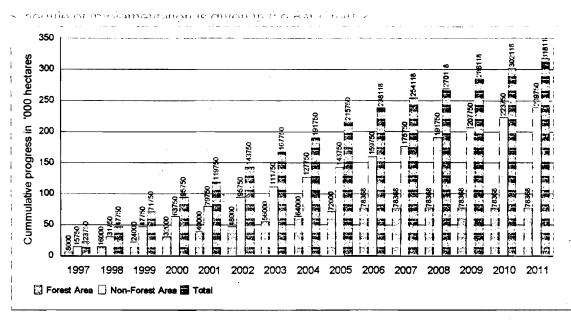
Table-3 Total Area of Freely Draining Critically Degraded Subwatersheds

Catchment belowNSP=5.46.702 ha. Gross = 3.52.089 ha. Net Treatable area = 3.18.118 ha.

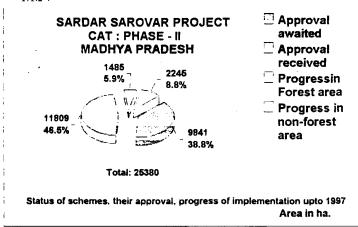
Project	Phase-I	Phase-II	Total
	(Directly	(Balance	Area
	Draining)	area)	
Jobat			28.211
Man			12.720
Maheshwar			13 209
Omkareshwar			14 745
SSP	1 25 725	3 52 089	4 ?? 814
<u> </u>		Total:	5 46.702

Post Private + marine Private





Bar Chart-2 Showing schedule of Implementation of Phase-II CAT works in M.P.



Pie chart-7 Showing Progress of CAT-II in M.P.

of

Implementation:

By the end of March. 1998. an area of 3730 ha. was treated. The status of submission of schemes. their approval, progress of implementation is shown

in the pie chart-7

B. Maharashtra:

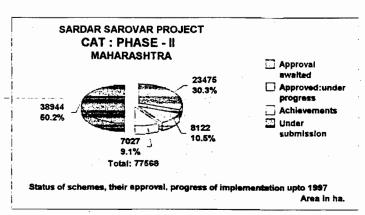
An area of about 77.568 ha. which is critically degraded freely draining is proposed to be treated as Phase-II programme under RVP, NAEB, etc. Schemes of the State and Central Govt. The area proposed to be treated includes 40.619 ha. of forest

land and 36.949 ha. of non-forest land. The status of submission of the revised schemes to the funding agencies is given in Pie Chart-8. The progress achieved by the end of June. 1998 was 7,027 ha.

Progress

Pie chart-8; showing progress of works on Phase-II areas in Maharashtra.

Gross area = 80,881 ha Net area = 77,568 ha. Progress = 7,027 ha.



2.COMPENSATORY AFFORESTATION

Approval for the diversion of forest land for the SSP was granted by the MOEF in 1987, 1990 & in 1993 (including for R&R works) but several conditions were attached relating to the planning and implementation of CAF. Principal amongst these are the following stipulations.

- For every hectare of forest land submerged or diverted for construction of the project there should be Compensatory Afforestation on one hectare of non-forest land plus reforestation on two hectares of degraded forest. This represents a two fold increase of the usual requirement.
- For 4,200 hectares of forest land in Maharashtra which is to be used for R&R, an equal area of non-forest land or double the area of degraded forest should be planted.
- The governments of the three states involved should prepare plans detailing their proposals for Compensatory Afforestation and submit these to the MOEF before work in the forest area is due to commence.
- The project should supply firewood to its construction workers, at its own cost, to prevent them from meeting their fuel needs from the surrounding forests.

Studies

There have been a number of studies in three states aimed at assessing the extent and significance of the loss of forest land attributable to the SSP.

- Sardar Sarovar (Narmada)
 Project Development Plan,
 Volume-II prepared by the Narmada Planning Group (NPG) in 1983.
- Studies on Ecology and Environment by M.S. University of Baroda (MSU) in 1983.
- Sardar Sarovar Project: Preparation of Environmental Work Plan by the Forest Department of Maharashtra in 1988.
- Eco-Environmental and Wildlife Management Studies on the Sardar Sarovar Submergence Area in Gujarat 1992 by MSU.
 Impact Assessment of Madhya
- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems by State Forest Research Institute Jabalpur (1989-92).
- Draft Final Report on Flora and Fauna In and Around Sardar Sarovar Project, Maharashtra by the University of Pune. Aug. 1997.

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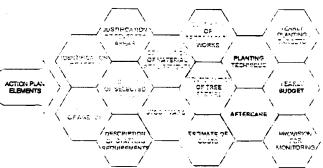
The Action Plans

In compliance with the conditions set by the MOEF, each state has prepared an action plan for the CAF of areas within its boundaries. The relevant documents are:

- Government of Gujarat Work Plan for Management of Environmental Effects, Section on Forests and Wildlife: The Compensatory Afforestation Plan for the Rann of Kutchchh, 1986.
- Project for Afforestation in Sardar Sarovar Project Impact Areas due to Diversion of Forest Lands For Sardar Sarovar Project (GOG), 1991.
- Compensatory
 Afforestation Scheme in
 Lieu of Sardar Sarovar
 Project in Dhule District,
 Maharashtra State
 (1989)
- Government of Madhya Pradesh Forest Department

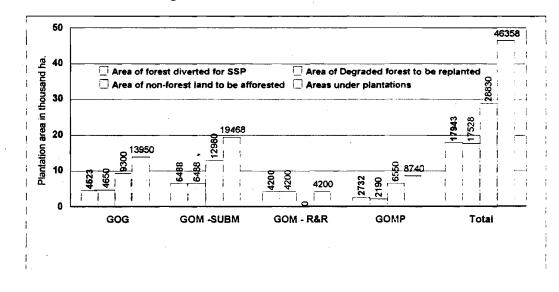
Action Plan of Compensatory Afforestation for Sardar Sarovar Multipurpose River Valley Project (1989).

These plans were submitted in varying stages of completeness but each has now been revised and updated. Action plans of three State Govt. contained following components:

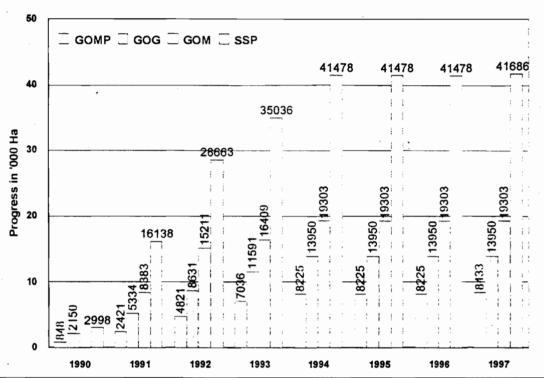


These action plans spell out a programme of tree planting in the three states on both non-forest and degraded forest areas as shown in bar chart 4 & 5 and Table 4 & 5.

Bar Chart-4: showing forest areas taken for afforestation/reforestation.



Bar chart-5: showing cumulative progress of plantation works in the state of Gujarat, Maharashtra and Madhya Pradesh. Cumulative progress for the SS Project as a whole is also shown.



♣ Table-4: Table showing progress of CAF, against the submergence area of 42,159 ha.

					(Ærea	in ha)
	G	OG	GO	M	GOMP	
Monsocn	Degraded forest	Non-forest	Degraded forest	Non- forest	Degraced forest	Non- forest
1650	-	2,150.00	-	-	132.00	716.00
1931	2,834.00	350.00	8,383.00	+	1,200.00	373.00
1992	2,450.00	847.00	4.552.00	2.276.00	2,400.00	-
1993	2,500.00	460.00	20.00	1,156.00	2,215.00	_
1994	1,516.00,	843.00	-	2,894.00	1189-a	a *
1995	•	Completed	Completed	NIL	2711	NIL
1996		-	-	NIL	:II	NIL
1997	- . ·	• .	_	NIL	ර-පි02	b*
Sub-total	9,300.00	4,650.00	12,977.00	6,326.00		
Total	13,95	0.00	19,303	3.00	6.433	3.00

^{*} Extent cfa & b is not available.

Map: Showing locations of sites of plantations in the state of Gujarat, Maharashtra and Madhya Pradesh

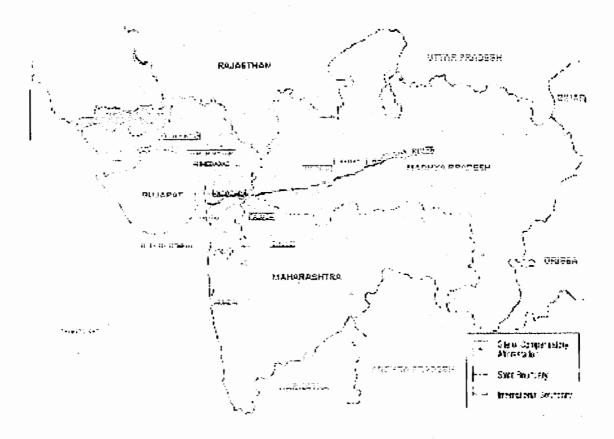


Table-5. Compensatory Afforestation against Forest Land released for R&R works in Maharashtra.

						(<i>F</i>	<u>trea in na.</u>)	_
Year	Land released	Progress 1993-94	Progress 1994-95	Progress 1995-96	Progress 1996-97	Progress 1997-98	Cumulative Progress	Target 1997- 98	:
1990	2.700.00	2.192.37	311.00	184.50	0.00	0.00	2.687.87	12.13	į
1993	1,500.00	0.00	0.00	896.00	0.00	0.00	896.00	604.00	ì
TOTAL	4,200.00	2,192.37	311.00	1,080.50	0.00	0.00	3,583.87	616.13	i

Plantation along Canal Banks:

The total potential of canal bank plantations is estimated to be 5.300 ha. A project report prepared for this purpose by forest Dept. is under

scrutiny by SSNNL. The plantation programme was launched from the

CLERCIC CLECT CLEAR CONTRACT CLEAR C

year 1990-91 Plantations on 924 ha have already been established till monsoon of 1997

Additional Plantation Activities

(a) Dam Vicinity Plantation (240ha)

An area of 240 ha. in the vicinity of the dam had also been planted. This work was completed by Forest Deptt. and is now being maintained by project authorities.

COMMAND AREA DEVELOPMENT: (Including Drainage Studies)

(A) Government of Gujarat:

Government of Gujarat have undertaken several studies related to

(b) Ravine Land Afforestation (200 ha.)

On the left bank of river Sabarmati an area of 200ha in two villages i.e. Ratanpur (120ha.) and Phirojpur (80 ha) was taken up for model plantation. Entire work has now been completed

(c) Project area plantations:

An area of 311 ha had been planted in the project area and the work is completed.

the Command area development. Some of which have been completed and the remaining are in progress. Govt. of Gujarat has formed an expert Multidisciplinary group to coordinate the studies & for drawing up the needed plans. The various studies are listed in table-6 & 7.

◆ Table-6. STUDIES COMPLETED

1.	Pre-Feasibility Study for Low Level Canal	Jyoti Consultants Ltd., Vadodara.	1981
2.	Mathematical Modeling of Ground Water for System Single Layer Model- Narmada- Mahi Doab.	Operation Research Group Vadodara.	1982
3.	Pre-Feasibility Level Drainage Study of Narmada Mahi Doab of SSP Command.	Core Consultants Ltd. Ahmedabad	1982
4.	Some Aspects of Role of Panchyats and Institutional Attangements for Canal Irrigation in Two Talukas of Ahmedabad District.	Institute of Cultural and Urban Anthropology, Ahmedabad.	1982
5.	A Study of Settlement Fattern (6 Talukas in the Narmada Command Area of Mahesana Distt. of Gujarar;	Department of Geography, Gujarat University, Ahmedabad.	1982
6.	Regionalisation of Narmada Command.	Operations Research Group, Vadodara.	1982
7.	Marginal Cost Study of Two Typical Distributeries and Two Typical Branches.	Dr. C.R. Shah, Vadodara	1983
8.	Socio-Economic Bench Mark Survey of 62	Fourteen Different Agencies including	Betwee
	Talukas (Sub-districts) of Narmada	Universities Research Institutions etc.	п 1982
	Command Area		& 1983
9.	Population Projection and Migration Study for Narmada Command Area.	Operations Research Group, Vadodara.	1983
10.	Study on Water Demand for Non-Agricultural Use from Marmada Project.	Gujarat Water Supply and Sewerage Board, Candhinagar	1983

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	Consumer Expenditure, Assets and Indebtedness of Rural Households of the Command Area of Sardar Sarovar (Narmada) Project	Directorate of Economics & Statistics, Gandhinagar	1983
	Wasteland Development Project for Command Area of Narmada Canal (Region 11 and 12).	Gujarat State Rural Development Corporation Ltd., Gandhinagar.	1984
13.	Mathematical Modeling of Ground Water System Narmada Mahi Doab.	Operations Research Group, Vadodara	1985
14.	Additional Work on Mathematical Modeling of Ground Water System-Single Layer Model Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
15.	State of Adoption of Improved Technology in Narmada Command and Rest of Gujarat State (Based on Analysis of Crop cutting	Operations Research Group, Vadodara	1985
16.	Experiments Data). Computer Aided Planning of Conveyance	Indian Institute of Management.	1986
17.	and Delivery Network. Land Use and Cropping Pattern Survey and Mapping of Narmada Command Area Zone 4A & 4B.	Ahmedabad. Department of Geography M.S. University, Vadodara.	1986
18.	Survey and Investigation Work of Ground Water Resources in Narmada-Mahi Doab	Gujarat water Resources Development Corporation Ltd., Gandhinagar.	1987
19.	Cropping Pattern and Waste Demand Study in Narmada Command Area.	Operations Research Group, Vadodara.	1987
20.	Inter-Regional Water Allocation and Determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1983
21.	Extended Study on Inter Regional Water Allocation and Determination of Branch	Operations Research Group, Vadodara	1989
22.	Canal Capacity. Growth of Agro-Processing Industries in Phase-I of the SSP.	Gujarat Industrial & Technical Consultancy Organisation Ltd. Gandhinagar	1990
23.	Consultancy Work for Control, Telemetry and Communication Network on Narmada Canal System for SSP.	Gujarat Communication & Electrical Ltd. Vadodara	1991
	Techno-Economic Study for Utilising Village Tanks as Borrow Area for Construction of Canal Network. Studies in Water Rates Policy, in 3 parts:	Operations Research Group, Vadodara.	1992
	Pricing of a Public Utility Survey of Literature.	Department of Economics, South Gujarat University, Surat	1992
27.	Financial working of Irrigation Projects - A Case of Four Projects in Gujarat.	Department of Economics, Sardar Patel University, Vallabh, Vidyanagar.	1992
28.	Some Policy Issue for Canal Wafer Rates in Gujarat.	Department of Economics, Sardar Patel University, Vallabh, Vidyanagar.	1992
29.	Mathematical Modeling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati.	Consultancy Engineering Service, New Delhi.	1993
30.	Mathematical Modeling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati.	Operation Research Group, Vadodara	1993
	Mathematical Modeling of Groundwater System for SSP Command Beyond Banas	Dalal Consultants, Ahmedabad.	1993
:= :	* # 14.2 * * * 10.2 *	- 4811	1

		•		
		up to Rajasthan Border.		
3	32.	Pre-feasibility Level Drainage Study for	Consultancy Engineering Services, New	1993
		SSP Command Beyond Mahi.	Delhi.	Tre Bank
;	33.	Study on Preparation of a Detailed	M/s. Wamana Consultants Pvt. Ltd.,	May,
		Integrated Command Area Development	Hyderabad.	1994
		Plan for SSP.		
3	34.	Environmental Impact Assessment Studies	M.S. University, Vadodara.	Nov
		on Inland and Marine Fisheries relevant to	· •	1994
		the Command Area of Sardar Samovar		
		(Narmada) Project.		
3	35.	Environmental Impact Assessment (EIA)	Commissionerate of Health, Medical	Oct.
		Studies on Water Related Diseases in	Services & Medical Education, Govt. of	1995
		Sardar Sarovar Project (SSP) Command	Gujarat, Gandhinagar	
		Area including the Area Down Stream of		DVDIE NO
		the SSP Dam.		্ৰান্ত প্ৰথম হৈছিল ইয়া গায় হৈছিল। প্ৰথম কৰাৰ কাৰ্যক্ষা কৰাৰ কাৰ্যকাৰ
(36.	Study of Flora and Fauna of the Command	Sardar Patel University, Vallabh	Nov.
		Area of Sardar Sarovar (Narmada) Project:	Vidyanagar.	1995
		Lying Between the Narmada & Sabarmati		The Fourth of America
		Rivers (EIA Studies).		
3	37.	EIA on Downstream of Sardar Sarovar	H.R. Wallingford.	April,
		Dam up to Gulf of Cambay.	0	1995
3	38.	Economic Dimension of the Sardar Sarovar	S.P.Institute of Social & Economic	100
		Project.	Research, Ahmedabad.	1995
3	39.	Study on Flora and Fauna of the Command	Saurashtra University, Rajkot.	Jan.
		Area of Sardar Sarovar (Narmada) Project		1996
		Lying in Saurashtra and Kachchh Area (EIA		فأروضنا أنسترته كالأراب والمراز
		studies).		Particular Company
4	40.	Review of Ground Water Drainage Study.	H.R. Wallingford	Feb.
				-1996
				200 200 200 200 200 200 200 200 200 200
		Agro Pollution Aspect of Command Area	H.R. Wallingford	
4	42.	Environmental Impact Assessment of Black	GEER Foundation	Dec.
		Buck National Park located at Velavadar in		1993
		the command area of SSP.		in the second se
4	43.	Study on Flora and Fauna of the Command	Gujarat University, Ahmedabad.	Mar.,
		Area of SS(N) Project: Lying Between		1993
		Sabarmati River and Rajasthan Border. EIA		
		Studies		

♣ Table-7...ON GOING STUDIES:

1.	Agricultural Research Studies.	Gujarat Agricultural Univ.	1987
2.	Survey and Investigation Work of Ground	Gujarat Water Resources Development	1989
İ	Water Resources Beyond River Mahi in SSP	Corporation Ltd. Gandhinagar.	1
l	Command.		1
¹ 3.	Action Research on People' Participation in	Gandhi Labour Institute, Ahmedabad.	1991
í	Water Management in SSP.		
4.	Ecological Study of Wild Ass Sanctuary and	Gujarat. Ecological Education & Research	Dec.
, i	Surrounding Area Using Remote Sensing	Foundation (GEER Foundation).	1993
i .	Technology for EIA	Gandhinagar.	
5.	*Environmental Impact Assessment of Nal	GEER Foundation	Dec.
!	Sarovar Bird Sanctuary.	•	1993
* D	raft/interim reports received in NCA	a quadra mana mana da da da da da da da da da da da da da	

(B) Government of Rajasthan

The Government of Rajasthan had submitted a report on Environmental & Ecological aspects and remedial measures for 'Narmada Canal Project'. Copy of the report was submitted to Ministry of Environment and Forests. Govt. of Rajasthan have assigned studies on EIA of Command area in Rajasthan portion to WAPCOS. Draft final report is available, which is in the process of approval by State Govt.

4. FLOFA, FAUNA, WILDLIFE AND CAPRYING CAPACITY

The guidelines of the MOEF require that while seeking environmental clearance for the hydropower projects surveys should be conducted so that the status of the flora and fauna present can be assessed, listed (rare and endangered) species can be detected if present, and appropriate conservation measures devised.

On the basis of relevant details supplied by the various states, MOEF issued clearance for the SSP in 1987. A condition of this clearance, as far as it related specifically to the Flora & Fauna was that the Narmada Control Authority would ensure in-depth studies on flora & fauna needed for implementation of Environmental Safeguard measures.

Studies Surveys

Important survey work included the following:

 The Environmental Impact Study of 1983 prepared by MSU.
 Preliminary Report on First Botanical Exploration and Plant Collection from Narmada Valley by the Botanical Survey of India in 1985 Report on the Survey of the Narmada Sagar Area by Zoological Survey of India, 1988.

 Note on Sardar Sarovar Project -Preparation of Environmental Work Plan for Forest and Wildlife by the State Forest Department, GOM 1988.

 Status of Flora and Fauna in and Around Sardar Sarovar Project Maharashtra is studied by the University of Pune (1992-94). Final report is received in NCA.

 Eco-Environmental and Wildlife Management Studies in the Sardar Sarovar Area in Gujarat, 1992, by MSU.

 Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems. The study was conducted by the State Forest Research Institute (SFRI) in Jabalpur and financed by the NVDA. This study was completed & report was submitted in 1994.

 Workshop on Approaches to Integrated Wildlife Management in Gujarat: A Report by the SSNNL October 1990. People's Involvement in Wildlife Management, by VIKSAT in 1991

- Wildlife Management Studies in the Submergence and Catchment Area of Narmada Project: With Special Reference to Shoolpaneshwar Wildlife Sanctuary, by the SSNNL 1992.
- Narmada Basin Water
 Development Plan: Development of Fisheries, 1987, was prepared by the Narmada Planning Agency, GOMP.
- Rapid Reconnaissance Survey of Limnological Aspects Part I. II and III, 1987, were undertaken by the Bhopal, Vikram and Rani Durgavati Universities for GOMP.
- Water quality data has been collected by the Central Pollution Control Board, Central Water Commission, the State Pollution

Control Boards and the National Institute of Oceanography.

 Narmada River Basin Development Project: Fisheries Component, 1991 by the German Consultants to the World Bank, GOPA.

 Sociological Survey of the Fishing Families of the Narmada River by CICFRI, 1991.

 Aquatic Fauna (Fish) Studies in Indira Sagar Submergence Area, prepared by the Friends of Nature Society in 1991 on behalf on the NVDA reported on the fish fauna of the Narmada.

 Pre-and Post-Impoundment Limnolo-gical Studies of Narmada Basin, by three universities coordinated by Barkatullah University for the NVDA. (1989-92) Study report was available in 1994.

 Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream is a desk review sponsored by the NCA and undertaken by CICFRI, 1993.

 Ecology and Fisheries of the Narmada Estuarine System with Special Reference to Proposed Impoundment (Sardar Sarovar Dam), is an ongoing study begun in 1988 by CICFRI.

The Action Plans

A) Wildlife (Terrestrial):

To ensure that the wildlife conservation measures are implemented effectively, action plans for the three states were prepared as follows:

 Felling plans for the forest area coming under submergence in Maharashtra and Madhya Pradesh will avoid the possibility of animals being trapped in the submergence area

 Plans for improvement works in the wildlife sanctuaries of Gujarat. Shoolpaneshwar sanctuary development action plan prepared by GOG in 1996 and submitted to Forest Deptt.GOG

B) Fisheries (Aquatic):

Three state Govt.(s) submitted the fisheries development plans which are as follows:

The Narmada Basin Water Development Plan: The Develop-ment of Fisheries, 1984. This comprehensive plan for GOMP addressed the development of fisheries in the Omkareshwar, Maheshwar and SSP areas. Phasing and programming with respect to pre and post-impoundment, clearance of the forests, training of fishermen, cooperative societies and post-impoundment management were proposed.

Environmental Work Plan: Sector GOG. Fish and Fisheries, 1986. This work plan, prepared compliance in with agreement with the World Bank included the establishment of fish hatcheries and fish farms. training of fishermen, establishing primary cooperatives, and establishing an Inter State Fisheries Board. In addition, it included proposals for conducthydrobiological studies. studies on the morphology of the river, investigations into physical and chemical characteristic of the water and soil, and studies on flora, fauna, fish vield, plankton, and productivity in the reservoir. This plan was again revised by GOG in August 1997 & re-submitted to NCA during November, 1997.

A Note on SSP: Preparation of Environmental Work Plan for Fisheries Development 1987. Maharashtra, This plan included proposals for the felling in the reservoir submergence zone, fish seed, hatcheries, fishing, stocking, manpower

requirements, and training and management through the Inter-State Board. Some more studies have been proposed by GOM through CICFRI.

Subsequently, the state governments have revised their plans with a view to address to issues as they arose. The revised plan for GOM included proposals for the fishing population to be resettled on the periphery of the reservoir or in R&R sites in Maharashtra. In addition, the establishment of low-cost hatcheries and irrigation tanks, the development

of pen cage culture fisheries, and intensive fish farming were proposed. GOG also revised their plan by end 1994. The plan contained four volumes covering upstream, downstream & command areas. In view of the progressive impoundment which commenced in March, 1994. NCA has constituted an expert group to lay down the guidelines for conservation & development of fisheries & its ecosystem. The plan submitted by state governments are under scrutiny of this expert group. The summary of status of planning is given in table-8&9.

Summary of Status of Environmental Planning:

▼ Table-8. Wildlife

The state of the s	TO ASIST A V W TO MANAGEMENT DESCRIPTION OF THE STATE OF	The state of the s	The second secon
Preliminary Surveys	Complete	Complete	Complete
• in-depth Studies	Complete, Final report	Completed, Draft Final	-
	available.	report available	
• Development of	Complete for Shoolpa-	Awaiting fesults of	
Management	neshwar sanctuary.	study report from SES,	but awaiting delibera-
Options	•	Pune.	tions of the expert
The state of the s			group.
Action Plans :			
Migratory corridors	Not needed	Not needed	Plan ready
Sanctuary	Shoolpaneshwar	Not needed.	Not needed.
development	sanctuary Management		<i></i>
	Plan prepared		
Wildlife	Massive afforestation	Under formulations	Awaits final outcome
	in catchment of SSP.		of the expert group.
nessures in			
- adjoining forest(s)			
• :- implementation		CAF & CAT Bearly	Arrangements
	•	completed: Plan under	
	implementation. CAT	formulated	final outcome of study.
	work (increasing		Substantial CAT works
12 marine 20 20 20 20 20 20 20 20 20 20 20 20 20	carry-ing capacity)		in the catchment
	nearing completion.		completed.

The SSP will also provide an opportunity to enhance nature conservation outside the immediate catchment area of the Narmada. In particular three wildlife sanctuaries located in the command area of the project will benefit from the increased freshwater availability resulting from

the project and there are plans by the GOG to further develop these. They comprise:

- Nal Sarovar, Bird Sanctuary;
- Wild Ass Sanctuary in the Rann of Kuchch.
- Velvadar Black Buck National Park.

7

Table-9. Fisheries

	a presenta provincia de la constitución de la const		tion on the standard transfer and the standard and the st
• Preliminary surveys	Yes	Yes	Yes
work plan Updating of detailed	Yes		Yes
surveys/studies of fish launa			
Updated Action	Yes	Yes	Submitted in 1997
Implementation:			1991
1. Plan for clear felling	Completed	Yes, to synchronise with submergence	Yes, to synchronise
		about 734.00 pa. felled	with sub- mergence work
			commenced.
2. Development of fish farms		Proposal under revision	Proposal under revision
Establishment of IFDB for future R&D Management		Agreed	Agreed.
4. Expert group to lay down guidelines for	the State &	As per col. No.2	As per col. No.2
Conservation & Development	constituted by the NCA. Four meetings held, guidelines are on the anvil.		

Progress of Implementation

CICFRI have already established one hatchery in Gujarat for augmenting the numbers of the 'Hilsa' fish in the reservoir. This currently produce around 25,000 spawns per year. CICFRI have also been commissioned to monitor the whole of the estuary and their study has been extended to examine pollution and to undertake modelling studies in the downstream environment.

A draft proposal for the creation of an Interstate Fisheries Development Board (ISFDB) has been prepared by the NCA and agreed, in principle, by the Governments of Gujarat, Maharashtra and Madhya Pradesh. The High Level Expert Group is working out the details of ISFDB.

The Organisation is expected to be set up and fully functioning prior to reservoir filling. An expert group has been constituted by NCA to lay down the guidelines for fish conservation & development during progressive filling of the reservoir to advise the state executive agencies for follow-up action. Guidelines are on the anvil.

On-going Fisheries Activities in the Sardar Sarovar

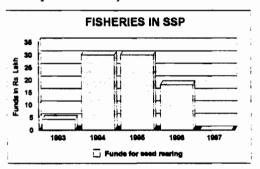
Some fisheries development activities are already going in the Sardar Sarovar from the year 1992 onwards. From 1993-94, these programmes received the financial support from the Sardar Sarovar projects. These activities are:

 Seed Stocking in the Sardar Sarovar:

- Development of Rearing space for Fish Seed Production;
- Mangrove Plantation Programme.

Till the year 1995-96, the State Fisheries Department and Fisheries Development Agencies have stocked 8.516 lakh fingerlings in the dykes of Sardar Sarovar, as a part of reservoir development programme of Fisheries State Department. During 1995-96, 2.31 lakh fingerlings 11.48 lakh yearlings were and 1996-97, 60 lakh stocked. In fingerlings have been stocked.

There is a provision to create rearing space for seed rearing in the Sardar Sarovar and the funds have been provided by the SSP



The total amount for the rearing ponds is at present Rs.82.72 lakh. The site selected for the rearing ponds initially in the reservoir premises was found to be unsuitable on account of higher water permeability of the soil.

Hence, another site has been located in the village of Timbi (Nanded Taluk) of Bharuch district, in the Survey No.303. The soil samples have been sent for analysis to decide the suitability.

In Gujarat, reservoir bowl is already cleared of all vegetative growth. Execution of felling in M.P. & Maharastra, as per felling plans prepared, awaits the commencement of impounding.

5. SEISMICITY

Studies

Page 541

Studies of reservoir induced seismicity (RIS) and rim stability have been carried out by the Geological Survey of India (GSI), Central Water and Power Research Station (CWPRS), University of Roorkee and World Bank Consultants. The principal studies are described below:

- University of Roorkee. 1980. Geological and Seismological Investigations of the Environs of Narmada Valley Around Navagam Dam site in Gujarat.
- GSI. 1981-82 and 1982-83. A
 Geotechnical Report on the
 Reservoir Competency
 Investigations in Parts of Sardar
 Sarovar Area, Bharuch &
 Vadodara Districts. Volumes I&II.
- Shenoi et al. 1982. Shenoi et al presented at the New Delhi Conference on the significance of Seismotectonic Aspects on Reservoir Development.
- Balasundaram, M.S. 1982 Sardar Sarovar Project: A Geotechnical Report Compiled and Edited for the Government of Gujarat.

- MSU. 1983. The Sardar Sarovar Narmada Project Studies on Ecology and Environment.
- NVDA published a Position Paper on Seismic Studies in January 1986.
- Krishna, Dr. J. 1989. Dams and Seismicity.
- GSI.1990. Study of the Rim Stability of the SSP.
- GOI.1993. Sardar Sarovar Project Seismicity and Sardar Sarovar Dam.

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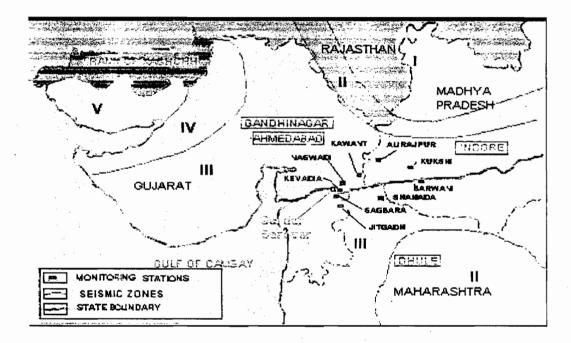
Progress of Implementation

The various recommendations for modification of the dam design which have all been implemented are summarised as:

- Adoption of horizontal design coefficient of 0.125g on the recommendation of the Dam Review Panel:
- installation of stress monitors in the main body of the dam;
- increase of the depth of the foundation to 18m below the lowest river bed.

The Government of Gujarat has identified 9 locations for the installation of seismic monitoring stations, 4 each on either side and one at the downstream of the Sardar Sarovar reservoir, out of 9 stations, 3 are in M.P., 1 in Maharashtra & 5 are in Gujarat. Construction work at all the 9 seismograph stations is completed and installation of instruments at all the stations except at Sagbara, is completed

Map: Showing locations of seismological stations on periphery of the Sardar Sarovar reservoir



The seismological observatory at Kevadia Colony is in operation since 1973. The data of Kevadia Colony seismograph station for the period from 1973 to 1984, was analysed by CWPRS, Pune and GEAR, Vadodara. Also. Micro-earthquake surveys around Navagam Dam were carried out in the year 1980 by Dept. of Earthquake Engineering, University of Roorkee. The Micro-earthquake

activity was found to be of low level and was generally scattered in the Narmada basin.

The seismological network with latest instruments was established in the year 1989. After the installation of new seismic instruments at new sites local micro - earthquakes as well as global earthquakes are being recorded. The events which are

recorded at network are analysed and located using the computer program im 'FASTHYPO' incorporated with Seismic be Data Processing and Analysis

Computer (DAC - 300). The progress of implementation is illustrated in Table below:

Status of implementation

AHOU	
 Dam design modifications 	
 Monitoring stations 	
	installation complete in 8.
• CSI (Nacjour Dansion) Rim Stability	Completed

6. HEALTH ASPECTS

studiesTracer Studies by EWPRS

Studies

A large number of studies have been carried out on the health profile of villages in the three affected states. The key studies are summarised below:

- Narmada Programme Schistosomiasis Back-to-Office Report, 1986, assessment carried out by Goodland, consultant to the World Bank, the National Institute of Communicable Diseases (NICD) and the World Health Organisation (WHO).
- Proceedings and Recommendations of the Meeting on Schistosomiasis Research and Surveillance field at NICD on 22nd November 1985.
- Disease Profile of Command Area by the State Commissariat of Health, Medical Services and Medical Education (SCHMS), 1986.
- Health Statistics, GOM, 1987.
 The State Department of Health produced a Report on the health profile of 33 project-

Reports submitted.

affected villages in Dhule district, Maharashtra.

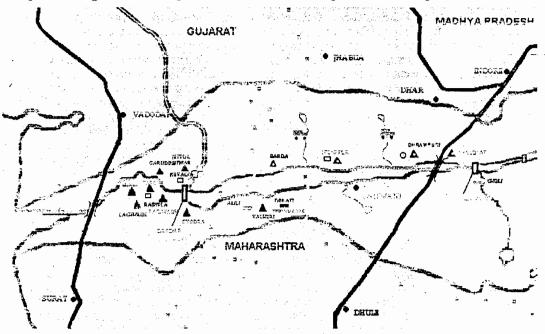
- Health Statistics 1982-84, GOMP. This study, published by GOMP in 1985 & updated in 1994.
- The Sardar Sarovar Narmada Project Studies on Ecology and Environment by MSU in 1983, considered public health in Chapter-3.
- Numerous studies have been conducted on the incidence of malaria in India amongst others, by the Malaria Research Center (MRC).

- Revised Health Plan by GOM, 1995.
- Revised Health Plan by GOG, 1996.
- Epidemiological Surveillance Studies by GOM, 1996.
- Epidemiological Surveillance Studies by Gandhi Medical College, Bhopal for GOMP. 5th Interim Report (1997) submitted.

Status of Implementation of Actions for Public Health

		ementation of Actions	for Public Health	
	of terrores		Ellerifickinikerist.	Allegatoria territatibiliza
•	Bas e line	Complete, 1986	Complete, 1987	Complete, 1994 being
	studies	updated '95	being updated.	updated.
•	Prepara-	Submitted and	Original submitted	Original submi-tted =
,	tion of	modified in 1986;	in 1987, revised in	1986, revised in 1988
	state	Urban Malaria	1991, 1992 & 1993.	and final plan
	action	Scheme proposed.		submitted in 1991.
	plan	Plan is being		Cost details inccr-
		revised.		porated in 1996.
•	Survey of	Complete	Complete	Complete
	existing		·	:
	facilities			
•	Establish	Hospital at Kevadia	Somawal village	Hospital, mobile with
	ment of	for workers;	hospital; health	and civil dispensaries
	new	labora-tory and	centers and health	for labour; detailed
	facilities	mobile unit	units functioning.	scheme for rese-ttled
		complete, drug		population
		dispensaries		
•	Vector	YMEP; SSNNL	NMEP; adoption	
	control	work-shop on	malaria control	~
	measures	malaria control;	guidelines of	strengthened
	in place	laboratory	irriga-tion	
		established, studies	Department	
		on health		
		completed	£	
•	Appointm	One senior health	51 posts filled up &	Needs identified.
	ent of	officer is posted at	laboratory facilities	
	specialist	Kevadia	Provided for one	
	st aff		PHC, 3 dispensa-	
			ries & one floating	
			dispensary.	
•	Disease	Entrusted to	Entrusted to	Evaluation cell estan-
	monitoring		regular health	9
	and	report submitted	department. Surv-	Gandhi Medical
	responsibil ity	P	eillance studies	College, Bhopal. Free
	ПУ	1986 being	commenced.	interim. reports
		revised.	Phase-I survey	received
			report submitted	
			by T.N. Medical	
			College. Proposal	
			for Phase-II study	
			submitted.	

Map:Showing status of implementation of health plan in SSP impact area



Implementation:
A) Govt. of Gujarat:

There is a dispensary at SSP dam site run by M/s Jai Prakash Associates. It has regular Medical Officer and other staff to diagnose and treat the malaria patient. Generally labourers and staff at dam site and their families take benefit of this dispensary.

Affected villages and rehabilitation sites of Bharuch Vadodara and Kheda District are looked after by respective district panchayat health staff for malaria and water borne diseases. Health worker and A.N.M. visits these sites regularly. Sr. Health Officer is visiting these villages and rehabilitation sites and coordinating functions of Health Department.

B) Govt. of Madhya Pradesh

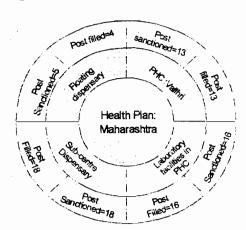
GOMP have already submitted cost breakup of Health Plan relevant to SSP. The work of locating a suitable site for the hospital at Nisarpur is under progress.

C) Govt. of Maharashtra:

The following Health Schemes have been sanctioned by Government of Maharashtra vide Govt. Resolution No.1 (PHC -1593 / 2038 / CR268 / 93/PH4 dtd. 4..4.1994 and No. MISC 1095 / 5 / CRI / PH 4 dtd. 15th November, 1995. The position is depicted in the fig.-4

 $oldsymbol{a}$

Fig-4: showing the current status of the implementation of the action plan in Maharashtra



7. ARCHAEOLOGICAL SURVEY AND ANTHROPOLOGICAL STUDIES

ARCHAEOLOGICAL SURVEY

In the case of SSP, where some sites may be submerged the NWDT award stipulated that, the entire cost of relocation and protection should be chargeable to GOG. Relocation work is to be supervised by the Department of Archaeology under the provisions of the 1958 Act.

Studies:

CONTROLL CONTROL CONTROLL CONTROLL CONTROLL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CO

Survey conducted for identification of various sites & monuments of significance has included the following:

- Gujarat: Archaeological Survey of Nineteen Villages Submerged by Sardar Sarovar Reservoir, 1989.
- Maharashtra: Survey by Department of Archaeology. Survey was carried out by the State Department of Archaeology

for cultural sites in 24 villages of Akkrani taluk and nine village from Akkalkuwa taluk, Dhule district.

- Madhya Pradesh: Survey by State Department of Archaeology and Museum (1992), in sixteen volumes.
- Anthropological Survey of India: Narmada Salvage Plan.
- Anthropological Survey of India: People's of India
- Adivasi Kala Parishad: Survey of Material Cultural in the Narmada Valley.
- Rashtriya Manay Sanghralaya : Narmada Salvaga Plan

Cultural Heritage in SSP Area

	Gujarat	Madhya Pradesh	Maharashtr a
• Relocation of temples	2.	23	
Excavation site(s)	-	14	-

Summary of Current Situation and Progress

	Gujarat	Madhya Pradesh	
 Survey of villages in Submergence Zone 	"Comp	lete' for all item in all	the States.
 Identification of Cultural Sites. 	"Comp	lete' for all item in all	the States.
Collection of Data and Documentation of Sites	Complete	In progress	Not required.
Selection of appropriate sites	Complete	In process	Not required
Action plan:	Complete	Finalised	Not required

• Survey in Maharashtra identified one temple which was on the border with Gujarat. GOG has already relocated this temple 15 km downstream of earlier location.

Monuments for protection/relocation

Stat	e Relocation of Excavation Sculptures
	temple Target/Progress Target/Progress
	Target/Progress
 Gujara 	$^{\prime}$. The constraints of $2/2$ $@$. The constraints of the constraints $e^{-\frac{1}{2}}$ $e^{-\frac{1}{2}}$
 Mahara 	shtra
 Madhy 	3 $7/6$ $*$ $188 & 76$ artifacts
Prades	n collected. ***

@ Relocation of Hampheshwar Temple is under progress.

*Relocation/Protection: Work for relocation of following temples is in prograss.

Village	Temple	Remarks
l Semalda	Kalanjeshwar	 Land allotment under progress,
	Shiv Mandir	 Estimate under preparation
3. Khujawa	Bhawani Mata temple	 か minda a maintaia mindram and seedo mei lauduscus (日本) and
4. Khujawa	Rock-cut-caves	 Decorated facades proposed for
5. Khujawa	Jaleshwar temple	Shifting to Lal Bagh
6 Roligaon+	Shiv Temple	

- + Shiv temple of Roligaon is proposed to be protected by constructing a wall.
- ** Excavation
- For excavation at village Khaparkheda & Brahmangaon. Funds sanctioned by NVDA & work was completed.
- For excavation at village Utawad. Work was completed earlier by ASI, Govt. of India.

*** Collection & display at Museum

- A good number of sculptures were collected from the regions coming under the submergence area of the Sardar Sarovar dam. This sculptures were obtained from Pipladgarhi, Khujawa, Dharamapuri and different other villages. Since these sculptures were lying open for a very long time they bear traces of weathering effect on them like salt formation, red-oxide deposition, besides accumulating dust, dirt and fungus on them.
- They were cleaned by the chemists using necessary chemicals like Ammonia. Sodium hydroxide, Benzene P.V.A. etc. After cleaning the sculptures were coated with preservative for saving them from further deterioration.
- Land for museum at Barwani & Kasrawad requested. Chemical treatment of rock cut statue at Pipladgarhi has already been started. This monument is proposed to be shifted at relocation site.
- Construction of a section 'Narmada Dirgha' in the museum at Bhopal has been started.
- Besides, Film documentation of all the monuments of SSP is in progress through an agency 'Madhyam', engaged by state dept. for documentation of the Important monuments.
- It is proposed to establish Narmada Park and museum to house sculptures at Lalbag Palace, Indore.

ANTHROPOLOGICAL STUDIES

of Government Madhya Pradesh has informed that in view of the studies being carried out in with Narmada Sagar connection Project, no separate anthropological studies are required and that the General, Anthropological Survey of India has also expressed the same view M.P. State Adivasi Kala Parishad has submitted its report on arts & culture. Enthropological Survey of India has informed that Narmada basin is already covered extensively under the project "Peoples of India". Besides Pashtriya Manav Sanghralaya has conducted needed studies in the past as follows. Further studies are covered

and the state of t

under R&R plan of the state Governments. The work done by An.S.I is being used.

- a study of the palaeo-ecology of quaternary fossils in the central Narmada Valley;
- excavation of upper Paleolithic site of Mehtakheda and further exploration of Nimar;
- collection of tribal artifacts in Madhya Pradesh.

Institutional responsibility for these actions was specified in the action plan whereby the first two elements were completed by Deccan College, Pune and the third by Adivasi Kala Parishad, for the Rashtriya Manav Sanghralaya, Bhopal

STATUS REPORT

INDIRA SAGAR PROJECT (ISP) ENVIRONMENTAL ASPECTS

1. PHASED CATCHMENT AREA TREATMENT:

The freely draining area of Indira Sagar Project down stream of Barqi Dam is about 39,25,422 ha. As per the guidelines of MOWR, directly draining watersheds of very high and high priority categories only, are to be treated pari passu with the construction of the dam and at the project cost. Prioritisation survey of the watersheds was entrusted earlier to SGSIT&S, Indore. Later on, as per GOI's instructions the prioritisation survey was entrusted to the All India Soil & Land Use Survey Organisation, New Delhi. The Survey has been completed by AIS&LUSO, New Delhi and the

survey reports have been received in the NVDA

I. DIRECTLY SUBWATERSHEDS

DRAINING

On the basis of the reports submitted by the AIS&LUSO. 30 subwatersheds belonging to the very high and high priority categories and directly draining into the reservoir have been identified for treatment. These 30 subwatersheds cover an area of about 73,456 ha as shown in pie chart-9. In addition an area of 1636 ha was treated up under pilot project earlier. The progress of catchment area treatment in these subwatersheds are presented in bar chart-5.

Pie Chart: 9 Showing Critically degraded Sub-watersheds below Bargi dam

INDIRA SAGAR PROJECT STATUS OF DEGRADATION IN CATCHMENT

Gross Area in ha.

57697
78.5%

15759
21.5%

Total: 73456

Total: 73456

Forest Area

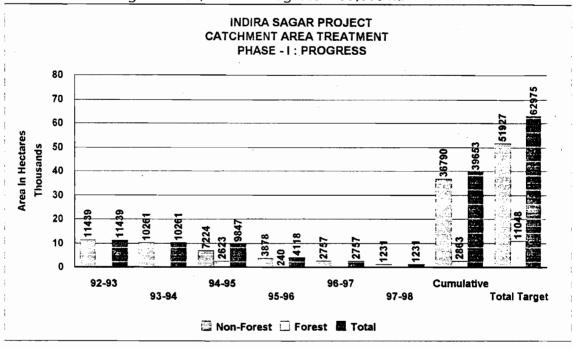
Treatable Area in ha.

51927
82.5%

Total: 62975

Total: 62975

♣ Bar Chart 5 Progress of Catchment Area Treatment:
 Target = 62,975 ha. Progress = 39,653 ha.



II. FREELY DRAINING AREA (Excluding Directly DrainingSubwatersheds)

Number of watersheds - 478 Gross Area - 10,12,650 ha. Net Area - 9,15,150ha.

Table 10 Schedule of Implementation: (Area in 000 ha.)

Year		Target					Progress over area			
				Submitted Approved						
	FA	NFA	TOTAL	NAEB	RVP	NAEB	RVP	FA	NFA	TOTAL
1995-96	0.00	18.00	18.00	0.73	0.198	NR	0 198	N.R	NR	NR
1996-97	0.00	18.00	18.00							
1997-98	10.00	27.00	37.00						_	
1998-99	10.00	28.80	38.80							
99-2000	10.00	28.80	38.80							
2000-01	10.00	28.80	38.80							
2001-02	10.00	28.80	38.80							
2002-03	10.00	28.80	38.80		!			}		
2003-04	10.00	28.80	38.80							
2004-05	10.00	28.80	38.80							
2005-06	1000	28.80	38.80							
2006-07	10.00	28.80	38.80							
2007-08	8.43	28.80	37.23							
2008-09	0.00	28.80	28.80							
2009-10	0.00	28.80	28.80			,				
2010-11	0.00	28.80	28.80							
2011-12	0.00	28.80	28.80							

2012-13	0.00	28.80	28.80				I	
2013-14	0.00	28.80	28.80					
2014-15	0.00	28.80	28.80					
2015-16	0.00	28.80	28.80					
2016-17	0.00	28.80	28.80					
2017-18	0.00	28.80	28.80					
2018-19	0.00	28.80	28.80			-		
2019-20	0.00	28.80	28.80					
2020-21	0.00	28.80	28.80					
2021-22	0.00	28.80	28.80					
2022-23	0.00	26.40	26.40	_				
2023-24	0.00	26.12	26.12					
Total	108.43	806.72	915.15					

N.R Not Reported

* 5 projects for seeking funds for 40 subwatersheds covering an area of 53,709 ha. of forest were submitted by NVDA to National Afforestation & Eco-Development Board.

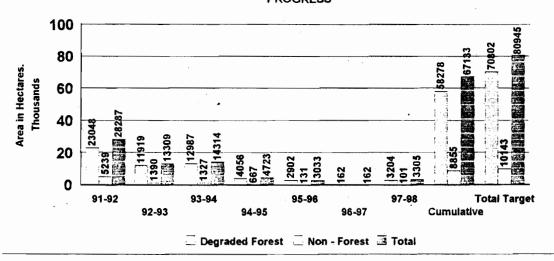
2. COMPENSATORY AFFORESTATION:

A total of 40,332 ha, forest land would come under submergence and an additional 779.90 ha of forest land has been diverted for the residential colony, power house complex, dam, saddle dam and approach roads.

Subsequently, another 308.40 ha. of forest land was permitted to be diverted for power house. Thus a total of 41,420 ha. of forest land has been permitted to be utilised for the construction of ISP. To compensate for this loss of forest, 10,143 ha. of nonforest and 70,802 ha. of degraded forest land has been identified for compensatory afforestation.

Bar Chart 6 Progress of Compensatory Afforestation:
 Target = 80,945 ha. Progress = 67,133 ha. Balance targets = 13,812 ha.

INDIRA SAGAR PROJECT COMPENSATORY AFFORESTATION PROGRESS



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* Table 11 Targets

	1997-98	1998-99*	Balance
Forest Area	15.728.00	12,524.00	0.00
Non Forest area	1,389.00	1,288.00	0.00
Total	17,117.00	13.812.00	0.00

*Due to slippage of targets during 1997-98 balance targets are shown in 1998-99.

3. COMMAND AREA DEVELOP-MENT:

The Government of Madhya Pradesh has submitted command area development plan. The project on completion will provide annual irrigation to 1.69 lakh ha.

The implementation of the plan would be taken up in three phases for completion in June-2007. The study on impact of Agre chemicals, runoff from fields on surface & ground water quality in the command area has been assigned to J.L. Agricultural University, Jabalpur. An MOU for this work was finalised. An allocation of Rs.24.5 lakhs was made. Studies have commenced and are making progress.

4. FLORA, FAUNA AND CARRYING CAPACITY

Botanical exploration of Indira Sagar Dam was carried out by Botanical Survey of India during 1985. Besides, wetland and aquatic flora of Narmada Valley in Madhya Pradesh was also published in 1991 in Vol 15 No.3 in J.Econ Toxicology.Bot.

Studies on these aspects were entrusted to the Wildlife Institute of India, Dehradun in December, 1989 and were completed by March, 1994. The final study report is submitted to MOE&F & NCA.

Besides this, the Friends of Nature's Society. Bhopal. has completed the preparation of Wildlife Retrieval and Conservation Plan. Implementation of the plan awaits submergence

Actions have been taken by NVDA to implement the recommendation of the WLI regarding declaration of National Park & protected areas. Matter is under consideration of the State Govt.

FISHERIES DEVELOPMENT:

The studies of certain aspects of fisheries have been included in the limnological studies being conducted by the three Universities of the Statestudies in the Upper Narmada, (Bargi Reservoir) by Rani Durgawati University, Jabalpur, studies in the Middle Narmada (Tawa, Barna and Kolar Reservoirs) by Barkatullah University, Bhopal, studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have completed the studies in their respective areas as per MOU and final report is available. Accordingly Action Plan has also been drawn up & is presently under scrutiny of NCA.

Aquatic fauna has also been covered under the studies completed by Friends of Nature Society, Bhopal. The draft report of FONS is also available. Action plan submitted earlier is being updated.

5. SEISMICITY AND RIM STABI LITY.

The reservoir competency survey has been done by GSI and report is submitted. In the report, GSI suggested further studies for some patches of narrow water divide. However environment sub-group decided not to have further studies as

experts were of the opinion that there was no water loss between Mandla & Rajghat.

Establishment of 10 nos. of seismic observatories in the Narmada Sagar Complex area is taken up by NVDA. Order has been placed and supply has commenced. Besides, 12 nos. of Wood Anderson Seismographs and 6 nos. of photographic recorders are being procured from IMD supply has commenced. Procurement of Micro Earthquake recorders completed. In the mean time on the initiatives taken by NVDA, CWPRS has already installed the instrument to record pre-impounding data and for undertaking seismic studies at NSP, Omkareshwar & Maheshwar projects through Analogue micro earthquake recorder & strong motion occillograph as an interim measure. Data will be interpreted by IMD.

6. HEALTH ASPECT:

A note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and comments were sent for modifying the report. NVDA has submitted the revised plan costing Rs.748.73 lacs for preventive and curative aspects of health. Regarding preventive aspects, a MOU has been signed with the Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal. Five half-yearly reports received. For studies on health aspect in project impact areas of SSP and NSP, work is proposed through a cell of monitoring and evaluation under the Directorate of Health Services, Bhopal. approved plan being implemented.

Pre-impoundment and postimpoundment Limnological studies carried out by three Universities will take care of water quality aspect. These studies have been completed and the final report is submitted. Action plan approved by NVDA is under scrutiny of NCA.

ARCHAEOLOGICAL AND ANTHROPOLOGICAL SURVEY:

Archeological Survey

A survey of the 254 villages is required for identification of the archaeological monuments falling within the submergence area. The State Department of Archaeology and Museum, Bhopal was entrusted with the survey of these villages which has been completed. The state Department have already submitted an action plan for relocation of monuments of Archaeological significance. This plan is being implemented.

Archaeological Survey of India has also completed the survey for 167 villages for centrally protected monuments for identification of the monuments of significance. Implementation of the action plan is already initiated.

Well inside the north bastion of Joga Fort is being affected due to submergence and meadsures for its protection is being finalised by ASI. The Siddeshwar temple is well above the FRL of 860 ft. and considered to be unaffected by the project.

Excavation of the early historic mound in village Khedinama in Hoshangabad distt. is completed and report is available in NCA. Ancient tools & artifacts have been found. Recently, State Deptt. has reviewed the action plan and has proposed shifting of 10 monuments and 5 excavation of sites in addition to the earlier proposal of collection of scluptures & excavation at Khedinema.

Cultural Heritage in NSP Area.

Target Progress

Relocation of Monument	10	-
Excavation	6	1

Anthropological Studies:

Efforts are being made for retrieval of bio-cultural material from the Narmada Basin. A lot of information is gathered from the field which generates immense data of Socio-Anthropological significance.

Rashtriya Manav Sanghralaya has constituted a working group for the retrieval of bio-cultural material in Narmada Basin. Survey of tribal art and handicraft entrusted to M.P. Adivasi Kala Parishad is completed and report is available. Besides Anthropological Survey of India has covered these studies under its own project called "People of India". NVDA has procured six volumes of this report viz. Vol.I,II,III, VIII, X & XI & these are being studied for use in the R&R of tribal PAFs. The report is in 61 volumes out of which 7 volumes are under final editing. A Narmada Salvage plan is also launched by Anthropological Survey of India recently and the entire area is scanned and some ancient tools have been found.

ANNEX - XXXII-(8).



नर्मदा नियंत्रण प्राधिकरण

NARMADA CONTROL AUTHORITY

No.Env-5(1)/98/330

Date: 20/02/1998.

'To

The Managing Director,
Sardar Sarovar Narmada Nigam Ltd.,
Block No.12, New Sachivalaya Complex,
GANDHINAGAR. - 382010.

Sub: Note on field visit to plantation sites & sanctuaries in Gujarat from 4th Feb. to 8th Feb. 1998) by the Executive Member, NCA.

Sir,

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recellentering

I am directed to send a copy of the note on field visit to plantation sites & sanctuaries in Gujarat (from 4th Feb. to 8th Feb. 1998) by the Executive Member, Narmada Control Authority for favour of your information and necessary action please.

Encl: As above.

Yours faithfully,

/c (A.K. JHA)
Dy. Director (Env.,,
Ph. - 554729.

Sputal 198

113-8G. Scheme No. 74-C. Vijay Nagar, Indore - 452 010 (M.P.) ११३, बो जो, स्कोम क., ७४-सी, विजय नगर, इन्दौर ४५२ ०१० ि: 557276(EM), 551144 M.(P). 554333 M (E&R) 553344 M.(C) 554477 (Secretary) 557888 (EPABX)

Gram: NARCONTROL Fax: 91-731-559888

A NOTE ON FIELD VISIT TO PLANTATION SITES AND SANCTUARIES IN GUJARAT STATE (FROM 4TH TO 8TH FEB. 1998) BY THE EXECUTIVE MEMBER, NARMADA CONTROL AUTHORITY

Shri R.S. Pfasad, Executive Member, NCA along with Dr. Pawan Kumar, Specialist (Environment), Narmada Control Authority visited plantation sites in Distt. Bhuj, Wild Ass sanctuary in Rann of Kutchch Distt. Surendra Nagar, Nalsarovar Bird sanctuary located in Viramgam. and Agro farm of Sh. Kalidas Bhai Patel in Vill. Vatva of Distt. Ahmedabad during 4th to 8th of February, 1998 for inspection of Compensatory Afforestation for Sardar Sarovar Project and effect of Canals on the Sanctuaries. The key issues were discussed with the concerned officers Forest officers and following observations were made.

Compensatory Afforestation:

Plantations spread to 65 ha carried out during the year 1992-93 at Sambhari in Mandvi range and plantations in the same year, spread to 125 ha at Naliya of Naliya range were inspected on 6th February, 1998. Besides the plantations at Bachau 85 Km. from Bhuj was inspected on 7.2.1998. It was observed that the plantation have survived with high percentage of survival and as compared to the adjoining habitat were putting on good growth. A new ecosystem with low biological diversity seems to be developing in an area where little or no resource existed in the past. However not much activity except watch & ward was seen in the plantation areas. It was also observed that these plantations were about 5 year old but due to near xeric conditions in the area may not be yet considered as having passed the establishment period & therefore require support watering during the period of adversity. In particular the plantations at Naliya need immediate care of watering otherwise there is a possibility of their dying after some years.

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Discussions were held with local forest officers Mr. Shukla, C.F. Bhuj and Mr. Jhala, D.F.O., SSPA, besides local forest officers to ascertain the regulations for maintaining the plantations. It emerged from the discussions that the areas identified for compensatory afforestation were first to be declared as forest land and the plantations were got to be raised through forest department as per the plans approved by the competent authority. After the plan period these forest areas were to be handed over to the forest department for regular upkeep & maintenance. It was discernible that these plantations were in need of certain funds for their upkeep & maintenance including support watering during the coming summer. Absence of needed funds may lead to weathering of the plantations. This may give rise to unnecessary criticism of the Sardar Sarovar Project. It was therefore felt that the project authorities may explore arranging suitable funds required for maintenance of these plantations either from the funds of the regular forest department or from any other source till these could be considered established or at least till such time the project is completed.

Wild Ass Sanctuary:

Considering that the wild ass sanctuary shall be impacted by the SSP waters mainly by the Saurashtra Canal which intersects the two Rann(s) the Little & Greater and also considering the fact that the Environment sub-group of Narmada Control Authority have recommended Ethological studies on Wild Ass to establish or to deny the above facts and also to suggest remedial measures if required. The sanctuary areas was inspected on 5th Feb., 1998 for having a feel of the habitat of the wild ass and to have discussions with the locals & the concern forest officers. Except for the increased number of salt pans sanctuary seems to be in good shape as was evident from the sighting of a large number of wild ass besides a group of Pelicans, Flamingos, Ibis, Hiren, Cormorent etc. in the shallow depression of sweet water within the sanctuary. Breeding of the Flamingos was confirmed by the presence of five chicks of Flamingo. During tour of the sanctuary a large number of salt pans were seen & the area was bustling with the activities. The finding of EIA studies undertaken by GEER Foundations that salt pans were on rise within the sanctuary areas and were conflicting with the interest of the wild ass and other fauna of the sanctuary. Discussions with the Sanctuary Superintendent & other officers revealed that the issue of expending salt industry within the sanctuary is subjudice and the matter is being looked into by the concerned authorities. Regarding the concern raised by the sub-group, discussions were held with freelance scientists Dr. Neeta Shah an equid specialist. She was of the view that though it was projected earlier that movement of wild ass shall be negatively impacted by the construction of Saurashtra branch Canal but wild ass hardly moves to the Greater Rann of Kutchch from the Little one. According to her as the conditions are more harsh and xeric, there were very little number of wild ass within the Greater Rann of Kutchch and for the same reason there was little movement of the wild ass across these two rann(s). She offered to discuss this issue any further with supporting documents if required.

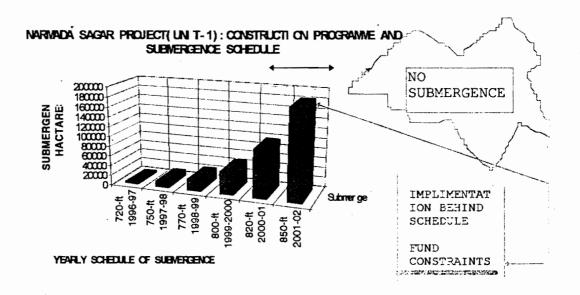
Nal Sarovar Bird Sanctuary:

Nal Sarovar Bird sanctuary projected as beneficiary of the proposed Sardar Sarovar Project was inspected on 8th February, 1998 & discussions were held with the incharge of sanctuary Mr. A.M. Parmar. The water was standing in the lake during February at 4 feet depth. It was observed that this year due to prolonged rainy season migratory birds were absent. The issues related with need for drawing of the canal water for the sanctuary were discussed and it was expressed by the Sanctuary incharge that in view of the fact that sweet water would be available to the sanctuary from the regeneration flows from the command of the SSP canal, the water from the Canals may not be needed. The efforts made by Mr. Parmar & his team in improving the management of the sanctuary and for resolving the conflict with the local villagers are laucable. It would be worth while to associate Mr. Parmar the incharge of the Sanctuary while discussing the EIA report prepared by GEER foundations currently under review of the Expert Multi-disciplinary Group.

Agro-Farm of Mr. Kalidas Bhar Patel:

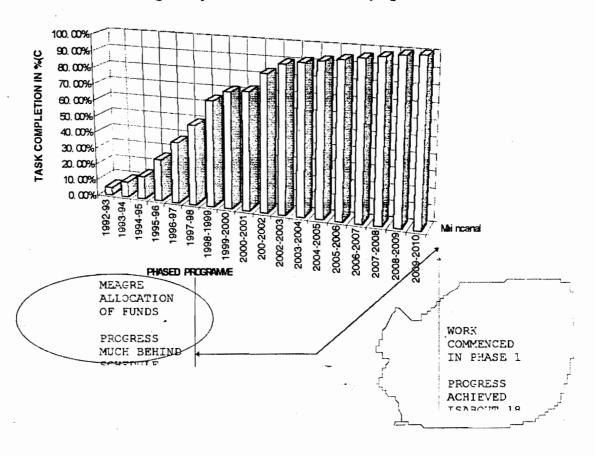
Agriculture farm of Mr. Kalidas Bhai Patel located in village Vatava Distt. Ahmedabad was inspected on 8th February, 1998 to ascertain the various models of tree cultivation suggested by him for their possible use on the farmers land within the proposed command of the Sardar Sarovar Project. It was observed that Mr. Sanjay Patel the Grandson of Late Mr. Kalidas Patel is currently managing the agriculture farm, his 60 heotare farm mostly had Ailanthus trees used mainly for small toys & packing industries in and around Ahmedabad. Some area of his farm was under Eucalyptus plantations and was surviving very well under irrigated conditions. The water table of the farm was stated to be about 260 ft. deep. Mr. Patel explained his experiences related with art of tree cultivation. Experiences of his grandfather have been documented to in greater details and shall be useful in designing, irrigated agroforestry plantation within the command area of the Sardar Sarovar Project.

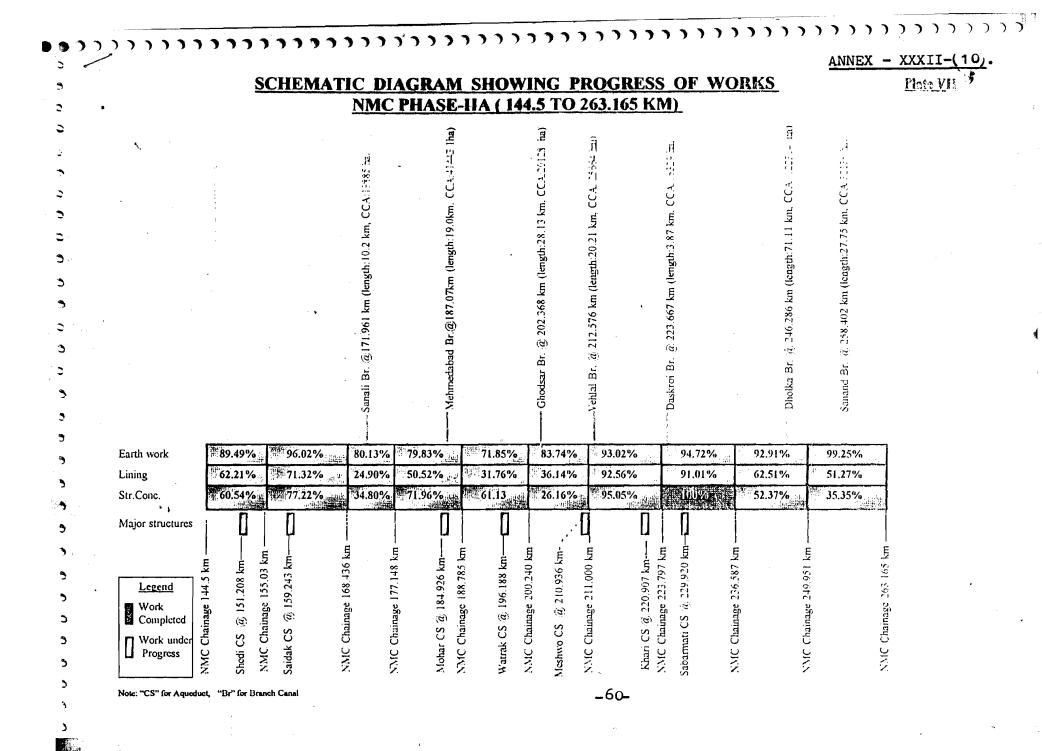
ANNEX-XXXII-(9).

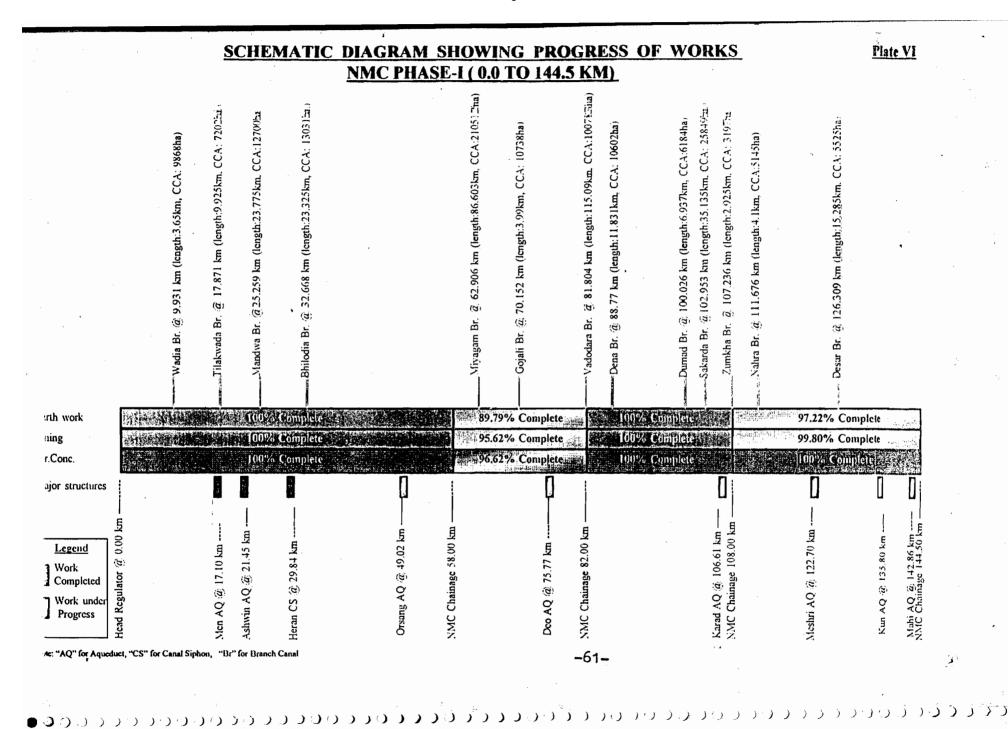


Narmada Sagar Project: Unit-2 Construction programme

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ANNEX-XXXII-(11:).

TABLE - 3

Yearwise Physical targets of Earth work, Excavation and Lining of Narmada Main Canal & Distribution System (Rajasthan Portion)

Description	Estd. Quantity	Unit	Target for the year								
			1994-95	1995-96	1996-97	1997- 9 8	1998-99	1999- 2000	2000- 2001	2001- 02	
Main Canal	,		l								
Earth Work	43.283	LCM	2.00	8.086	12.00	7.348	8.00	5.849	-		
Lining	74.00	Km.	-	3.00	16.00	23.000	20.00	12.00	•	-	
Distribution											
Earth Work	182.87 ·	LCM	-	13.721	36.382	24.228	24.811	39.034	32.135	12.559	
Lining	1349.00	Km.		-	145.00	250.00	350.00	300.00	200.00	164.00	

TABLE -4

Statement showing the Sub-Head wise target for Expenditure for Narmada Main Canal and Distribution System (Rajasthan Portion)

(Rupees in Lacs) Description Total Proposed yearwise target for Expenditure Expend Balance upto 31-3-Coet Cost 1994 1994-95 1995-96 1996-87 1997-86 1998-99 1989-2000-2001-2008 2001 02 E. work 888.27 **85 00** 803.27 73.55 144 93 185 90 136 90 153.29 108.71 2096.05 2096.05 6.83 426.20 Lining 317.61 482,16 612.14 251.11 1581.80 1581.80 182.11 198.10 353.68 506.29 341.62 1208 38 560 45 Buildings 797.74 797 74 252.35 315.18 229.58 1504.78 533.01 Dietribution-7291.32 1172.68 1321.6€ 7291.32 2.00 359.47 1209.37 422.39 440.42 aystem 2620.11 2620.11 100.00 529.67 567.17 26.80 30 00 29.30 Courses 156.79 156.79 25.09 90.00 96.21 430.07 Maintanance 5.00 20.00 20.00 Minc. 1306.28 1306.28 7.00 130.00 190.00 223.00 150.00 313.64 Establ 1981.69 1981.69 40.77 170.99 309.00 358.77 376.45 Payment of Share Cost to 1250.0 5000.00 3750.0 1336.5 28014.0 26764.0 2617.50 3000.00 3500.00 3500.00 3500.00 Gujarat Gove 46734.05 1335.0 3000.0 4625.87 6424.11 6906.84 8119.05 3475.6 Total 46649.0 7036.19 5871 38 1

TABLE - 5

NARMADA CANAL PROJECT (RAJASTHAN PORTION) YEARWISE POTENTIAL CREATION

Name of tributary	Off-taking RD in Km	C.C.A. in Ha.	Potential Creation (In Ha.)							
			1996-97	1997-98	1998-99	1998-2000	2000-2001	2001-2002		
Yank Disty	6.00	17046	17046	1	-	-	-			
Balera Disty	15.50	22594	11350	11344	-	-	-			
Isrol Disty	29.00	11803	-	11803	-	-	-	,		
Rathoda Discy	44.00	22260	-	-	13378	8582		. •		
Chitalwana Disty	51.00	24433	-	-	9770	14663	- ;			
Keriya	57.00	1158	- 1	-	1158	-	-			
Hotigaon Disty	59.00	2969	- i	-	-	2969	-			
Banki Disty	70.60	4239	-	-	-	. !	4239			
Tail Disty	74.00	25874	-	. •	-	-	17330	11544		
		135471	28396	23147	24306	26514	21569	11544		

BACK TO OFFICE REPORT

VISIT TO JOGA FORT - 20TH JULY, 1998.

TO: THE MEMBER (E&R), NCA, INDORE.

FROM: DR PAWAN KUMAR, SPECIALIST (ENVIRONMENT)
A.K. JHA, DEPUTY DIRECTOR (ENVIRONMENT)

ISSUE: INSPECTION OF JOGA FORT AND ASSESSMENT OF IMPACT ON THE FORT DUE TO NSP.

As a follow-up of the decision taken during the 1st meeting of the Committee on Archaeological Aspect of NSP held on 20.5.98, a team consisting of representatives from NCA, NVDA & Archaeological Survey of India (ASI) (list is enclosed at Annex-1) visited the Joga Fort on 20.7.98 for resolving the issues related with impact of Narmada waters on Joga Fort situated in village Joga Kalan of district Hoshangabad, M.P.

During the visit, NVDA engineers stationed at Khandwa, who are in-charge of the project execution, provided the salient levels at or nearby Joga Fort.

R.L.of plinth of Joga Fort	:	+ 274.80 M
R.L. of TOP of Joga Fort	:	+ 284.75 M
R.L. of Main Gate of Joga Fort	:	+ 271.035 M
R.L. of TOP of well	:	+ 261.39 M
F.R.L. of ISP	:	+ 262.10 M
HFL corresponding to 1 in 100	:	+ 264.27 M
year Flood (62,500 cumees)		•
HFL corresponding to 1 in 1000	:	+ 266.029 M
year Flood (83,366 cumees)		
BWL corresponding to 1 in 100	:	+ 265.52 M
year Flood		
BWL corresponding to 1 in 1000	:	+ 266.637 M
year Flood		
Water Level on (20.7.98)	:	+ 252.00 M
River Bank	:	+ 259.14 M
River Bed	:	+ 248.75 M

SOURCE OF IMPACT

CHARLES CONTROLLE CONTROLL

A drawing indicating few important levels is also enclosed. From the above data, it becomes clear that the well situated in the midst of north bastion will be fully submerged at FRL + 262.10 M. However, this will remain submerged for 2-3 months during monsoon when reservoir might be full at FRL. Once the water is released from reservoir for power generation and irrigation, water will be drained through openings made into the bastion surrounding the well.

As far as backwater effect is concerned, the temporary rise due to backwater will be about 0.60 M near well over and above HFL.

ASSESSMENT

From on-the-spot assessment of the north bastion, it was observed that the bastion was situated on firm rock. Moreover, at a distance of 50-100 M upstream of the bastion, there are two natural spurs of rock projecting from left bank which deviates the current and not allowing it to impinge on the bastion. It was observed that only plasters, applied during regular maintenance at two Patches had fallen-off.

The proposal of ASI of constructing a wall around the bastion was discussed and it was felt that this was not required from engineering as well archaeological point of view as it would conceal the existing bastion completely.

RECOMMENDATIONS

It was suggested by the team that 50 mm shotcrete with a wire mesh around the wall from base to top of the northern bastion would be adequate measures. The effect of scouring at the toe of the wall could not be ascertained as it was inside the water. It is further recommended that in case effect of scouring are discernible, these may be plugged suitably.

ANNEXURE-I

LIST OF PARTICIPANTS IN THE VISIT TO JOGA FORT ON 20.7.98

NARMADA CONTROL AUTHORITY

- 1. Dr. Pawan Kumar, Specialist (Environment)
- 2. Shri A.K. Jha, Deputy Director (Environment)

ARCHAEOLOGICAL SURVEY OF INDIA

- 1. Shri N.Tahir, Dy. Superintending Archaeologist, ASI, Bhopal
- 2. Shri G.Ramchandani, Assistant Superintending Archaeological Engineer, ASI, Bhopal.
- 3. Shri S.N.Shrivastava, Conservation Assistant, ASI, Bhopal.

NARMADA VALLEY DEVELOPMENT AUTHORITY

- 1. Shri Suresh Chandra, Member (E&F), NVDA.
- 2. Shri C.R.Andhare, Superintending Engineer, ND Circle-9, Khandwa.
- 3. Shri R.N.Chandravanshi, Executive Engineer, ND Divn.13, Khandwa.
- 4. Shri R.K.Garg, SDO, ND Sub-divn.66, Khandwa.
- 5. Shri B.Singh, DFO, Harda, NVDA.
- 6. Shri A.K.Singhal, AE(Reh.), NVDA.

केवल सरकारी प्रयोग के लिए FOR OFFICIAL USE ONLY



A.

COUNTERING CONTRACTOR STATE ST

नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल ENVIRONMENT SUB-GROUP

बत्तीसर्वी बैठक का कार्यवृत्त MINUTES OF THE 32ND MEETING

14 अक्टूबर, 1998 को पर्यावरण भवन, नई दिल्ली में हुई Held at New Delhi on 14th October, 1998

> **इन्दौर** INDORE नवम्बर, 1998 November,1998

MINUTES FOR 32ND MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 14TH OCTOBER, 1998 AT PARYAVARAN BHAWAN, NEW DELHI.

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	Submission of CAT plans for freely draining critically degraded sub-watersheds.	5	
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MINUTES OF 32ND MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 14TH OCTOBER, 1998 AT PARYAVARAN BHAWAN, NEW DELHI.

INTRODUCTION

The 32nd meeting of the Environment Sub-group of NCA was held at Paryavaran Bhawan, Ministry of Environment & Forests, New Delhi on 14th October, 1998. A list of participants is enclosed at *Annex – XXXII-Min.(I)*.

Secretary, MOE&F and the Chairman of the Sub-group welcomed the participants. Discussion on the agenda items was taken up thereafter.

Item No.XXXII-1(149): CONFIRMATION OF MINUTES OF THE 31ST MEETING.

Member (E&R), NCA brought to the notice of the Sub-group the letter of Dr. Shekhar Singh requesting correction in the minutes of the 31st meeting. A copy of the note, dwelling on the need for a time frame on pari-passu compliance received from him was also circulated during the meeting.

It was decided to discuss the suggestions given by Dr. Shekhar Singh in his note but the minutes of 31st Minutes were confirmed as circulated.

Item No. XXXII-2 (150): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

I) Pari-Passu Context & Compliance (Letter of Dr. Shekhar Singh) [XXI-4(148)].

The Chairman observed that the construction of Sardar Sarovar Project has been at halt for the last few years giving an opportunity for correcting imbalances in sequencing of the events. He appreciated the works being done in Gujarat and expressed that there was a need to expedite the works in Madhya Pradesh. He suggested formation of a committee of the Sub-group for an independent assessment through field visits.

He further informed that officers from MOE&F & NCA would be undertaking a joint inspection of the works on environmental safeguard measures in NSP areas shortly. During this field visit affected people would also be given an hearing. This was welcomed by V.C., NVDA.

M.D., SSNNL, GOG however cautioned that the same and same issues were raised repeatedly by the NBA before the Supreme Court, R&R Sub-group, R&R Committees etc aimed only at stalling the project. He pointed out that any issue, non-issue or forum which helps in generating a confusion was good enough for them. He further clarified that they were not feeling shy of redressing any grievances.

The note on time frame circulated by Dr. Shekhar Singh was taken up for discussions. A copy of the note is placed at *Annex-XXXII.Min.(2)*.

Chairman desired to review the broad time frame on compliance and suggested that while discussing this, the views expressed by Dr. Shekhar Singh in his note may also be kept in view.

Catchment Area Treatment:

On the suggestion contained in the note of Dr Shekhar Singh it was pointed out by the Member (E&R), NCA that the needed studies were already in place and completed action plans were available and that execution had also significantly advanced.

Regarding time frame for completion of the works Prof. Ramasheshan desired that a decision should be recorded which should be final and should not be open to discussion off and on. He was of the view that for directly draining areas to impounded reservoir the work of CAT should be completed in its vicinity before the storage was completed. The Sub-group endorsed his view.

Rehabilitation:

Regarding the suggested time frame, it was pointed out that the time frame for R&R was already laid down by the Narmada Water Dispute Tribunal Award & the implementation was already under review of the Supreme Court. Besides, there was a

separate Sub-group on this issue therefore it would be desirable to leave this issue for the other Sub-group.

Seismicity & Rim Stability:

Prof. Katti informed that before the alignment was completed, the risk analysis had been done and seismic aspect had been taken care of. In view of this, the issue is redundant in the present context.

Impact on human health:

It was pointed out that the studies on the negative impacts of the project on human health were studied by the state health departments with the help of leading institutes like National Institute of Communicable Diseases, Malaria Research Centre, Indian Council of Medical Research, Medical Colleges (Gandhi Medical College, Bhopal, Topiwala National Medical College, Mumbai,), Commissionerate of Health, World Bank experts etc. Baseline data was collected and action plans were already in place. The plans prepared by the State Health Departments included both preventive and curative aspects. These plans were being reviewed periodically by the experts on health and were being updated time to time. A note on the plans & action taken by State Governments would be made available to all the members.

Impact on aquatic ecosystem:

The time frame for such items was already covered up in the discussion above, the implementation aspect would be taken-up during review of the progress.

Dust and noise pollution at construction site:

The Chairman desired that this activity should be carefully planned and implemented.

Archaeological Monuments site, Submergence of terrestrial bio-diversity.

This should be taken care of on the line as agreed earlier.

Summing up the discussion on the time frame the Chairman clarified that all these issues were considered prior to according environment clearance by the MOEF. He however, desired that a tabular statement on the lines discussed above may be prepared for a review, while preparing the statement the submergence would be the criteria for assessing the pari-passu compliance in general. However, on the issue like flora-fauna, archaeology etc. which are impacted by the submergence directly, steps for their mitigation have to be taken, prior to submergence. He Further clarified that the Subgroup accepted the spirit of the Dr. Shekhar Singh's letter.

II) Submission of Catchment Area Treatment (CAT plans for freely draining critically degraded sub-watersheds [Item No.XXII-2(112).]

Submission of micro watershed plan for freely draining critically degraded sub-watersheds by Govt. of Maharashtra and Madhya Pradesh.

As per the decision of Govt. of India of June, 1992, the project authorities were required to submit Action Plan for treatment of balance of the critically degraded subwatersheds within the freely draining catchment.

Govt. of Gujarat

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There was 29,157 ha of catchment in Gujarat. Govt. of Gujarat have almost completed treatment of the entire freely draining catchment within the Narmada basin.

Government of Madhya Pradesh

Govt. of M.P. were required to submit schemes for treatment of sub-watersheds covering both forest and non-forest areas spread to 3,52,089 ha.

Govt. of M.P. had submitted 16 no. of schemes spread to 37,514.28 ha. area. GOMP informed that additional 6 schemes covering an area of 13,530 ha have been submitted to GOI for fundings. In total 13,400 ha has been treated up out of 52,000 ha. On Chairman's specific query about time frame, GOMP informed that work in SSP area was scheduled for completion by 2011 and that for NSP by 2023.

Govt. of Maharashtra

Govt. of Maharashtra were required to submit schemes for treatment of subwatersheds spread to 80,881 ha. area covering, both forest and non-forest land.

In pursuance of the discussions of 31st meeting, 35 no. of schemes for treatment of forest areas covering 41,973.15 ha.were received from Govt. of Maharashtra. These reports were reviewed in NCA office & observations thereon were annexed with the agenda papers.

The issue in Maharashtra could not be discussed in the absence of any representatives from GOM.

III) POLICY ISSUES

Regarding increasing the duration of treatment from the present three years, to five years, the representatives of the states sought the assistance of sub-group for taking up this issue with the MOA. It was informed that NCA & NVDA have approached the MOA for a consideration. Jt. Commissioner, MOA was requested to convene a meeting to review this issue.

The Chairman suggested that MOEF should keep pursuing this issue with Ministry of Agriculture.

1. Silt Monitoring:

Govt. of Gujarat

It was informed that CCF, SSPA in consultation with the Director, GERI is preparing the plan for evaluation & monitoring of sedimentation in the reservoir.

Govt. of Madhya Pradesh

Representative of GOMP informed that one silt monitoring station though sanctioned but could not be established because of non-availability of imported equipment. It was assured that NVDA were in touch with the concerned manufacturers and progress of establishment of SMS would be informed shortly.

Cost estimates for preparation of Action plans and implementation of environmental safeguard measures.

Representatives of GOMP informed that estimates for environmental safeguard measures at 1996-97 price level were under revision. Sub-group was informed that as this involves data collection from various departments it might take some time. V.C., NVDA however, assured that efforts would be made to make this available by the next meeting.

Govt. of Gujarat provided an updated statement on environmental cost during the meeting. This is placed at *Annex-XXXII-Min.(3)*.

3) Establishing a separate authority for coordinating Environmental works in Maharashtra.

A draft TOR for the proposed Narmada Environment Authority in Maharashtra compiled by NCA was provided to GOM for their consideration. In the absence of a representatives from GOM, the views of State Govts. could not be known. However, it was suggested that there might be difficulty in notifying an elaborate authority as suggested, therefore GOM might like to create an environmental cell for this purpose instead of an authority.

Chairman took a strong view of continuous absence of responsible representatives from GOM.

4) Publications on Environment:

GOMP presented copies of its publication on Rehabilitation programme of Indira Sagar Project (ISP) during the meeting, a copy of this is placed at Annex-XXXII-Min. (4). They informed that publication on Environment in respect of ISP was under printing and that for SSP it was being drafted. They assured that suitable scientific and popular publication on the good works done/being done by NVDA would be issued shortly. GOG informed that they were working on publication on bio-diversity and other

publication and they were in touch with the NCA for bringing out similar publications on other topics.

Chairman desired that NCA should take the initiative to bring out popular scientific publications on key environmental safeguards in the projects. Member (E&R), NCA assured the Sub-groups of one such publications before the next meeting.

Chairman suggested that if necessary, leading institutes specialising in specific areas might be engaged for the purpose.

5) Cost of Catchment area treatment works in Maharashtra:

Narmada Control Authority during it's 55th meeting held on 13.11.1996 desired that the cost norms for treating catchment area in Maharashtra may be looked into by the ESG. Sub-group discussed the issues during 28th to 30th meeting and it was agreed that the cost estimates for treatment works varies with features like topography, soil type, menu of treatment etc. have to be viewed accordingly.

Comparative cost estimates of CAT works in MP & Maharashtra based on the plans were considered. A brief note on comparison of estimates (for CAT in Forest Area) was annexed with the agenda papers. The Sub-group agreed with the analysis and noted the information brought out in the agenda.

The expenditure statements for CAT works were furnished by GOG & GOM. This was in line with the planned estimates.

6) Monitoring of R&R aspects of NSP:

It was brought out that R&R Sub-group chaired by the Secretary, Ministry of Social Justice and Empowerment could discharge the function of monitoring of R&R of ISP. This was noted.

Item No. XXXII-3(151): PRESENT STATUS OF STUDIES, SURVEYS AND ENVIRONMENTAL ACTION PLANS.

Updated progress on the agenda items listed in the discussions, received from the State Govt. of Madhya Pradesh and Gujarat, during the meeting are placed at Annex-XXXII-Min. (5)& (6).

1) PHASED CATCHMENT AREA TREATMENT

• Narmada Sagar Project

GOMP informed during the meeting that against a target of 73,456 ha. an area of 40,818 ha. has been completed.

• Sardar Sarovar Project

Government of Madhya Pradesh

GOMP informed that an area of 70,403 ha against a total target of 1,25,725 ha had been completed. It was pointed out that going by the past performance of the NVDA it would be a difficult task of treating an area of 15,000 ha per year. Vice Chairman, NVDA assured the Sub-group that though availability of funds was a constraint yet they would make all efforts for adhering to the given targets for CAT. In response to a query from the Chairman regarding a definite time frame for meeting this targets, Vice Chairman, NVDA assured that CAT works would be completed within 2 years in SSP and 4 years in NSP areas.

2) COMPENSATORY AFFORESTATION

Narmada Sagar Project

Govt. of Madhya Pradesh

Compensatory afforestation works over an area of 67,133 ha against a target of 80,945 ha were reported to have been completed by the end of June, 1998. Progress of plantations during 1997-98 was reported as 3,305 ha.

Sardar Sarovar Project

Govt. of Madhya Pradesh

By the end of June, 1998, Govt. of M.P. had completed plantation works over an area of 8,433 ha against a final target of 8,740 ha.

Govt. of Maharashtra

Progress could not be discussed.

Govt. of Gujarat

By the end of September, 1994, Govt. of Gujarat had completed plantation works in the entire planned area of 13,950 ha. (including both non forest and degraded forest areas).

Officers from NCA visited compensatory afforestation site in Distt. Bhaj, and offered suggestions. Govt. of Gujarat informed that in accordance with the suggestions given by officers of NCA during their field visit funds have been provided for watering of the plantations in summer & maintenance of watchman for its protection.

3) COMMAND AREA DEVELOPMENT:

• Narmada Sagar Project

Programme and progress of works on construction of canal networks as per the information available was annexed with the agenda papers. This was under examination by NVDA.

As per earlier decisions the TOR(s) framed by GOG & GOR were also required to be referred by the GOMP for finalising the TOR for preparation of Command Area Development Plan. Copies of the TOR for the studies on integrated development of the command area were made available to the NVDA. TOR from Govt. of Rajasthan was awaited. V.C., NVDA however, assured the Sub-group that TOR for the integrated development of the command area would be finalised by the next meeting.

Representative from Jawaharlal Nehru University, Khandwa presented the findings of study "Impact of agro-chemicals on water quality". They observed that with the availability of water, farmers tend to use more fertilisers and adopt different cropping pattern. They further observed that sub-surface water pollution was more. They informed that they would be developing a model by considering the important cropping pattern and recommending the preventive measures within two years.

• Sardar Sarovar Project

Progress of works on construction of canal and status of readiness was presented with the agenda papers.

Govt. of Gujarat

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Representative of GOG informed that phase-I of command area development was linked with raising of dam height upto EL+110.0 M and completion of main canal/branch canal / Distributories in that reach. Unless these two components were completed irrigation can not start in the command. It was further informed that plan for integrated development of the command area was under preparation. Regarding scope of irrigated agro forestry in phase-I it was informed that scientists of Gujarat Agriculture University & that of the Horticulture & Forest College, Navsari have been requested to give their

recommendations in this regards. A draft plan would be prepared in consultation with ICAR, New Delhi.

M.D., SSNNL elaborated the approach of SSNNL for command area development. He informed that command area of Narmada main canal had been divided into 13 agroclimatic zones. He informed that main canal was totally lined to avoid seepage thereby reducing the possibility of water logging. He further informed that one of the assumptions of the planning was to promote conjunctive use of water. Farmers would be provided water on volumetric basis. He assured that mathematical modeling was also being developed. He informed that canal operation would be fully automatic for the first time in India. Chairman appreciated the approach of GOG.

Govt. of Rajasthan

Progress of works on construction of canal networks was presented with the agenda papers.

It was informed that Environmental Impact Assessment of the Narmada Canal in Rajasthan had been completed by WAPCOS and report was awaiting approval of GOR. Addl. Secretary (Env.), Govt. of Rajasthan informed that EIA report presented by WAPCOS was likely to be approved by Govt. of Rajasthan by the end of Oct. 1998. Chairman desired that Command Area Development plan should invariably include groundwater, conjunctive use of water, water logging, cropping pattern, use of pesticides etc.

4) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

Narmada Sagar Project

A large number of studies completed for the Indira Sagar Project (NSP) were reviewed by the Committee of experts convened by NCA, for indicating the actions needed for protection of flora & fauna. The main thrust areas were conservation of endangered species, provision of migratory corridors and improving the carrying capacity. Based on the recommendations of the study group declaration of prime areas of Indira Sagar Project as National Park/ sanctuaries was lying pending with GOMP. Representative of GOMP informed that notification for declaration of National Park/ Sanctuaries was still under consideration of State Govt. Chairman desired that Chief Secretary, GOMP should be addressed by MOE&F to expedite the notification.

Sardar Sarovar Project:

Reports submitted by various study groups were reviewed during the 2nd meeting of the Expert Committee on Flora & Fauna held on 26th September, 1996. Expert group in view of the enlargement of Shoolpaneshwar sanctuary in Gujarat border in Maharashtra & proposal for creation of Park/Sanctuaries for ISP in M.P. recommended

that there was no need for creation of new Park/Sanctuaries in M.P. or Maharashtra, even though recommended in the study reports.

Government of Gujarat

GOG informed that action plan on development of Shoolpaneshwar Sanctuary was completed. It covers habitat improvement, captive breeding of endangered species, interpretation center and eco-development programme. It was informed by GOG that implementation of this plan was going on.

Government of Madhya Pradesh

GOMP informed that SFRI, Jabalpur had carried out the survey of the impacted zone of Sardar Sarovar Project in Madhya Pradesh. They observed that forest area was highly degraded. They further informed that State forest Deptt. was requested to draw up a plan for forest management and social forestry. This would be in addition to the area already covered up under CAT.

The Chairman desired that the action plan should focus on eco-regeneration through planting of indigenous species with the help of local inhabitants.

Govt. of Maharashtra

Progress could not be discussed.

5) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

• Narmada Sagar project

During 31st meeting held on 20.1.98, NVDA informed that protection/relocation of 10 monuments besides excavation of additional 5 sites have been included in the revised Action Plan.

It was informed that as directed by the Sub-group during 31st meeting held on 20.1.98 a committee was constituted to resolve various outstanding issues on archaeological aspect of NSP. He informed that in addition to the field visit to Joga Fort two meetings of this committee were held on 20.5.98 and 1.9.98. The committee had concluded that though Joga Fort was above the submergence, the northern bastion containing intake well would be impacted by the submergence of Indira Sagar Projects. To protect this monuments ASI had indicated that application of cement over the national monuments was not desirable and hence suggestion of shotcreting was not acceptable. However a suitable plan to safeguard the monuments would be taken by the ASI. NVDA assured that they would be accepting the recommendation of ASI on the protection of north bastion of Joga Fort.

They further informed that revised action plan of Archaeology was ready wherein the concern raised by Dr. Romila Thapar and Mr. Otta had also been addressed. The Chairman desired that Member (E&R), NCA should get in touch with Dr. Romila Thapar to allay her apprehensions.

• Sardar Sarovar Project

Government of Madhya Pradesh

Sub-group reviewed the compliance status of the monuments affected by SSP during its 31st meeting. Accordingly seven monuments were to be relocated by GOMP. Temples located at Semalda and Barda were required to be relocated before the dam height could be raised to 110m.

Member (E&F), NVDA informed that temple at Barda had been relocated. As regards the relocation of the temple at Semalda, this is to be executed by ASI. In addition to this, sanction has been issued for relocation of monuments of Khujawa and rock cut sculptures at Pipladgarhi area.

Government of Gujarat

Out of the two temples proposed for relocation, one temple viz. Shoolpaneshwar temple was already relocated. Regarding 2nd temple, GOG representative informed that Hampheshwar temple would be relocated by next year.

ANTHROPOLOGY

Government of Madhya Pradesh

The Govt of Madhya Pradesh has proposed that the Project Affected Families (PAFs) belonging to scheduled tribe and scheduled caste on their migration to Gujarat on their resettlement & rehabilitation, be extended with all statutory, semi-statutary and non-statutory privileges, benefits and rights as they were enjoying in their home state of Madhya Pradesh. In this context, the Govt. of Gujarat has issued a Govt. Resolution vide its letter No.SCW/1091/201/Kit dated 18.7.1991 to the effect of extending of semi-statutory and non-statutory benefits.

As regards the statutory benefits, the Govt. of Madhya Pradesh vide its letter No.7/TW Cell/1148 dated 2.8.94 has proposed amendment to Article 341 and 3-42 of the Constitution of India to the Govt. of India, Ministry of Welfare (Ministry of Social Justice & Empowerment). The Govt. of Gujarat has also consented for the aforesaid amendment. But orders to this effect are still awaited from Govt. of India.

Chairman suggested that MOE&F would request MOSJ&E to expedite the issue.

6) SEISMICITY & RIM STABILITY OF RESERVOIR

• Narmada Sagar Project

GOMP informed that 10 sites have been identified. They provided a copy of status report of seismic monitoring network of ISP complex which is placed at *Annex-XXXII-Min(7)*.

• Sardar Sarovar Project

Government of Gujarat

For regular monitoring of the seismicity in the vicinity of the reservoir, a total of 9 seismic stations have been planned GOG informed that 8 stations were functioning and ninth was under construction.

7) HEALTH ASPECTS

• Sardar Sarovar Project & Narmada Sagar Project

DDG, ICMR presented the recommendations of the 2nd meeting of Committee of experts on health held on 22.5.98. GOMP informed that as suggested by ICMR and health committee, reference baseline data would be reviewed. DDG, ICMR suggested that during the course of study itself, a third party evaluation should be done. Representative of NICD suggested that surveillance studies in some impacted areas might be taken up under National Disease surveillance programme of GOI to which NICD is the co-ordinator. Chairman requested NICD to help project authorities in this matter.

8) FISHERIES DEVELOPMENT OF SARDAR SAROVAR PROJECT & NARMADA SAGAR PROJECT RESERVOIR

A meeting of a small working group, constituted by the High Level Expert Group on Fisheries Development & Conservation was held on 6.8.98 to amalgamate the draft guidelines for conservation & development of fisheries in the reservoir, streams, revulets & the command area. This was followed by the field visit of the experts from Ministry of Agricultural, I.C.A.R., Govt. of Gujarat & NCA. The recommendations of the group shall be discussed during 5th meeting of High Level Expert Group to be convened soon.

Prof. Shekhar Singh pointed out that all efforts were being made to compensate the commercial loss of fisheries whereas nothing was being done to preserve the aquatic biodiversity. He suggested inclusion of ecologists in the committee supervising conservation of aquatic ecosystem. It was informed that there was a High Level Expert Group on Fisheries Development & Conservation under the chairpersonship of the Adll. Sec.(FY) Ministry of Agril. Govt of India and that two eco-itheologists were represented on to this committee on the suggestion of the environment subgroup. Already four meetings have been held so far. Fifth meetings is likely to be convened shortly. The guidelines for conservation & development of fisheries in the reservoir, stream rivulets & command area are on the anvil.

Item No. XXXII-4(152): Strengthening of Environment wing of NCA

M.D., SSNNL pointed out that a lot of work has been done on the environmental monitoring of Sardar Sarovar Project. A number of studies had been completed on every aspect of Environmental Safeguard Measures. Narmada Control Authority, being the primary monitoring authority, should take the lead in generating a data bank for which sustained interaction & coordination would be required. He suggested that NCA should have Officers in Environment discipline in the higher rank for specialised jobs. He further suggested that a committee may be constituted under member E&R, NCA for the purpose.

Member (E&R), NCA informed that a comprehensive review was being done which would take care of this aspect.

Summing up the discussion Chairman observed that a large number of studies had been carried out in SSP & NSP and stated that we should generate a data bank which should act as a model for future projects. Chairman agreed to the suggestions of M.D., SSNNL and stressed further that data should be easily comprehensible and retrie able to provide a decision support system. He requested members of the Sub-group to help project authorities in this endeavor.

He suggested that before convening the next meeting, a booklet should be published to answer the questions raised by various project proponents/opponents and to bring out up-front the good works being done.

The meeting ended with a vote of thanks to the chair.

ANNEXURES

LIST OF PARTICIPANTS OF THE 32^{ND} MEETING OF ENVIRONMENT SUBGROUP HELD ON 14^{TH} OCTOBER, 1998 AT PARYAVARAN BHAWAN, NEW DELHI.

GOVERNMENT OF INDIA

Ministry of Environment & Forests

S/Shri

1. Vishwanath Anand, Secretary, MOE&F,

- CHAIRMAN
- 2. V.P. Singh, Chief Conservator of Forest (C), Western Region, Bhopal.
- 3. Dr. Nalini Bhat, Additional Director, New Delhi.

Narmada Control Authority

1. N.D. Tiwari, Member (E&R),

- MEMBER SECRETARY
- 2. Dr. Pawan Kumar, Specialist (Env.).
- 3. A.K. Jha, Dy. Director (Env.).
- 4. Joginder Singh. Dy. Director (L).

Sardar Sarovar Construction Advisory Committee

1. A.K. Mahana, Secretary, SSCAC, Vadodara.

Ministry of Water Resources

1. V.K. Trikha, Under Secretary (PP), New Delhi.

Indian Council of Medical Research.

1. Dr. Rashmi Arora, Dy. Director General, ICMR, New Delhi.

National Institute of Communicable Diseases

1. Dr. Gautam Biswas, Dy.Director, NICD, New Delhi.

Ministry of Agriculture

- 1. Dr. P.S. Pathak, ADG (Agroforestry), ICAR, New Delhi.
- 2. K. Vijaya Kumar, Joint Commissioner (Fisheries), MOA.

Botanical Survey of India

1. Dr. S.K. Shrivastava, Scientist, BSI, Allahabad

COVERNMENT OF GUJARAT

- 1. L. Hansingh, Mar ging Director, SSNNL.
- 2 Dr. S.A. Chavan, CCF, SSPA.
- 3. V.C. Trivedi, J.C. @ & Spl. (Env.).

G - FREMENT OF MADHYA PRADESH

- 1. Ravinder Sharma, Vice Chairman, NVDA.
- 2. Stouch Chr. dra. Member (E&F), NVDA.
- 3. K.N. Dube Die stor (CAT), NVDA.
- 4. R.K. Behro, SMS (H&S), NVDA
- 5. R.R. Singh, Project Officer, Deptt. of Archaeology & Museum.
- 6. Dr. D.L. Kauraw, Senior Scientist, JNU, Khandwa.

GOVERNMENT OF RAJASTHAN

1. N.K. Mathur, Additional Secretary (Env.)

EXPERTS MEMBERS

- 1. Dr. R.K. Katti, Prof., UNEECS, Mumbai.
- 2. Dr. S. Ramaseshan, Prof. (Retd.), (HT, Kanpur), Chennai & Expert (Hydrology).
- 3. Dr. Shekhar Singh, IIPA, New Delhi.

ANNEX-XXXII·Min·(2)

Dams, Conditional Environmental Clearances and the pari-passu clause

Shekhar Singh

- In the last 15 years or so, there has been a tendency to grant conditional environmental clearance to major dams with a pan-passu clause. This means that the environmental studies and assessments that need to be done, and the action that needs to be taken in advance of project clearance would have to be done concurrently with project construction.
- 2. Presumably, such clearances are given when there is a need to expedite initiation of the construction of the project. The desirability, or otherwise, of this is not being discussed here.
- There are three distinct sets of environmental issues relating to dam projects. These are:
 - i) Whether the project is environmentally viable? In other words, are the inevitable environmental costs of the project justified?
 - ii) What measures need to be taken, if the project is to be made environmentally viable, to minimise its negative impacts on the environment?
 - iii) What are the costs of such measures and how do they affect the financial viability of the project?
- 4. In order to answer question (i), detailed environmental impact studies need to be carried out and their findings assessed. On the basis of these, it can be determined whether the benefits from the project justify its inevitable environmental costs.
- 5. If, based on the earlier exercise, the project is found viable then the earlier studies have to be built-upon and action plans have to be formulated to minimise environmental damage.
- 6. Once the measures required for minimising environmental damage have been clearly determined, then they need to be costed in order to ensure that even if the project is considered environmentally viable, does it remain financially viable if all that is required to protect the environment is done.

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- 7. Clearly, if proper decisions have to be rnade, all these questions have to be asked and answered prior to a project being considered for environmental clearance.
- 8. When a conditional *pari-passu* clearance is given, it usually means that these three questions have not been answered to the point where a final decision can be made. In other words, when a project is given conditional *pari-passu* clearance, there is a possibility that the project might subsequently be proved to be environmentally and/or financially non-viable.
- There is also the practical danger that, due to the inadequate monitoring system of the Ministry of Environment and Forests (MoEF), once clearance is given, albeit conditional, the required studies and action plans would not be finished in time. Even where the studies and action plans are completed, there is the danger that the required remedial measures will not be implemented in time or properly. Therefore, in





those cases where the government has seen fit to grant environmental clearance even before the environmental and financial viability of a project is established, there is a special responsibility on the MoEF to ensure that at least the *pari-passu* clause, with all its inherent weaknesses, is properly adhered to.

- 10. It also has to be ensured that the decisions relating to the environment are being made in a democratic, participatory and transparent manner, especially by consulting and keeping informed all the main stakeholders, especially the communities most directly affected by the project.
- 11. The question of how exactly to determine what constitutes adherence to the *paripassu* clause has never been settled. This is clear from the debates which surround this aspect of three of the major projects which have been given such conditional clearance: the Indira Sagar project in Madhya Pradesh, the Sardar Sarovar project in Gujarat and the Tehri project in Uttar Pradesh.
- 12. Recently, the Sardar Sarovar and Narmada Sagar project authorities have suggested that compliance with the *pan-passu* clause should be judged based on the proportion of submergence. In other words, they seem to suggest that the *pan-passu* condition would be fulfilled if, overall, the proportion of studies, action plans or action completed is not less than the proportion of the reservoir filled. This, however, appears to be an unsatisfactory and erroneous way to determining compliance with the *pan-passu* clause.
- 13. The correct interpretation of the *pari-passu* clause involves identifying the different types of environmental activities required under a conditional clearance, and the purpose of each. It must also be remembered that *pari-passu* means concurrent and not co-terminus action.
- 14. As already mentioned earlier, by giving conditional clearance with a pan-passu clause the government in effect allows project work to start without determining the environmental or financial viability of the project. However, this does not take away the right of the government to re-assess the clearance that it has given if findings of the required studies begin to establish that the project is environmentally non-viable. In other words, the government has the obligation to reverse its decision on the project if subsequent evidence suggests that the environmental costs of the project are unacceptable, or that their mitigation to within acceptable limits would make the project financially non-viable. For this purpose, all the required studies that assess the environmental impact of the project and determine costs of mitigation should be completed as soon as possible. This is essential in order to minimise the financial loss in case the project is proved to be non-viable and consequently scrapped. That is why conditional clearances often prescribe a time frame within which studies, action plans and even some action has to be completed.
- The second objective of the various studies and action plans is to ensure that the environmental impacts of the project are minimised. For this purpose, it is essential that these studies and action plans are completed and action taken, before project related activities cause irreversible damage to the environment. In fact, where project activities threaten an ecosystem or species that is to be rehabilitated, not only studies and action plans but even successful rehabilitation must be completed before such project activities are allowed to commence. There could, for example, be an ecosystem or species that would disappear even if 10% of the area was submerged.



Consequently, it cannot be argued that if 10% of the surveys of wildlife have been completed and 10% of the remedial action taken, then it does not violate the *paripassu* clause if 10% of the area is submerged. Clearly, 100% of the surveys and action plans and 100% of the rehabilitation must be completed before such submergence is allowed.

- 16. Similarly, degraded catchments would have a negative impact on the project by silting up the reservoir. Where any impoundment starts before the catchments (at least the very high and high erodibility categories) are adequately treated and stabilised, an important purpose of catchment area treatment is defeated. Clearly, if all this is kept in mind, the simple formula of percentage of impoundment being co-related to the percentage of environmental study and action is not correct.
- 17. Many other such examples can be given to establish that if proper management of the environment is to take place, a simple formula equating the proportion of impoundment to the proportion of environmental studies and action taken, would not work.
- 18. I have attempted below to suggest some sort of a timetable for many of the specific aspects relating to the environment. My belief is that, unless this or a similar timetable is followed, the *pari-passu* clause for these projects could not be considered as having been complied with.

Paripas2.doc

Issue	F	Required Time Fram	ne	Remarks
: :	Study (to be completed)	Action plan (to be completed)	Implementation (to be completed)	
Catchment Area Treatment	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Two years prior to any impoundment (Of at least the very high and high- erodibility categories of the catchment)	All very high and high erodibility catchments must be treated and allowed to stabilise before any impoundment is permitted, in order to prevent siltation. Infact, the actual activity of catchment area treatment, which often involves pit digging and other earthwork, can temporarily enhance rates of siltation. Therefore, it is important that all these activities are completed before any trapping of silt through impoundment starts.
2. Rehabilitation	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Two years prior to impoundment	The rehabilitation component of the project is perhaps the most critical and is the one which usually requires the largest financial outlays. As such, it is essential that all studies and action plans must be completed before any impoundment, including that due to building-up of back waters, takes place. This also includes the identification of land and its acquisition. However, the shifting of families should start only when the impoundment schedule is final. The process should start at least two years in advance of impoundment, with the families having the option to maintain both sites while they settle down in their new homes. The final shifting of project affected persons should be done only when submergence of an area is imminent.
3. Seismicity and dam safety	Prior to start of any construction	Prior to start of any construction	Prior to start of any construction	Critical for ensuring the safety of the dam and other structures. It is therefore important that construction should not be started till all the safety-related studies are completed and the resultant modifications, if any, to the structural designs have been incorporated.

If specific dates have been prescribed in the clearance letter, by which any or all of these steps have to be completed, then those dates have to be adhered to, if they are earlier.

4 Impost on hims	Dei	15:	·	
4. Impact on human health	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to impoundment	The negative impacts of reservoirs on human health, especially as they breed vectors, are well documented. Even in the Narmada project there is concrete evidence of this. Therefore, preventive measures must be in position prior to impoundment.
5. Impact on aquatic ecosystems	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to diversion/ impoundment	The diversion of the river, building of a coffer dam and the creation of reservoirs have major negative impacts on aquatic ecosystems, especially on fish diversity, other biodiversity, and on water quality. As this is an irreversible process once diversion or irnpoundment starts, it is important that studies and action plans be completed prior to any diversion. Implementation of preventive measures should be completed prior to the affecting activity (diversion or impoundment) being permitted.
6. Dust and noise pollution at construction site	Prior to any construction	Prior to any construction	Prior to any construction	The construction activities related with such projects pose a significant threat of dust and noise pollution on the surrounding ecosystem and human settlements. It is, therefore, essentially to study the surrounding ecosystems and to develop and implement action plans for the minimisation of the impacts and for the rehabilitation of species and ecosystems, prior to the start of construction.
7. Submergence of terrestrial biodiversity	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to impoundment	All wildlife (flora and fauna) studies and action plans must be completed prior to any impoundment being allowed. Rehabilitation programmes, as required, must be implemented so as to ensure that species or ecosystems are adequately rehabilitated before their original locations are submerged.
8. Archaeological monuments and sites	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to submergence of site/ monument	Archaeological monuments must be identified and shifted out prior to their sites being submerged. More importantly, all archaeological sites must be investigated and the findings evaluated prior to their being submerged. Where required, salvage of archaelogical objects must be done prior to impoundment.

Issue	Required Time Frame		ne	Remarks
	Study (to be	Action plan (to	Implementation	
	completed)	be completed)	(to be completed)	
9. Impact on	Prior to start of	Prior to start of	Prior to diversion/	The blocking of a river by a dam has significant negative
downstream aquatic	construction of	construction of	impoundment	impacts on the downstream aquatic ecosystems. These
ecosystems	diversion canal/	diversion canal/		include a loss of nutrients due to the trapping of silt by the
	coffer dam/ main	coffer dam/ main		dam. The change in water flow regimes and the blockage
	dam	dam		of passage of migratory fish. Even the diversion of the river
			,	waters has many such impacts. As these are irreversible
				impacts, studies, action plans and implementation must be
				completed before any diversion or impoundment is
				permitted.
10. Water logging	Prior to start of	Prior to start of	Prior to	The social and economic justifications for large dams are
,	construction of	construction of	impoundment	usually very critically dependent on the benefits from
	coffer dam/ main	coffer dam/ main		irrigation. However, these benefits are often not realised
1	dam	dam	•	because of significant problems relating to waterlogging in
	."			the command area. Consequently, the possibility of water
				logging and the modalities of preventing such waterlogging
				must be determined before permitting any impoundment.
, ,				Very often, when the modalities of preventing waterlogging
				are properly understood, there is a requirement to change
				the water use patterns determined for the project. This
				becomes impossible if the project has progressed to a
:				stage where impoundment has been permitted.
11. Compensatory	Prior to start of	Prior to start of	At least five years	Compensatory afforestation, as the name suggests, is
afforestation	construction of	construction of	prior to the cutting	meant to compensate for the forests that would be felled or
	coffer dam/ main	coffer dam/ main	of trees in the	submerged as part of the project. Consequently, the
	dam	dam	submergence	compensatory forests must be established before the
			zone	original ones are cut or submerged.
11. Other				A similar analysis has to be done for each of the other
environmental				environmental issues to determine what is the proper
issues			•	timeframe within which they should be studied, their action
				plans developed and implementation started and
				completed.

ENVIRONMENTAL COST OF SSP, GOG.

Related to unit - I Dam

A)Expenditure by project authorities i)Cost of Survey and Studies (in Rs. lacs)

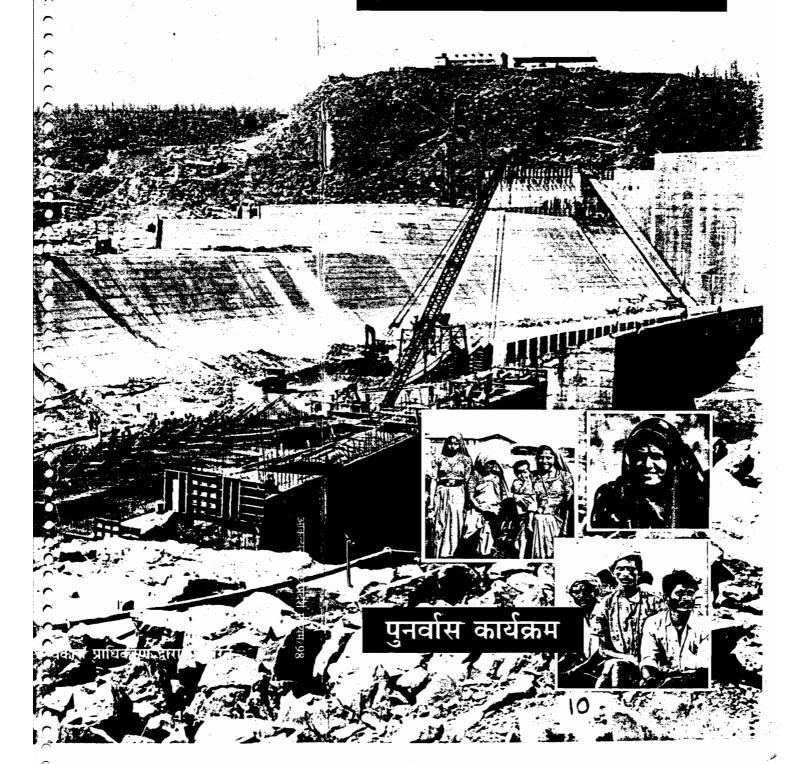
	Estimate	Expenditure
CAF	4.52	4.52
CAT	8.77	8.77
CAT F&F	101.84	80.47
Health	2.5	2.5
Arch/Anth	1.3	0.6
Seismicity	5.05	5.07
CAD	11,25	11.25

ii) Cost of Implimentation (in Rs. lac: lacs)

	Estimate	Expenditure
CAF	1809.10	1754,71
CAT	3509.00	3298.84
F&F	75.31	64.42
FISH	-	-
HEALTH	3800.00	303.47
ARCH/ANT	156,00	95.55
SEIS	219.57	318,55
CAD	NA	

ANNEX-XXXII: Min (4)

इंदिरा सागर परियोजना





शासन नर्मदा मुद्दे पर खुले दिमाग से चर्चा को तैयार हैं। हम सिचाई और ऊर्जा जैसे महत्वपूर्ण विषयों पर जनभागीदारी के साथ एक विकेन्द्रीकृत प्रक्रिया के तहत काम करें। पुनर्वास के विषय में हमारा प्रयास है कि मानवीय दृष्टिकोण और संवेदनशील रूप अपनाया जाये।

> - दिग्विजय सिंह मुख्यमंत्री



नर्मदा परियोजनां से जहाँ विकास जुड़ा है वहाँ कुछ खोना भी पड़ रहा है। परन्तु हम इसकी भरपाई जनभागीदारी के माध्यम से करने के लिये संकल्पशील हैं। विस्थापितों को बेहतर मुआवजा, एवं सुविधा देने हेतु कटिबद्ध हैं।

- सुधाव यादव उपमुख्यमंत्री एवं अध्यक्ष नर्मदाघाटी विकास प्रधिकरण

इंदिरा सागर परियोजना मध्यप्रदेश की जीवन रेखा नर्मदा

पश्चिम दिशा की ओर प्रवाहमान नर्मदा भारत की पाँचवीं बड़ी नदी है। इसका बहाव रावी, व्यास तथा सतलज के सम्मिलित बहाव से भी अधिक है। नर्मदा शहडोल जिले के अमरकंटक के पास मैकल पहाड़िया से निकलकर मध्यप्रदेश, महाराष्ट्र एवं गुजरात राज्यों में 1312 कि.मी. की यात्रा कर खंभात की खाड़ी में मिलती है। नर्मदा नदी का जलप्रहण क्षेत्र लगभग 97.411 वर्ग कि.मी. के क्षेत्र में फैला है जिसमें से मध्यप्रदेश में 88.02%, महाराष्ट्र में 3.31% तथा गुजरात में 8.67% क्षेत्र आता है।

नर्मदा कछार में सामान्य वर्षा उद्गम स्थान के पास 1500 मी.मी. से लेकर निचले भाग में 900 मी.मी. के बीच है।

परियोजना का विवरण

निर्माणाधीन इंदिरा सागर बहुउद्देशीय परियोजना खंडवा जिला मुख्यालय से लगभग 75 कि.मी. दूरी पर ग्राम पुनासा के निकट मध्यप्रदेश की जीवन रेखा नर्मदा नदी पर निर्माण की जाने वाली मध्यप्रदेश की प्रमुख परियोजना है। इससे निर्मित जलाशय भारत में निर्मित जलाशयों में से सर्वधिक क्षमता का जलाशय होगा।

बांध

अत्याधुनिक तकनीक (चिल्ड कांक्रोट से निर्मित बांध 653 मीटर लम्बा तथा नदी तल से इसकी अधिकतम ऊँचाई 92 मीटर होगी, इसमें 20 मीटर x 17 मीटर आकार के 20 निकास द्वार बाढ़ का अतिरिक्त प्रानी की निकासी हेतु लगाया जाना प्रस्तावित है।

विद्युत गृह

विद्युत गृह की स्थापित क्षमता 1000 मेगावाट होगी, इसमें 125 मेगावाट क्षमता की 8 विद्युत इकाईयाँ स्थापित की जावेंगी।

नहर प्रणाली

इसके बांये तट पर 248.65 कि.मी. लंबी मुख्य नहर प्रणाली कार्य तीन चरणों में पूर्ण करना प्रस्तावित हैं, जिससे खंडवा एवं खरगोन जिले में कुल 1.23000 क्षेत्र में सिंचाई सुविधा उपलब्ध कराने का लक्ष्य रखा गया है।

पुनर्वास नीति

इंदिरा सागर परियोजना के निर्माण के फलस्वरूप खंडवा (पूर्व निमाइ) होशंगाबाद एवं देवास जिलों के कुल 249 प्रामों (69 आंशिक तथा 180 पूर्ण) की 44363 हेक्टेयर निजी भूमि तथा 80,572 जनसंख्या प्रभावित होगी। राज्य शासन ने एक दीर्घकालीन पुनर्वास नीति निर्धारित की है, तदनुसार पुनर्वास का कार्य प्रगति पर है।

O

खंडवा जिले का हरसूद तहसील मुख्यालय डूब से प्रभावित शहरी क्षेत्र है। इस नगर की पुनर्बसाहट के लिये अत्याधुनिक सुविधाओं से सम्पन्न एक आदर्श नगर न्यू हरसूद ग्राम छनेरा के पास निर्माणाधीन है।

इंदिरा सागर परियोजना के निर्माण एवं डूब से प्रभावित ग्राम धारी कोटला के 32 परिवारों को ग्राम सरल्या में सम्पूर्ण आवश्यक सुविधाओं के साथ बसाया गया है।

परियोजना से प्रस्तावित लाभ

- खंडवा तथा खरगोन जिले के 1 लाख हैक्टेयर क्षेत्र में सिंचाई सुविधा उपलब्ध कराना।
- पुनासा उद्वहन योजना द्वारा लगभग 6,000 हैक्टेयर क्षेत्र में अतिरिक्त सिंचाई सुविधा उपलब्ध कराना।
- 3. 1000 मेगावाट विद्युत उत्पादन।
- 4. प्रतिवर्ष 4.0 लाख टन खाद्यान्न तथा 55 लाख टन अन्य फसलों का अतिरिक्त उत्पादन।
- 5. जलाशय क्षेत्र में मछली पालन तथा उद्योग के रूप में विकसित करना।
- औसतन लगभग 8000 लोगों को वर्ष तक तथा 5000 लोगों को 20 वर्ष तक रोजगार उपलब्ध कराना।
- नये उद्योगों की स्थापना को बढ़ावा जिससे निमाइ तथा मालवा क्षेत्र में खुशहाली और समृद्धि के नये आयाम खुलना।
- निमाई तथा मालवा क्षेत्र में उद्योग तथा 564 प्रामों में घरेलू उपयोग के लिये जल प्रदाय।

नर्मदा घाटी परियोजनाओं के विस्थापित परिवारों के लिये पुनर्वास नीति

- खेती की जमीन के बदले जमीन अगर जोत की भूमि से एक चौथाई से अधिक जमीन डूब में आ रही हो।
- कम से कम 2 हैक्टेयर कृषि भूमि दी जायेगी।
- जिस विस्थापित परिवार की 3 चौथाई जमीन अधिग्रहित हो रही हो, विस्थापित चाहे तो उस की शेष एक चौथाई भूमि का भी अधिग्रहण किया जा सकता है और तदनुसार मुआवजा भुगतान भी किया जायेगा।
- विस्थापित भूमि के बदले. भूमि नहीं चाहता है तो पूरा नगद मुआवजा भुगतान एकमुश्त में प्राप्त करने का विकल्प।
- विस्थापित परिवार के हर बालिंग लड़के एवं अविवाहित बालिंग पुत्री को अलग परिवार माना जायेगा और विस्थापित की ही तरह उसे भी पात्रता अनुसार पुनर्वास
 नीति के पूरे लाभ मिलेंगे।

- खेती की जमीन का मुआवजा निकट के कमांड क्षेत्र की भूमि के मूल्य के आधार पर निर्धारित होगा।
- अतिक्रामक की भूमि का भी मुआवजा दिया जायेगा।
- डूब में आने वाले निजी भवनों का भी मुआवजा दिया जायेगा। मुआवजा नये सिरे से ऐसे भवनों के पुनर्निर्माण पर लगने वाले मूल्य पर आधारित होगा।
- भवन का मालिक भवन का पूरा सामान कृषि पैदावार और अन्य भंडार अपने साथ ले जा सकेगा। यह मुआवजे के अतिरिक्त होगा।
- विस्थापित परिवारों को नये स्थलों तक पहुँचाने की परिवहन सुविधा शासन द्वारा
 नि: शुल्क दी जायेगी। यदि ऐसा परिवार यह सुविधा नहीं लेना चाहता है तो 500 रुपये का एकमुश्त अनुदान दिया जायेगा।
- विस्थापित परिवारों को नई बसाहट स्थल के ग्राम में 60x90 फीट (502 वर्गमीटर) आकार का आवासीय भूखंड निःशुल्क दिया जायेगा।
- परिवार के प्रत्येक बालिंग पुत्र एवं अविवाहित बालिंग पुत्री को भी इसी आकार का भूखंड दिया जायेगा।
- विस्थापित परिवारों को जमीन के बदले जमीन देते समय सिंचाई सुविधाओं की भी व्यवस्था की जायेगी। सिंचाई सुविधायें उपलब्ध कराया जाना संभव नहीं होने की स्थिति में विस्थापित परिवार को 2 हेक्टेयर भूमि के स्थान पर 4 हेक्टेयर भूमि दी जायेगी।
- ऐसे परिवारों को जो गरीबी की रेखा के नीचे हैं, उनके आवास के मुआवजे के अतिरिक्त नई बसाहट स्थल पर मकान बनाने के लिये इंदिरा आवास योजना के अंतर्गत पात्रता के अनुसार अनुदान दिया जायेगा।
- यदि नये भूखंड की कीमत विस्थापितों से अधियहित भूखंड के मुआवजे से अधिक है तो अंतर की ग्रशि का भुगतान शासन द्वाग्र किया जायेगा।
- नगरीय क्षेत्रों में रहने वाले किरायेदार परिवारों को स्वयं का मकान बनाने के लिये
 उनके आयवर्ग के अनुसार सह-शुल्क भूखंड उपलब्ध कराया जायेगा। परन्तु यदि
 किरायेदार गरीबी रेखा के नीचे है तो उसे नि:शुल्क भूखंड की पात्रना होगी।
- मकानों का मुआवजा वर्तमान में मकान बनाने की लागत के आधार पर दिया जायेगा।
- नये नगरीय बसाहट स्थलों पर सभी नागरिक सुविधायें उपलब्ध कगई जायेंगी। आरंभिक अविध में सभी विस्थापित परिवारों को पुनर्वास अनुदान की व्यवस्था भी है। छोटा और सीमान्त कृषक परिवार को 11 हजार रुपये, अनुसूचित जाति और अनुसूचित जनजाति कृषक परिवारों को 11 हजार रुपये और अन्य भूमिस्वामी परिवारों को 5500 रुपये का अनुदान दिया जायेगा।
- व्यावसायिक प्रशिक्षण की व्यवस्था।

C

अन्य निर्णय

इंदिरा सागर परियोजना के डूब क्षेत्र के विस्थापित कृषकों की समस्याओं को सहानुभूतिपूर्वक सुलझाने हेतु 13 जुलाई 98 को राज्य मंत्रिपरिषद ने पुनर्वास नीति में अनेक कल्याणकारी निर्णय जोड़े हैं:-

- अब डूब क्षेत्र में अधिप्रहित की जाने वाली भूमि का मूल्यांकन Tail End पर स्थित हरदा क्षेत्र की भूमि बिक्रियों के आधार पर नहीं किया जावेगा। इसकी गणना सिवनीमालवा क्षेत्र की भूमि बिक्रियों की दरों के आधार पर किया जावेगा।
- विस्थापित कृषकों के अधिमहित कुओं का मूल्यांकन अब वास्तविकता के आधार पर किया जावेगा जो लोक निर्माण विभाग के सी.एस.आर. के अनुरूप होगा। पूर्व में 'जीवनधाय' योजना अंतर्गत निर्धारित मूल्य ही दिये जाते रहे हैं।
- अधिग्रहित भूमि में सिंचाई हेतु स्थापित सीमेंट काक्रीट/पी.व्ही.सी. के पाईप/ नालियों के लिये मुआवजा नहीं दिया जा रहा था। अब शासन ने निर्णय लिया है कि इसका भी मूल्यांकन कर भुगतान किया जावे।
- 4. जो विस्थापित पुनर्बसाहट स्थल पर आवासीय भूखण्ड (Plot) नहीं लेते हैं इसके एवज में वर्तमान में उन्हें रुपये 15 हजार का अनुदान दिया जाता है। अब शासन ने निर्णय लिया है कि अनुदान की ग्रांश इंदिरा आवास योजना की सीमा तक बढ़ाई जाकर रुपये 20 हजार का अनुदान दिया जाये।
- मूंदी कस्बे के निकट विस्थापितों के पुनर्वास हेतु नया पुनर्वास स्थल विकसित किया जावेगा।
- एक माह में शिफ्ट कर लेने का लेखी वचन पत्र (undertaking) देने पर आवेदक विस्थापित को दो के बजाये एक ही किश्त में मुआवर्ज का भुगतान किया जावेगा।
- प्राप्त मुआवजे से अधिक मूल्य की अन्यत्र भूमि क्रय करने पर विस्थापित कृषक को ब्याज मुक्त 20 वर्षीय ऋण दिया जावेगा। एक माह में इस हेतु नियम बना लिये जायेंगे।
- 8. इस वर्ष संभावित डूब में आ रहे ग्रामीण को ग्रहत देने एवं बचाव हेतु आकिस्मिक कार्य योजना स्वीकृत की गई है जिसमें टेम्परी शेड्स का निर्माण, पेयजल, स्वास्थ्य सुविधा, नावें व तैग्रक दल की व्यवस्था की गई है। इस बीच निःशुल्क भोजन भी दिया जावेगा।
- नये पारित होने वाले अवार्डों में विस्थापितों कृषक को भूमि का बाजार मूल्य प्राप्त हो इस हेतु एक माह में नई प्रक्रिया का निर्धारण किया जावेगा। इन ग्रामों के 5 विस्थापित प्रतिनिधियों से भी मूल्य निर्धारण में सलाह मशविरा किया जावेगा।
- 10. इंदिरा सागर डूब क्षेत्र में पारित पुराने अवार्ड प्रकरणों में जहां कम दरों के निर्धारण

की शिकायतें हैं वहां संभागीय आयुक्त की अध्यक्षता में गठित कमेटी इनकी समीक्षा करेगी। इस कमेटी में अशासकीय सदस्य भी रखे जावेंगे। जिन प्रकरणों में कम मुआवजे की शिकायतें सही पाई जाती हैं वहां कमेटी द्वारा युक्तियुक्त पाई गई राशि निर्धारित की जावेगी। विस्थापित को अंतर की राशि विशेष पुनर्वास अनुदान के रूप में स्वीकृत की जावेगी।

- 11. विस्थापित द्वारा अन्येत्र क्रय की गई भूमि पर देय स्टाम्प ड्यूटी एवं राजस्ट्रेशन ू शुल्क का भुगतान शासन द्वारा किया जावेगा।
- पुनर्बसित ग्राम में विस्थापित परिवार के पात्र सदस्य को शिक्षाकर्मी के रूप में नियुक्ति हेतु प्राथमिकता दी जावेगी।
- वन भूमि पर अतिक्रामक जिन पात्र विस्थापितों की रसीदें गुम गई है शासकीय ऽ
 रिकार्ड से जांच कर उन्हें भी मुआवजा दिया जावेगा।
- 14. डूब क्षेत्र भूमि के अधिप्रहण के अलावा अन्य प्रयोजनों के लिये भी यदि भूमि अधिप्रहित की जाती है जैसे- पुनर्वास स्थल की स्थापना/पुल/सड़क निर्माण तो इन प्रयोजनों से भी विस्थापित होने की दशा में उक्त सभी लाभ प्राप्त होंगे। इसी तरह इंदिरा सागर क्षेत्र के लिये निर्धारित उक्त नाति नर्मदा घाटी विकास विभाग के अंतर्गत अन्य निर्माणाधीन परियोजनाओं के लिये भी लागू होगी।

शासन यह स्पष्ट करना चाहता है कि वह विस्थापितों की समस्याओं के प्रति संवेदनशील है एवं उनका मददगार है। शासन पुनर्स्थापन की प्रक्रिया में विस्थापितों का सहयोग लेना चाहता है।

इस वर्ष (1998) मानसून से 8 गाँव डूब से प्रभावित होंगे, जो हैं:-

प्रभावित गाँव	पुनर्वास स्थल जहाँ विस्थापित को उनकी सहमित के आधार पर बसाया जा रहा है।		
	आधार पर बसाया जा रहा हा		
1. अभावा	बैदानी, सरलिया		
2. सरई	अंजनियाखुर्द, अंजनिया		
3. गुस्लास	चांदेल, रजूर, खेड़ी		
4. नागपुरमाफ़ी		•	
5. লাडवा	चैनपुरसरकार, कालापाठा,		
6. वंद्यानिया	खालना, खेडी, मूंदी,	•	
7. भोगानी	रजूर	•	
8. पाडियादेह	बड़ौदा, सतवास, अजनाल, राजौर		
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नवीन बसाहट स्थल पर सुविधा

डूव प्रभावित 8 गाँवों की आबादी को नवीन पुनर्वास स्थल पर बसाया जा रहा है। वहाँ मूलभूत सुविधायें जैसे पानी, बिजली, सड़क की समुचित व्यवस्था है। इसके अतिरिक्त शाला भवन भी बनकर तैयार है। विस्थापितों के इन पुनर्वास स्थलों पर बसने की सहमित देने के पश्चात अन्य सुविधाओं का भी विस्तार किया जायेगा।

नोडल अधिकारी- इन प्रभावित गाँवों के लिये खंडवा जिला प्रशासन ने 8 नोडल अधिकारी नियुक्त किये हैं जो बाद से बचाव और सुरक्षा प्रबंध करेंगे। प्राप्तवासियों के सतत् सम्पर्क में रहकर कठिनाई हल करेंगे।

सम्पर्क में रहकर कठिनाई हल करेंगे।			
गाँव का नाम	नोडल अधिकारी	बाढ़ से बचाव हेतु अस्थाई ठहरने का स्थान	
1. पाडियादेह	श्री जी.जी. उपाध्याय,	चीच प्राम में स्कूल भवन तथा	
	उपयंत्री, नर्मदा विकास	अस्थाई शेड़ में	
	उपसंभाग क्र66, खंडवा		
2. सरई	श्री जैन उपयंत्रीं,	हाईस्कुल प्रांगण बलड़ी	
•	नर्मदा उपसंभाग	तथा अस्याई शेड्स में	
	क्र28, खंडवा		
3. अभावा	श्री आर.वी. सुर्यवंशी,	बलड़ी हाईस्कूल शेड निर्माण	
	उपयंत्री, नर्मदा विकास	• • • • • • • • • • • • • • • • • • •	
	उपसंभाग क्र65, खंडवा		
4. बंधानिया	श्री एम.एल. सोनी,	गाँव के पास स्थित ऊँची	
	उपयंत्री, उपसंभाग	टेकरी पर निर्मित टीन शेड्स में	
	क्र65, खंडवा		
5. भोगानी	श्री गणेश निकम,	ग्राम कुकढाल में निर्मित शेड्स	
	उपयंत्री, उपसंभाग	में तथा प्राथमिक शाला और वन	
	क्र27, खंडवा	विभाग के रेस्ट हाऊस में	
6. लाडवा	श्री अब्दुल माजिद,	बलड़ी में निर्मित	
	उपयंत्री, उपसंभाग	टीन शेड्स में	
	क्र28, खंडवा		
7. नागपुर मार्फ	त्री आर.एन. शर्मा,	प्राम के पास टेकरे पर निर्मित	
	उपयंत्री, उपसंभाग	टीन शेड्स में	
	क्र65, खंडवा		
8. गुल्लास	श्री ओ.पी. पुनासे,	श्री इकलाक सेर्ट के मकान	
•	उपयंत्री, उपसंभाग	के पास टीन शेड में	
	क - 27 खंडवा		

इंदिरा सागर परियोजना अंतर्गत विकसित किये जा रहे पुनर्वास स्थलों का प्रगति विवरण

I. "	पुनर्वास स्थल सरल्या:-	
1.	भूखंडों की संख्या	67 (60x90)
2.	प्रशासकीय स्वीकृति	रु. 36 लाख
3.	शाला भवन का निर्माण	कार्य पूर्ण
4.	हेण्ड पम्प एवं ट्यूबवेल	कार्य पूर्ण
5.	आंतरिक मार्ग निर्माण	कार्य पूर्ण
6.	सामुदायिक भवन	कार्य पूर्ण
7.	बाह्य विद्युतीकरण	कार्य पूर्ण
8.	सुचालक यूनिट	कार्य पूर्ण
n.	पुनर्वास स्थल सतवास, जिला देवास	<u>t:-</u>
1.	भूखंडों की संख्या	667 (60x90)
2.	प्रशासकीय स्वीकृति-प्रथम चरण	रु. 53.139 लाख-
		147 भूखंडों के लिये
3.	माध्यमिक शाला भवन	कार्य पूर्ण
4.	तीन हेण्ड पम्प	कार्य पूर्ण
5.	आंतरिक मार्ग निर्माण	कार्य प्रगति पर
6.	सामुदायिक विकास भवन	
7.	बीज भंडार का निर्माण	कार्य आरंभ हो रहा है।
III.	पुनर्वास स्थल बेढानी:-	
1.	भूखंडों की संख्या	82
2.	प्रशासकीय स्वीकृति	रु. 44.73 लाख
3.	प्राथमिक शाला भवन	कार्य पूर्ण
4.	तीन हेण्ड पम्प	कार्य पूर्ण
5.	आंतरिक मार्ग	निविदा बुलाई गई।
6.	बाह्य विद्युतीकरण	कार्य प्रगति पर
7.	सामुदायिक भवन	
8:	बीज भंडार	निविदायें प्राप्त हो चुकी हैं।

IV. पुनर्वास स्थल अंजनिया खुर्दः-

भूखंडों की संख्या

86

2. वित्तीय स्वीकृति

₹. 21.15 लाख

प्राथमिक शाला भवन

कार्यपूर्ण

हेण्ड पम्प तीन

5. मार्ग निर्माण कार्य पूर्ण

6. सामुदायिक भवन एवं वीज भंडार निविदायें आमंत्रित निविदायें आमंत्रित

v. पुनर्वास स्थल खालवा:-

١. भूखंड की संख्या 39

2. वित्तीय स्वीकृति रु. 15.18 लाख

3. आंतरिक मार्ग निर्माण

4. बाह्य विद्युतीकरण कार्य किया जा रहा है।

5. हेण्ड पम्प

VI. पुनर्वास स्थल कालापाठा:-

427

भूखंडों की संख्या

2. प्रशासकीय स्वीकृति

₹. 285.52 लाख

3. विस्तृत आंकलन तैयार किये जा रहे हैं।

VII. पुनर्वास स्थल चैनपुर:-

भूखंडों की संख्या 1.

177

. 2. प्रशासकीय स्वीकृति ₹. 108.93 लाख

विस्तृत आंकलन

तैयार किये जा रहे हैं

वर्तमान में मुख्य अभियंता, लोक निर्माण विभाग के पास वर्ष 1998-99 में इन पुनर्वास स्थलों के विकास हेतु रु. 145 लाख उपलब्ध कराये गये हैं। इस वित्तीय वर्ष में इन कार्यों हेतु रु. 300 लाख का बजट प्रावधान किया गया है।





ANNEX-XXXII-Min (5)

32nd MEETING OF THE ENVIRONMENT SUB-GROUP

OF

NARMADA CONTROL AUTHORITY

14th OCTOBER, 1998

STATUS REPORT

 OF^{\cdot}

NARMADA SAGAR & SARDAR SAROVAR PROJECTS

NARMIADA VALLEY DEVELOPMENT AUTHORITY

GOVT. OF MADHYA PRADESH

NARMADA BHAWAN, BHOPAL-462 003

Item No. XXXII-1(149): CONFIRMATION OF MINUTES OF THE 31ST MEETING.

The minutes may be confirmed after the decision of the Chairman on the comments of Dr. Shekhar Singh.

Item No.XXXII-2(150) : REVIEW OF ACTION TAKEN ON THE

DECISIONS OF THE PREVIOUS

MEETINGS.

1. Submission of Catchment Area Treatment (CAT plans for freely draining critically degraded sub-watersheds [Item no.XXII-2(112).

- A) Submission of micro watershed plan for freely draining critically degraded sub-watersheds by Govt. of Maharashtra and Madhya Pradesh.
- i) FORMULATION OF SCHEMES:

The progress of formulation of schemes for treatment of the critically degraded sub-watersheds within the freely draining catchment is as under:-

Six more schemes pertaining to critically degraded freely draining sub-watersheds (5 for Sardar Sarovar Project and one for Narmada Sagar Project) have been sent to NCA with an area of 13530 ha. Out of the total 22 sub-watersheds approved by the funding agency so far, an area of 13425 ha has been treated (i.e. 9152 ha under SSP and 4273 ha under NSP).

ii) POLICY ISSUES

No action is expected from NVDA at present.

B) Silt Monitoring

It was informed by NVDA during 31st meeting that a detailed pint for establishing Silt Monitoring Station (SMS) is under preparation the same would be established before the monsoon of 1998. In the connection the officers were directed to visit the Sites of Silt Monitorial Station already established in River Valley Project. NVDA is continuous

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in touch with Central Soil & Water Conservation Research Centre, DATIA-M.P., Damodar Valley Corporation, HAZARIBAGH (Bihar) & Ministry of Agriculture, GOI, New Delhi for necessary guidance in this regard. The establishing of Silt Monitoring Station is still under process because imported equipments are not readily available. However, in this regard the discussions were held in Standing Committee meeting at NASIK from 28.9.98 to 29.9.98 and it was agreed that there is really a problem of imported SMS equipment. However, we are in touch with the concerned manufacturers and progress of establishment of SMS will be informed accordingly. Cost Estimate for preparation of Action plan and implementation of

environmental safeguard measures [Item No.XXII-2(112)(2)]:

Information regarding studies and action plan related to SSP is presented in annexure-1. Estimates for environmental safeguard measures at 1996-97 price level are under revision. It may be mentioned that this job may require some more time as it involves collection of data from various other departments viz. Health Services, Fisheries, Archaeology etc.

Establishing a separate authority for coordinating Environmental works in Maharashtra [XXVIII-3(36)(1)].

It pertains to Maharashtra state.

Publications on Environment [XXVIII-3(136)(ii)].

Publication on environment in respect of Indira Sagar (i.e. Narmada Sagar) Project has been preparaed and is under printing. For Sardar Sarovar Project, it is being drafted. Suitable scientific and popular publication on the good works done/being done by NVDA would be issued shortly.

5. Catchment area treatment works in Maharashtra-Cost aspect [XXX-2(123)(7)].

As desired expenditure till August, 1998 on implementation of CAT works (forest area) in M.P. is Rs. 2216.20 Lacs for Sardar Sarovar Project.

6. Monitoring of R&R aspect of Narmada Sagar Project [XXV-2(123)(3)].

This agenda throws light on the discussions held during the 57th meeting of NCA on 1.7.98, the minutes of which are yet to be confirmed. As such the information is immature to be brought to the notice of the members.

Item No. XXXII-1(151): PRESENT STATUS OF STUDIES, SURVEYS AND ENVIRONMENTAL ACTION PLANS.

i) PHASED CATCHMENT AREA TREATMENT :

Narmada Sagar Project:

- The latest progress of works on CAT (directly draining subwatersheds) is 40,818 ha which is about 65% of the total target.

Sardar Sarovar Project:

Progress on CAT works (D.D.) is 70,403 ha against the total target of 1,25,725 ha. It covers 56% of the target.

ii) COMPENSATORY AFFORESTATION:

Narmada Sagar Project :

Compensatory afforestation over an area of 67.183 ha is completed against the total target of 80.945 ha. Thus the progress is 83%.

Sardar Sarovar Project:

So far 8.710 ha is covered against the total target of 8.740 ha. The target is almost achieved.

iii) COMMAND AREA DEVELOPMENT:

Narmada Sagar Project:

The details of programme & progress of construction of canal works as shown in annexure 32-9 of the agenda, are being examined.

Regarding outlines of the terms of references (TOR) for the integrated development of the command area of NSP it may be mentioned that the Chairman first directed to update the T.O.R. by incorporating the relevant aspects from EIA studies for the command area of SSP. In the 30th meeting the TORs framed by GOR were also required to be referred. The later is yet awaited.

A monitoring note on studies for agro-chemicals runoff follows. The Principal Scientist conducting the studies is also requested to make presentation of the works done so far.

Sardar Sarovar Project :

No command area of SSP lies in Madhya Pradesh.

iv) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

A) Narmada Sagar Project:

Notification for declaration of National Park/Sanctuaries are still under consideration of the State Government. However, it may be mentioned that the inter-departmental issues have been resolved by holding series of meetings.

B) Sardar Sarovar Project:

In light of recommendations made in the 2nd meeting of the Expert Committee that carrying capacity of the area would be improved by executing CAT works alongwith plantations in the catchment area, the State Forest Department is requested to draw up a plan for forest management & social forestry which would be additionally required despite the coverage of area under CAT programmes for the directly draining sub-watersheds & freely draining sub-watersheds. Identification of thrust areas is in process.

v) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY:

ARCHAEOLOGY:

Narmada Sagar Project:

The details of the proposal pertaining to Joga Fort are being prepared by ASI. The progress in this regard is to be given by ASI.

Sardar Sarovar Project:

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<u>'</u> ر

The current position will be presented by the State Department of Archaeology and Museum in the meeting. Status of progress is as under:-

The relocation work of temple located at Barda has been completed. As regards the relocation of the temple at Semalda, the same is to be executed by ASI. In addition to this the sanction has been issued for relocation of monuments of Khujawa and rock cut sculptures at Pipalda Garhi area.

ANTHROPOLOGY

Narmada Sagar & Sardar Sarovar Project :

Progress in respect of arrangements/benefits extended to S.T.. PAFs is enclosed at annexure - 2. Balance publications of Anthropological Survey of India are still out of print.

vi) SEISMICITY AND RIM STABILITY OF RESERVOIR

Narmada Sagar Project:

Status of progress is enclosed at annexure- 3.

vii) HEALTH ASPECTS:

Narmada Sagar Project:

As regards suggestions on epedimiological surveillance studies, Gandhi Medical Collage has been approached for reviewing the reference base line data.

Sardar Sarovar Project:

Regarding phasing of incremental facilities to be extended as per plan. the Commissioner, Health Services has been requested to do the needful at the earliest.

As for the details of water quality monitoring stations it may be mentioned that M.P. Pollution Control Board which is already monitoring the water quality at 13 locations in the Valley, has kindly agreed to share the data with the NVDA. The desired details have been intimated to NCA vide letter No. 427 dated 31.7.98.

As regards peoples involvement and using mass communication means for bringing awareness to prevent diseases, the Commissioner, Directorate of Health Services. Bhopal was requested to evolve a suitable system. Response is awaited.

viii) FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR:

No action is required at present from NVDA.

Item No.XXXI-4(152): STRENGTHENING OF ENVIRONMENT WING OF NCA:

No comments.

ENVIRONMENTAL COST OF SARDAR SAROVAR PROJECT

RELATED TO UNIT-I DAM :-

[A] Expenditure by Project Authorities:-

(i) Cost of Survey & Studies (in lacs)-

S.No.	Component	Estimated/Actual Expenditure
1.	Compensatory Afforestation	2.44 2.44
2.	Catchment Area Treatment	$\frac{3.28}{2.80}$
3.	Flora & Fauna	<u>20.33</u> 20.33
4.	Health .	29.63 27.84
5.	Archaeology/Anthropology	<u>59.00</u> 36.33
6.	Seismicity & Rim Stability	23.00 12.50

. 2

(ii) Cost of Implementation (in lacs)

S.No.	Component	Estimated/Actual Expenditure
1.	Compensatory Afforestation	. <u>1800.00</u> 1014.00
2.	Catchment Area Treatment	8835.05- 4802.43
3.	Flora & Fauna	N.A. Nil.
4.	Health	$\frac{1354.63}{521.20}$
5.	Archaeology/Anthropology	700.00 74.90
6.	Seismicity & Rim Stability	-

Annexure-2

Note on arrangements/benefits to S.C./S.T. PAFs of Sardar Sarovar Project

The Govt. of Madhya Pradesh has proposed that the Project Affected Families (PAFs) belonging to scheduled tribe and scheduled caste on their migration to Gujarat on their resettlement & rehabilitation, be extended with all statutory, semi-statutory and non-statutory privelages, benefits and rights as they were enjoying in their home state of Madhya Pradesh. In this context, the Govt. of Gujarat has issued a Govt. Resolution vide its letter No.SCW/1091/201/kit dated 18.7.1991 to the effect of extending of semi-statutory and non-statutory benefits.

As regards the statutory benefits, the Govt. of Madhya Pradesh vide its letter No. 7/TW Cell/1148 dated 2.8.94 has proposed amendment to Article 341 and 342 of the Constitution of India to the Govt. of India, Ministry of Welfare (non-Ministry of Social Justice & Empowerment). The Govt. of Gujarat has also consented for the aforesaid amendment. But orders to this effectare still awaited from Govt. of India.

Draft Compliance note on agenda items for the 32nd meeting of the Environment Sub-group scheduled to be held on 14th October, 1998 at New Delhi.

Item No. XXXII-(149):

CONFIRMATION OF MINUTES OF THE 31st MEETING:

Compliance:

The comments/note from Dr. Shekhar Singh, IIPA, New Delhi have not been annexed with the agenda received from NCA. So, the comments can be offered at present stage on receipt of the same.

Item No. XXXII-2(150):

REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS:

- 1. Submission of CAT (P.2).
- A. No comments.
- B. Silt Monitoring (P.3).

During 31st meeting, GOG presented a report on silt monitoring exercised being carried out by CSWRTI. The report highlighted that due to primitive agriculture methods, silt outflows from forest lands encroached by the tribals for agroforestry and/or other suitable agricultural practices.

Progress made to be reported.

Compliance:

FROM: SSNNL

PHONE NO. : 0091 02712 23049

Oct. 23 1998 04:29PM P2

GOG is considering the recommendation of CSWRT, Vasad about the Silt outflow from encroached forest land where tribals resort to primitive agriculture methods. CCF, SSPA in consultation wit the Director, GERI has been requested to prepare an action plan for the Evaluation & Monitoring of, sedimentation in the reservoir.

2. Cost estimates for preparation of Action Plan and implementation of environmental safeguard measure (Item No. XXII-2(112)(2)) - (P.3)

Compliance:

An updated statement on Environmental cost of SSP is enclosed herewith.

3. Establishing a separate authority for coordinating Environmental works in Maharashtra (XXVIII-3(136)(1))

Sub-group during its 31st meeting recognising the need for better inter-departmental coordination stressed establishing an agency, like NVDA in MP and SSNNL in Gujarat.

NCA has approached SSNNL to provide a copy of its TOR.

Compliance:

A copy of Memorandum of Article/TOR of SSNNL is enclosed herewith.

A copy of resolution of a separate agency for monitoring rehabilitation and environmental activities namely `Sardar Sarovar Punarvasvat Agency' is also enclosed herewith.

4. Publication on Environment:

FROM : SSNNL

PHONE NO. : 0091 02712 23049

Oct. 23 1998 04:29PM P3 ...

(XXVII-3(136)ii):

Progress on bringing a scientific and popular publication on the good works being done by project authorities.

Compliance:

Work has been started on preparation of suitable scientific and, popular publications for the Conservation of Biodiversity in Narmada Catchment Area and canal command area. For this necessary help and guidance has been sought from Dr. Pavankumar, Specialist Environment, NCA.

5. Catchment Area Treatment in Maharashtra - Cost aspect. (XXX-2(123)(7)-(P.4)

SSNNL was requested to send its expenditure statement on CAT works to NCA.

Compliance:

The required informations are enclosed herewith.

6. Monitoring of R&R aspect of NSP (XXV-2(123)(3)) - (P.5).

No comments.

Item No. XXXII-3(151): (P.6)

PRESENT STATUS OF STUDIES SURVEYS AND ENVIRONMENTAL ACTION PLANS

1. PHASED CATCHMENT AREA TREATMENT

GOG:

FROM : SSNNL

PHONE NO. : 0091 02712 23049 Oct. 23 1998 04:30PM P4

No comments.

ii. COMPENSATORY AFFORESTATION (P. 7):

Officers from NCA during 1st week of February, 1998 visited compensatory afforestation site in District Bhuj. GOG may indicate the actions taken on the suggestions offered.

Compliance:

With reference to the comments of NCA team to Bhuj during February, 1998, it is stated that, all the necessary funds are provided to the Conservators of Forests, Bhuj for upkeeping of compensatory plantations. There funds are provided for watering of the plantations in summer and maintenance of watchmen for its protection.

iii. COMMAND AREA DEVELOPMENT:

Regarding preparation of plan for integrated development of the command area, it was suggested that, Planning Commission had prepared certain maps which may be useful in this endeavour. GOG was requested to get in touch with DDG, ICAR to expedite the issue.

Compliance:

NPG arranged meetings with scientists of Gujarat Agriculture University and senior forest officials to discuss várious aspects of Agroforestry Development in Phase-I area of SSP command.

The scientists of Gujarat Agriculture University are preparing the draft plan for irrigated agro forestry development in Phase-I of SSP Command Area.

The scientists of Horticulture and Forest College, Navsari

PHONE NO. : 0091 02712 23049

Oct. 23 1998 04:30PM P5

have also been requested to furnish detailed information about scope of agroforestry in Phase-I area of SSP command based on their research work.

After obtaining these informations, a draft plan will be prepared in consultation with ICAR, New Delhi.

iv. SURVEY OF FLORA, FAUNA AND CARRYING CAPACITY STUDIES (P.10)

Action Plan on Development of Shoolpaneshwar Sanctuary was reviewed by the Sub-group-group during its last meeting held on 28-10-98. Progress on implementation of action paln may please be reported.

Compliance:

Action plan of Shoolpaneshwar Sanctuary is already under implementation by the State Forest Department. Further progress is awaited.

v. ARCHAEOLOGICAL AND ANTHROPOLOGICAL SURVEY: (P. 11 & 12)

GOG:

Progress on construction of Hampheshwar temple.

Compliance:

The progress of construction work of temple carried out is as under:

- i. The stone masonry of 'Garbhgraha' is done upto 5.0m height.
- ii. About 18 columns of 'Rangmandap' have been erected.

FŘŎM: SSNNL

PHONE NO. : 0091 02712 23049

Oct. 23 1998 04:31PM P6

iii. Stone masonry work for two small temples namely Ramji and Ambaji adjoining to the main temple is done upto sill level.

The expenditure incurred for the above work upto 30-4-98 is Rs. 23.60 lacs. The work is held up since October, 1996 due to unwillingness of contractor to execute the works.

The arrangements are undertaken to complete the remaining works in consultation with some religious leaders, expeditiously.

vi. SEISMICITY AND RIM STABILITY OF RESERVOIR: (P.12)

GOG may present the status of the functioning of the seismic monitoring work.

Compliance:

The construction work of 9th station is under progress.

Functioning of the seismic monitoring system with 8 stations is functional.

vii. Health Aspects: (P. 13)

The progress on all the aspects discussed on 22-5-98 in a meeting of experts and officers of the Health Department of the three states may be reported.

Compliance:

The progress is awaited from the State Health Department.

viii. FISHERIES DEVELOPMENT OF SSP AND NSP RESERVOIR: (P. 14)

The recommendation of the small working group, constituted by

3M: SSNNL

PHONE NO. : 0091 02712 23049

Oct. 23 1998 04:31PM P7

the High Level Expert Group on Fisheries Development and Conservation which visited recently shall be reported during the meeting.

Compliance:

GOG has submitted its proposal for the Inter-state fishing activities.

item No. XXX1-4(152):

Strengthening of Environment Wing of NCA:

· Compliance:

The Environment Cell at NCA needs to be reconsidered in view of action plans being undertaken or completed so far.

The Environment Cell should be headed by an environmentalist of a higher rank equivalent to Chief Engineer, Level-II. CE should be substantiated by an expert on each of the items specified in the Environment Clearance Order and there should be supporting staff provided.

It is recommended that a small sub-committee be constituted under the Chairmanship of Member (E&R) of NCA to assess the requirement of persons for Environment Cell of NCA.

The posts created under Environment Cell of NCA should have ample promotional avenues.

It is recommended that, if necessary, a committee of Environment Sub-group Member should be created to finalise the structure of Environmental Cell of NCA under the Chairmanship of Member (E&R).

FROM : SSNNL

PHONE NO. : 0091 02712 23049

Oct. 23 1998 Ø4:32PM P8

Expenditure Statement of CAT works, GOG.

	Prog	r e s s
Year	Pysical In Ha.	Financial (Rs. in Lakh)
1987-88	•	7.27
1988-89	528	56.85
1989-90	-	108.19
1990-91	4000	198.09
1991-92	4770	316.66
1992-93	6013	496.58
1993-94	6000	525.69
1994-95	5731	495.80
1995-96	-	235.20
1996-97	3578	401.72
1997-98	-	456.96
Total	30620	Rs. 3298.84

ANNEX-XXXII-Min(7)

STATUS REPORT OF SEISMIC MONITORING NETWORK OF ISP COMPLEX, M.P.

(OCTOBER '98)

As per the recommendation of the DRP the Pre and Post impoundment seismic monitoring net work for the ISP complex was planned in consultation with CWC and IMD; New Delhi. The net work includes 10 seimological observatories located on both the flanks, shown in Annexure-3(9). The status of construction of observatories and installation of equipment/instruments and programme as on date is given in Annexure-3-(b).

Prior to February 95 the CWPRS, Pune was entrusted/consulted to monitor the seismic activity of the valley/region by locating the field observatories at Narmadanagar, Omkareshwar and Maheswar. The data with analysis from 23.2.87 to 23.8.92 has since been received from CWPRS, Pune. The extract of the results obtained is given in table-1 below. The results of data up to end of 1994 is awaited from CWPRS, Pune.

contraction and the contra

TABLE-1

<u>Distance</u>	Magnit	(Richter)		
•	<1	1-2	2-3	> 3
0-50 Kms.	32	57	17	0
50-100 Kms	0	22	19	. 1

sontd...2

In February 1995 eleven Micro Earthquake recorders were procured by NVDA and three were installed at Narmada Nagar Omkareshwar and Maheshwar in temporary/field observatories after discontinuing studies from CWPRS Pune. The interpretation of available data from above observatories is still pending for want of expert/spcialized services. IMD has expressed their inability for want of personnel.

Presently permanent observatories of the envisaged monitoring net work are operational at 1 Narmada Nagar, 2. Omkareshwar 3. Maheswar 4. Khandwa 5. Channera 6. Barwani with Micro Earthquake recorders only.

As per recommendation of DRP & IMD New Delhi Besides Micro Earthquake recorders additional instruments as listed below have been procured and are in the process of installation. The programme of installation is given in Annexure-3(b).

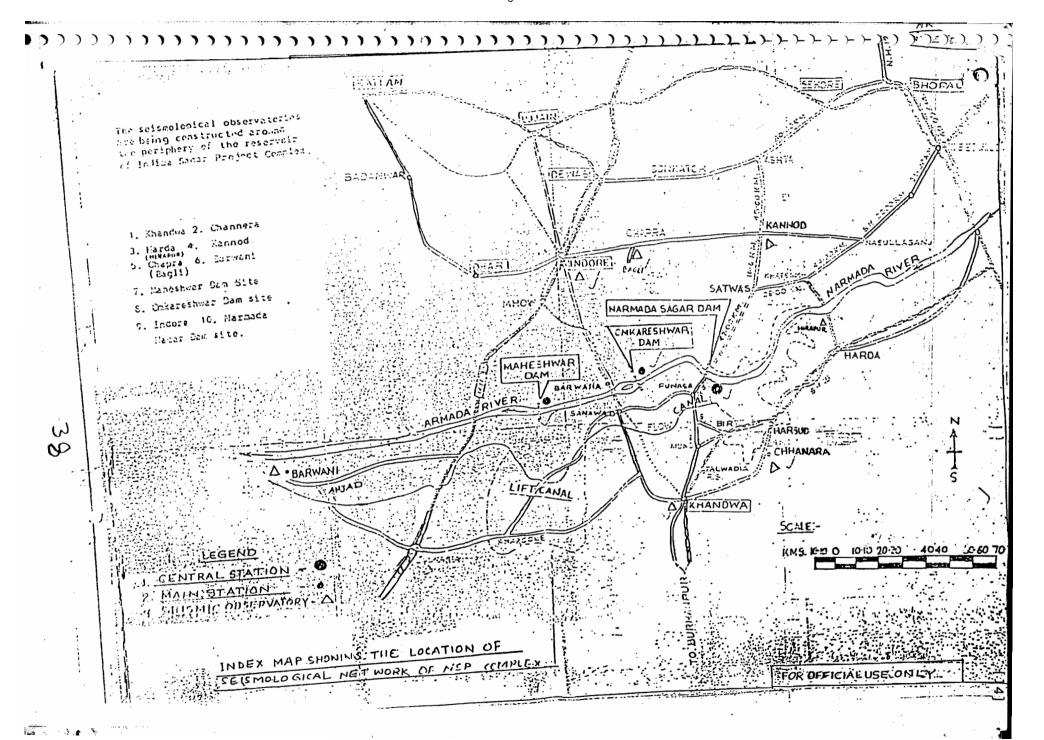
- 1. Wood Anderson Seismograph
- 2. Short Period Seismometer.
- 3. Long Period Seismometer.
- 4. Strong Motion Accelerograph.
- 5. Data Processing and Analysis System.

The programme of installation of Strong Motion accelerograph in the dam body is dependent on the construction of Dams via Narmada Sagar, Omkareahwir 3

Maheshwar. However, Strong Motion accelerographs are to be installed at seismic obserbatories at above three project site as per phasedout programme.

The analysis of available data from the above observatories need to be done, as soon as specialised nands are available as a consultancy is fixedup. It is proposed to get the data analised from GSI, Nagpur sicne IMD had-expressed their inability for want of personnel. GSI is installing a telemetered net work around Khandawa, under a World Bank aidded, DST project. It would be proper to give the consultancy to interpret/analysed the data from NVDA obsevabories to GSI also for a proper correlation of the events recorded by two independent seismic network.

Andraust 151



Annoxuro 3(b).

NETWORK-ISP-COMPLEX M.P.

1. NANUMADIA NAGAM Completed Installed in Phase-I To be installed in Installed in Phase-II upto 6/98 Illed in Phase-II upto 12/98 Illed in Phase-II		OBSERVATORY	vatory/Construction activities.	Nicro-Earthyuske Recorder HEO-9008	Wood Anderson Selsmojraph			Long Period Seismometer	Strong Hotion	Accelerograph	Data Pro
### ### ##############################						Component	Threa Component		Observatory	Dam Body	cessing analysis system
2. OMKARESINAN Under const. 2. OMKARESINAN Under const. 3. MANIESINAN Electrification is to be done. 4. KILANDAMA Completed do do do lied in phase- 11 uyto 12/98 5. CHAINERA Electrification installed in fase-11 on done. 6. BARWANIdo do do Nil -		I. NARMADA NAGAH	Completed		lled in Phase-II upto		in fase-II upto	tallod in phase-li	lled in phase-fl	Middle-1 Top - 1 P.H 1	I To be installed in phase II, upto 12/98
CONSTRUCTION 3. MANIESIMAN Electri- fication is to be done. 4. KILANDAMA Completed -do- -do- -do- -do- -nii- niini		2 0444855181411	lladas	4	- 40 -	-111.1-	- do -	. 4.		on const. prog.	
		2. UNKAKESHWAR		40	- 00 -	-1111-	- 40 -	- do -	- do -	- do	-N11- :
4. KIUNDAMA Completed - do - do - To be Insta - HII -		3. HAHESINAR	fication	- do -	- ùo -	- 1111 -	- do -	- do -	- do -	- do -	-N11 -
Ited in phase-											:
5. CHAIMERA Electrification Installed in - H11 do N11	.1	4. KIIAHDAWA	Completed	- do -		lled in phas	ie-	- N11 -	- M11 -	- N11 -	- N11-
11ed in phase-III upto 6/99 7. IMPORE do , To be installed in Phase-III upto 6/99 8. KAMMADD do do		5. CHAJINERA	is to be.	fase-II on				- N11 -,	- N11 -	- N11 -	- N11 -
11ed in phase-III upto 6/99 7. INDORE											
7. INDORE do To be installeddo To be installedNil-		G. BARWANI	do	do	lled in phase-III	do	NII	H11 -	-N11-	-Ni 1-	-N11-
in Phase-II upto 12/98 upto 6/99 8. KAMUMOD dodoHilN					•						;
9. NAGLI(Chapra) undur Const. To be installed - NIIdoNII-		7. Indore	do ,	in Phase-II	do	lled Phase	aN[]- [[[-N11-	-N11-	-N11-	-N11-
In Phase-[][upto 6/99dodoN11-		B. KAMIND	do	do	-1111 -	Do	N11-	-N1 I -	-N11-	-N11-	-N11-
		9. HAGLI(Chapra)	undur Const.	In Phase-III	- HII-	do	-N11 -	-NII-	-N11-	-NII	N11-
		10 HIRAPIR(Harda)	do	do	- N11-	do	-N11-	-N11-	-N11-	-N11	N11-
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	.) . 2) .)										

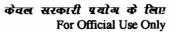
Annexure-3(C)

DISTANCE_WISE DISTRIBUTION OF EARTHQUAKES

[from 1.1.98 to 30.6.98]

Seismic observating Narmada Nagar

Distance from	Magn	itude (Richter)		 	
Seismic Obser- vatory.	<1,	I-2,	2-3 ,	>3,	 	
0 - 20 Kms	-	-	-	-		
21 - 50 Kmss	-	-	- -	4		
51 - 100 Kms	-	-	-	1		
101 - 200 Kms	-	-	2	7		
201 Km & Above	-	1	3	67		





पर्यावरण उपदल ENVIRONMENT SUB-GROUP

तेंतीसर्वी बैठक की कार्यसूची Agenda for the 33rd meeting

स्थानः पर्यावरण भवन, नई दिल्ली । Venue: Paryavaran Bhawan, New Delhi.

दिनॉकः 28 सितम्बर, 1999, 11 बने Date: 28th September, 1999, 11.00 A.M.

नर्मदा नियंत्रण प्राधिक्रण NARMADA CONTROL AUTHORITY

इ**न्दीर** सितम्बर, 1999

Indore September, 1999

AGENDA OF 33RD MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA TO BE HELD ON 28th SEPTEMBER, 1999 AT PARYAVARAN BHAWAN, NEW DELHI.

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AGENDA OF 33RD MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA TO BE HELD ON ____ SEPTEMBER, 1999 AT PARYAVARAN BHAWAN, NEW DELHI.

Item No.XXXIII-1(153): CONFIRMATION OF MINUTES OF THE 32ND MEETING.

Minutes of the 32nd meeting of Environment Sub-group of Narmada Control Authority were circulated to all Member and invitees vide letter No.Env-3(32)/98/2233-66, dtd. 1.12.98.

No comments were received. The minutes are put up for confirmation.

Item No. XXXIII-2 (154): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

1. PARI-PASSU CONTEXT & COMPLIANCE [XXI-4(148)].

During the last meeting while reviewing the issue of pari-passu compliance, it was suggested that a committee of the Sub-group for an independent assessment through field visits might be formed. Accordingly, a committee consisting of Director, Botanical Survey of India; Director, Wildlife Institute of India; Prof. R.K. Katti; Prof. S. Ramaseshan; Addl. Director, MOEF under the chairmanship of Member (E&R), NCA with Specialist (Environment), NCA as Convenor, was constituted vide NCA office letter No.Env-3(33)/99/475, dtd. 16.3.99. Composition and terms of reference of the committee given in the notification are enclosed at **Annex-I**.

The first field visit of this committee was undertaken during June-July 1999 to the areas in M.P. and Maharashtra with the local officers and progress on various Environment Sub-group parameters were reviewed. Report of the committee containing observations and recommendations was circulated to all the members of the Sub-group vide this officer letter No.Env-3(33)/99/1594-1608, dtd. 23.8.99.

Members may like to discuss and review.

2. JOINT INSPECTION BY MOEF AND NCA OFFICIALS TO THE NSP AREAS [XXXI-4(148)].

During the last meeting, Sub-group was informed that officers from MOEF and NCA would be undertaking a joint inspection of the works on environmental safeguard measures in NSP areas. Accordingly, a joint inspection was undertaken during $22^{nd} - 23^{rd}$ December 1998 to the NSP areas by officials of MOEF, NCA and NVDA to ascertain the status of compliance of environmental clearance conditions in general and R&R & compensatory afforestation in particular. Observations and recommendations of R&R issues were sent to the Chairman of R&R Sub-group and Secretary, Ministry of Social Justice & Empowerment vide MOEF letter dated 28.1.99. A copy of the report is enclosed at Annex-II

Members may like to discuss and review.

3. SUBMISSION OF CATCHMENT AREA TREATMENT (CAT PLANS FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS JITEM NO.XXII-2(112).]

As per the decision of Govt. of India of June 1992, the project authorities were required to submit Action Plan for treatment of balance of the critically degraded sub-watersheds within the freely draining catchment.

Present status is summarised below for a review.

Govt. of Gujarat

There was 29,157 ha of catchment in Gujarat. Govt. of Gujarat has almost completed treatment of the entire freely draining catchment within the Narmada basin.

Govt. of Madhya Pradesh

Govt. of M.P. was required to submit schemes for treatment of subwatersheds covering both forests and non-forest areas spread to 3,52,089 ha.

Govt. of M.P. have prepared plan for treating 3,49,892 ha from 139 subwatersheds for treatment by 2011. Micro-watershed plans were promised by GOMP on year-to-year basis. So far project authorities have submitted schemes covering 30,881 ha of the catchment to RVP schemes of which 23,210.78 ha area is proposed to be treated at the cost of Rs.1062.67 lacs during the current year. By the end of March 1999, an area of 9152 ha was treated.

Govt. of Maharashtra

Govt. of Maharashtra were required to submit schemes for treatment of sub-watersheds spread to 80,881 ha area covering, both forest and non-forest land.

Project authorities have submitted macro-watershed plans for critically degraded freely draining net area for about 77,568 ha during 1994. The net area proposed to be treated includes 40,619 ha of forestland and 36,949 ha of nonforestland. However, for seeking funds, as pr the discussions in the Environment Sub-group of NCA, Govt. of Maharashtra have re-casted their plans on the basis of the guidelines of the NAEB/RVP schemes for micro-sub-watersheds have been prepared for 35 sub-watersheds of which 13 schemes have received approval. These 13 schemes cover a total of 22,706 ha area of forest and nonforest.

By the end of March 1999, an area of 3,646 ha against the approved area of 7050 ha of forestland besides 7854 ha against the approved area of 15,656 ha of non-forestland was treated up.

4. Duration of treatment in catchment areas

Regarding increasing the duration of treatment from the present three years, to five years, during the last meeting, it was informed that NCA & NVDA have approached the MOA for a consideration. Joint Commissioner, MOA was requested to convene a meeting to review this issue.

It was agreed that MOEF would keep pursuing with the Ministry of Agriculture & Co-operation.

5. Silt Monitoring

Govt. of Gujarat

During the last meeting, it was informed that CCF, SSPA in consultation with the Director, GERI was preparing the plan for evaluation & monitoring of sedimentation in the reservoir.

Progress may please be reviewed by the members...

Govt. of Madhya Pradesh

During the last meeting, GOMP informed that one silt monitoring station though sanctioned but could not be established because of non-availability of imported equipment and it was assured that NVDA were in touch with the concerned manufacturers and progress of establishment of SMS would be informed shortly.

Progress may please be reviewed by the members.

6. COST ESTIMATES FOR PREPARATION OF ACTION PLANS AND IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD MEASURES.

During the last meeting, it was informed by NVDA that estimates for environmental safeguard measures at 1996-97 price level were under revision. It was assured that efforts would be made to make this available by the next meeting. Govt. of Gujarat submitted a copy of the updated statement on environmental costs.

Govt. of M.P. and Govt. of Maharashtra are requested to present the cost estimates and expenditures.

8. ESTABLISHING A SEPARATE AUTHORITY FOR COORDINATING ENVIRONMENTAL WORKS IN MAHARASHTRA.

During the last meeting, in the absence of concerned officers of the Govt. of Maharashtra the draft TOR for the proposed Narmada Environment Authority in Maharashtra compiled by NCA for consideration of the GOM could not be discussed. It was suggested that there might be difficulty in notifying an elaborate authority as suggested, therefore GOM might like to create an environmental cell for this purpose instead of an authority.

Progress may please be presented for a review by the members.

9. PUBLICATIONS ON ENVIRONMENT

During the last meeting, GOMP presented copies of its publication on Rehabilitation programme of Indira Sagar Project which were annexed with the minutes of the 32nd meeting and it was assured that publication on Environment in respect of ISP was under printing and that for SSP it was being drafted. NVDA assured that suitable scientific and popular publication on the good works done/being done by NVDA would be issued shortly.

Progress may please be presented by the NVDA.

It was informed by the GOG during the last meeting that GOG were working on publication on bio-diversity and other publication and they were in touch with the NCA for bringing out similar publications on other topics.

Progress may please be presented by the GOG.

During the last meeting, the Chairman desired that NCA should take the initiative to bring out popular scientific publications on key environmental safeguards in the projects. A copy of the draft publication on Indira Sagar Project is circulated to the members with the agenda papers.

Members may like to express their views on the draft publication.

10. MONITORING OF R&R ASPECTS OF ISP:

Chairman of the Environment subgroup during its 25th meeting held on 11th July 1995, stated that monitoring of the R&R aspect of the Indira Sagar Project should not be ignored. The issue was discussed subsequently in the NCA meetings and its Sub-groups on Environment and R&R. During the last meeting of the Environment Sub-group, it was noted that, as discussed in the NCA and R&R Sub-groups, the R&R Sub-group chaired by the Secretary, Ministry of Social Justice and Empowerment could discharge the function of monitoring of R&R of ISP.

This issue was discussed during 58th meeting of the NCA held on 18.12.98 wherein it was decided that the same R&R Sub-group which monitors Sardar Sarovar Project would also monitor Indira Sagar Project. However, the Chief Secretary, M.P. through his letter dtd. 15th July 1999 addressed to the Secretary, Ministry of Water Resources have objected to monitoring of R&R aspects of the Indira Sagar Project by NCA or its Sub-group.

Members may like to discuss and review.

Item No. XXXIII-3(155): PRESENT STATUS OF STUDIES, SURVEYS AND ENVIRONMENTAL ACTION PLANS.

Current status of the progress on various items as on 31st March 99 is placed at **Annex-III**.

Latest available progress of works vis-à-vis status of compliance is presented below for a review by the members:

1) PHASED CATCHMENT AREA TREATMENT

During the last meeting, Sub-group endorsed the views expressed by Dr. Ramaseshan that for directly draining areas to impounded reservoir the work of CAT should be completed in its vicinity before the storage was completed.

Government of Madhya Pradesh

During the last meeting, it was pointed out that going by the past performance of the NVDA, it would be a difficult task of treating an area of 15,000 ha per year. Vice-Chairman, NVDA had assured the Sub-group that though availability of funds was a constraint yet NVDA would make all efforts for adhering to the given targets for CAT and that CAT works would be completed within 2 years in SSP and 4 years in NSP areas.

Indira Sagar Project

Against a target of 73,456 ha, an area of 41,219 ha has been completed.

Sardar Sarovar Project

By the end of August 1999, an area of 72,504 ha against a total target of 1,25,725 ha had been completed.

Govt. of Maharashtra

In the absence of concerned officials of the Govt. of Maharashtra, during the last meeting, Sub-group could not review the progress. However, during the First field visit of the Committee constituted, field officers of the Govt. of Maharashtra participated.

Sardar Sarovar Project

In Maharashtra, against a target of 24,298 ha, an area of 23,295 ha has been treated. According to macro-watershed plan, 1003 ha area remains to be treated.

Current status of works along with progress on maintenance may please be presented for the agriculture as well as forest areas.

Govt. of Gujarat (Sardar Sarovar Project)

By the end of September, 1994, Govt. of Gujarat had completed plantation works in the entire planned area of 13,950 ha. (including both non forest and degraded forest areas).

2) COMPENSATORY AFFORESTATION

Govt. of M.P.

Indira Sagar Project

Compensatory afforestation works over an area of 67,188 ha against a target of 80,945 ha were reported to have been completed by the end of June 1999. Progress of plantations during 1998-99 was reported as 55 ha

Sardar Sarovar Project

By the end of June 1999, Govt. of M.P. had completed plantation works over an area of 8,710 ha against a final target of 8,740 ha.

Govt. of Maharashtra - Sardar Sarovar Project

For the submergence, progress achieved was 19,281 ha against a target of 19,468 ha. Whereas for the land released for R&R works, progress achieved was 3,584 ha against a target of 4,200 ha.

Govt. of Gujarat - Sardar Sarovar Project

By the end of September 1994, Govt. of Gujarat had completed plantation works in the entire planned area of 13,950 ha. (including both non forest and degraded forest areas).

3) COMMAND AREA DEVELOPMENT:

Govt. of Madhya Pradesh - Indira Sagar Project

Programme and progress of works on construction of canal networks as per the information available was annexed with the agenda papers of the 32nd meeting. During the last meeting, it was informed that NVDA was examining this document.

Progress may please be reviewed by the members.

As per earlier decisions the TOR(s) framed by GOG & GOR were also required to be referred by the GOMP for finalising the TOR for preparation of Command Area Development Plan. During the last meeting, Vice-Chairman, NVDA assured the Sub-group that TOR for the integrated development of the command area would be finalised by the next meeting.

Progress may please be presented by the NVDA.

During the last meeting representative from Jawaharlal Nehru College, Khandwa of the Rani Durgavati University, Jabalpur had presented the findings of study entitled "Impact of agro-chemicals on water quality", a model on preventive measures was assured.

Progress may please be presented by the NVDA.

Govt. of Gujarat - Sardar Sarovar Project

Progress of works on construction of canal and status of readiness was presented with the agenda papers.

Further progress may please be presented by the GOG.

During the last meeting, it was informed that phase-I of command area development was linked with raising of dam height upto EL+110.0 M and completion of main canal/branch canal / Distributories in that reach. Unless these two components were completed irrigation can not start in the command.

It was further informed that plan for integrated development of the command area was under preparation.

Progress may please be presented by the GOG.

Regarding scope of irrigated agro-forestry in phase-I it was informed that scientists of Gujarat Agriculture University & that of the Horticulture & Forest College, Navsari have been requested to give their recommendations in this regard. A draft plan would be prepared in consultation with ICAR, New Delhi.

Progress may please be presented by the GOG.

Govt. of Rajasthan - Sardar Sarovar Project

During the last meeting, it was informed that Environmental Impact Assessment of the Narmada Canal in Rajasthan had been completed by

WAPCOS and that it was likely to be approved by the Govt. of Rajashthan by the end of October 1998.

Progress may please be reviewed by the members. by the GOR.

4) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

Govt. of Madhya Pradesh

Indira Sagar Project

It was informed during the last meeting that to implement the recommendation of the experts for declaration of prime areas of Indira Sagar Project as National Park / sanctuaries, the proposal was under consideration of the State Govt. As desired by the Chairman during the 32nd meeting, a letter was addressed by MOEF (copy placed at **Annex-IV**) to the Vice-Chairman, NVDA for expediting the pending works.

Progress may please be reviewed by the members.

Sardar Sarovar Project

During the last meeting, GOMP informed that based on recommendation of the study group, the State Forest Department was requested to draw up a plan for forest management and social forestry and that this would be in addition to the area already covered up under CAT.

Further progress may please be reviewed by the members.

Government of Gujarat - Sardar Sarovar Project

During the last meeting, GOG informed that action plan on development of Shoolpaneshwar Sanctuary was completed. It covered habitat improvement, captive breeding of endangered species, interpretation center and eco-development programme. It was informed by GOG that implementation of this plan was going on.

Progress may please be reviewed.

Govt. of Maharashtra - Sardar Sarovar Project

During the last meeting, in the absence of concerned officials of the Govt. of Maharashtra, progress of works could not be reviewed by the Subgroup. Based on recommendations of the study group for the areas in

Maharashtra, an Action Plan and it's implementation in time was desired by the Sub-group.

Progress may please be reviewed by the members.

5) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Government of Madhya Pradesh

The State Department of Archaeology & Museum have revised their earlier Action Plan during January 1999. This Action Plan referred to as Action Plan of 1997. It is proposed in this Plan to protect ten monuments besides excavation of five mounds and collection of sculptures. Executive summary of this Action Plan is placed at **Annex-V**. It was informed by the NVDA that protection works for the monuments identified in 1993 Plan are being entrusted to Archaeological Survey of India.

Progress may please be reviewed by the members..

Indira Sagar Project

As suggested during 31st meeting of the Environment Sub-group held on 20.1.98 a committee was constituted to resolve various autstanding issues on archaeological aspect of NSP. Committee met twice and had the field visit before concluding that measures to protect the intake well of Joga Fort are needed. During the 32nd meeting, NVDA assured that they would be accepting the recommendation of ASI on the protection of north bastion of Joga Fort.

Action Plan for protection was to be prepared by the Archaeological Survey of India. An estimate for safeguarding the monument was prepared by the ASI. Salient features of the estimates are placed at Annex-VI. However, a site visit to the Joga Fort by the Director-General of ASI as assured during the 2nd meeting of the Committee on Archaeological Aspects, is awaited.

During the 32nd meeting, the Chairman desired that to allay her apprehensions related to archaeological investigations, Member (E&R), NCA should get in touch with Dr. Romila Thapar. Member (E&R), NCA reviewed the status of archaeological investigations being undertaken by various organisations and the information gathered, was communicated to her.

A copy of the letter sent is placed at **Annex-VII** for information of the Sub-group.

Sardar Sarovar Project

Sub-group reviewed the compliance status of the monuments affected by SSP during its 31st meeting. Accordingly seven monuments were to be relocated by GOMP. Temples located at Semalda and Barda were required to be relocated before the dam height could be raised to 110m.

Member (E&F), NVDA informed that temple at Barda had been relocated. As regards the relocation of the temple at Semalda, this is to be worked by ASI. In addition to this, sanction has been issued for relocation of monuments of Khujawa and rock cut sculptures at Pipladgarhi area. Present status is summarised in the field visit report circulated to the members.

Government of Gujarat - Sardar Sarovar Project

Out of the two temples proposed for relocation, one temple viz. Shoolpaneshwar temple was already relocated. Regarding 2nd temple, GOG representative informed that Hampheshwar temple would be relocated before the submergence.

Progress may please be reviewed by the members..

ANTHROPOLOGY

Government of Madhya Pradesh

During the last the meeting, to effect the extending of semi-statutory and non-statutory benefits to the PAFs entitled to similar facilities in their home State. It was informed that Gujarat has issued a Govt. Resolution vide its letter No.SCW/1091/201/Kit dated 18.7.1991 Govt. of Madhya Pradesh vide its letter No.7/TW Cell/1148 dated 2.8.94 has proposed amendment to Article 341 and 342 of the Constitution of India to the Govt. of India, Ministry of Welfare (Ministry of Social Justice & Empowerment). The Govt. of Gujarat has also consented for the aforesaid amendment. But orders to this effect are still awaited from Govt. of India.

The Chairman had suggested that MOE&F may request MOSJ&E to expedite the issue.

6) SEISMICITY & RIM STABILITY OF RESERVOIR

Govt. of Madhya Pradesh - Indira Sagar Project

During the last meeting, GOMP informed that for seismic monitoring 10 sites were identified.

A copy of the status report on seismic monitoring network of ISP complex was annexed with the minutes of the last meeting for a review by the members.

Government of Gujarat - Sardar Sarovar Project

During the last meeting, it was informed that for regular monitoring of the seismicity in the vicinity of the reservoir, a total of 9 seismic stations were planned and that 8 stations were already in place.

Progress on establishment of the 9th station may please be reviewed by the members.

7) HEALTH ASPECTS

Sardar Sarovar Project & Indira Sagar Project

During the last meeting, representative of NICD suggested that surveillance studies in some impacted areas might be taken up under National Disease surveillance programme of GOI to which NICD is the co-ordinator. Steps taken may please be brought to the notice of the Sub-group by NVDA.

Final report of the Gandhi Medical College, Bhopal is awaited. It was agreed by NVDA during the last meeting that on going surveillance studies by Gandhi Medical College, Bhopal shall incorporate reference baseline data also.

Progress may please be reviewed by the members..

To review health aspects of the Sardar Sarovar and Indira Sagar Projects, 3rd meeting of Committee of experts on health is scheduled on 28th August 1999.

Outcome of this meeting shall be reported during the meeting.

8) FISHERIES DEVELOPMENT OF SARDAR SAROVAR PROJECT & INDIRA SAGAR PROJECT RESERVOIR

To review the on going fisheries activities and to design strategies for conserving the reservoir, fifth meeting of the High Level Expert Group on Fisheries development and conservation for the Sardar Sarovar reservoir was

convened on 5th January 1999. A copy of the minutes of the meeting are placed at **Annex-VIII**.

Working groups set up by the HLEG have submitted their reports. These reports have been compiled and are being given ministerial inputs by the FDC., Ministry of Agriculture & Cooperation. Guidelines are being finalised.

This is for information of the members.

On the recommendations of the desk review studies carried out by CICFRI, Govt. of Maharashtra entrusted certain studies on organic loading of the reservoir to Vadodara centre of CICFRI. Reports are awaited. A letter in this regard was addressed by Ministry of Agriculture & Cooperation to the CICFRI

Govt. of Maharashtra may please present the status of the studies.

Item No. XXXIII-5(156): Any other item.

Date and venue of the next meeting.

ANNEXURES



नर्नदा नियंत्रण प्राधिकरण

MARMADA CONTROL AUTHORITY

No. Env-3(33)/99/475

16th March, 1999.

NOTIFICATION

Sub: Constitution of a committee to ascertain the pari-passu compliance of Environment Safeguard Measures on Sardar Sarovar Project & Indira Sagar Project.

- 1. Environment Sub-group of NCA during the 32nd meeting held on 14.10.98 at Paryavaran Bhawan, New Delhi, desired that a committee shall be formed for undertaking the field visits to the Sardar Sarovar & Indira Sagar Project areas, to access & ascertain the pari-passu compliance of Environmental Safeguard Measures. Letter from MOEF suggesting composition of the committee is enclosed.
- 2. It is therefore decided to constitute a committee with the following members.
- 1. Member (E&R), NCA Chairman.
- 2. Dr. S. Ramasheshan, non official member.
- 3. Dr. R.K. Katti, non official member
- 4. Director/His nominee Wildlife Institute of India, Dehradun.
- 5. Director/His nominee Botanical Survey of India, Calcutta.
- 6. Dr. Nalini Bhat, Addl. Director, MOE&F.
- 7. Specialist (Env.), NCA Convenor.
- 8-9. Two officers each to be nominated by State Governments of Maharashtra, M.P., Gujarat and Rajasthan dealing with Environment Safeguard measures in SSP & ISP will be members of the Committee during the field visits in their States.

The State Governments are requested to furnish the name of the members for this committee.

3. Terms of references:

- a) The officers from State Departments related to environmental safeguard parameters will be associated with the field visit.
- b) Field visits would be coordinated by the Narmada Control Authority. Necessary inputs, for data, information, maps etc. required by the committee during the field visit would be made available by the officers of the concerned states.

Contd...2/-

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113-BG, Scheme No. 74-C, Vijay Nagar, INDORE - 452 010 (M.P.) 113-बी.जी., स्कीम नं. 74-सी_{र विजय} नगर, इन्होर - 4**5**2 010 (म.प्र.) Gram: NARCONTROL Fax: 91-731-559888

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- c) The committee would assess the progress of works for ascertaining the pari-passu compliance of the environmental stipulations for the Sardar Sarovar and Indira Sagar Project by undertaking field visits to the Project areas and would place the report of the findings to the sub-group.
- d) Rehabilitation aspects would be monitored separately by R&R Sub-group and its committee/officers.

e) Expenditure towards TA/DA of the non-official members of the committee on account of field visit will be borne by the Narmada Control Authority.

Encl. Fratain

Dy. Director (Env.)

Copy to:

- 1. The Chairman, NCA and Secretary, MOWR, Shram Shakti Bhawan, Rafi Marg, New Delhi-110001, for favour of information, please.
- 2. The Executive Member, Narmada Control Authority, Indore for favour of information piease.
- 3. Dr. Nalini Bhat, Additional Director, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi in response to her letter No.3-87/80-IA.I, dated 23.2.99.
- 4. All members of the committee.

V. Rajagopalan Joint Secretary

D.O.No. 3-87/80-IA.I

Dated the 28th January, 1999.

Dear Sir,

has reference to the monitoring rehabilitation and resettlement issues pertaining to the Narmada Sagar Project (NSP), M.P.

- Our Ministry has been receiving representations from various NGOs including the Narmada Bachaoo Andolan Group highlighting the deficiencies in the rehabilitation programme evolved by Narmada Valley Development Authority In response to these representations and as (NVDA). desired by the Minister of Environment and Forests, a site inspection was undertaken during 22-23 December, 1998 by officials of MOEF, NVDA and NCA, to ascertain the status of compliance of environmental clearance conditions in general and R&R and compensatory afforestation in particular. While our Ministry will look into the issues pertaining to compensatory afforestation, it was felt that R&R issues could be considered by the Sub Group of NCA constituted for the purpose. I am enclosing the field visit report, in this connection, for your perusal and initiating necessary action.
- I would be grateful if you could keep us informed of the follow up action initiated on the issues raised in the field visit report..

With regards,

Yours sincerely,

Shri D.K. Manavalan, Chairman (R&R Sub Group) and Secretary, Ministry of Social Justice and Empowerment, Shastri Bhavan (Room No. 604, A-Wing), New Delhi.

A NOTE ON FIELD VISIT TO THE NARMADA SAGAR PROJECT SITES IN MADHYA PRADESH.

A field visit was undertaken on 22nd and 23rd Escember, 1998 to ascertain the status of compliance in respect of environmental clearance issued by the Ministry of Environment & Forests (MOEF) in June, 1987 to the Narmada Sagar, In view of paucity of time, attention was confined to R&R and compensatory afforestion. The details are as follows:

As per R&R Action Plan, 1994 of Government of Madhya Fradesh, land shall be provided in lieu of land lost. Out cf 249 villages likely to be submerged by NSP, Land Aquisition Awards have been declared for 24 villages in Enandwa district. The total compensation payable amounts to Rs.65 crore. Out of this,Rs.55 crores have already been distributed and the balance amount is proposed to be distributed by March, 1999.

1. Satwas rehabilitation site

By the monsoon of 1999, 13 villages consisting of about 2200 families are likely to be submerged. These families are planned to be resettled in 7 R&R sites namely: Sarliya, Satwas, Bedhani, Anjhia Khurd, Khalwa, Kala Fatha and Chainpur. Out of these 13 villages, PAPs of Enari Kotla village (which was submerged due to construction coffer dam) have been resettled at Sarliya rehabilitation site.

The Satwas rehabilitation site is being developed by NVDA for rehabilitation of the PAPs of first phase of submergence. The total area of the Satwas rehabilitation site is 101 ha. This site can accommodate 667 PAFs. It is proposed by NVDA to resettle 147 PAFs at this site in Phase-I and the balance 520 PAFs in Phase-II. Following facilities have been planned:

- * School
- * Training centre
- * Bus stand
- Community centre

When enquired, NVDA officials were unable to furnish details of village communities (of the 13 villages coming under submergence in phase-I) that have consented to move to this rehabilitation site. It appears that such consent is yet to be obtained. This site does not appear to have been planned with a view to rehabilitating PAPs in such a way that they would be able to earn their livelihood in the vicinity. The surrounding areas do not appear to be

developed - either in terms of agriculture or industry. As such, it is unlikely that PAPs ultimately settled here would be able to buy agricultural land in the neighbourhood. Sources of wage employment in the neighbourhood also appear to be meagre. Satwas R&R site provides only for house plots and a training centre for handicrafts.

Discussions with NBA

Ms. Chittarupa Palith, Alok Aggrawal, Ramesh Billore and Kamal Baba were present during the discussions held at the project site. Officers from the NVDA, various departments of GOMP and NCA were also present. Following points were brought out by the representatives of NBA:

- * Method of Sauda Chitthi (50% of land compensation is released upfront and the balance, after an agreement to purchase land is brought by the PAPs) adopted by GOMP is full of anomalies and is leading to divesting PAFs of their land holdings.
- * Families whose lands have been acquired for purposes other than submergence such as for railway track, compensatroy afforestation etc. should also be treated as PAFs.
- * GOMP is not offering land in lieu of land lost which is contrary to GOMP's rehabilitation plan of 1994.
- * R&R sites are being developed wihtout obtaining the consent of the PAFs.
- * Many people have been cultivating the land since ages and these lands have been used for raising compensatory afforestation. The 1994 action plan of GOMP provides land even to encroachers. However, this is not being followed.
- * It was pointed out that CAG has objected to raising of compensatory afforestation in the forest areas which were having density above 0.4 and therefore cannot be considered as degraded.
- * Regarding catchment area treatment, flora and fauna etcd., NBA had no comments and desired more time to look at the reports.

On 23rd December, 98 the following field visits were undertaken. The representatives of NBA also accompanied us.

1. Visit to revenue area Malgaon (Ghoda Pachhad)

The site consists of revenue area of 102 ha. planted during the year 1992 as part of compensatory afforestation programme against forest land released for the Marmada Gagar Project. The quality of afforestation was good. The

survival percentage was reported to be 58. The complaint of NBA that some encroachers who have been evicted prior to planting of the site have returned was not found to be true.

2. Visit to plantation site Fod Kheda

Visit to the site was undertaken on the suggestion of NBA representatives to ascertain the status of compensatory afforestation.

The survival percentage of compensatory afforestation works was reported to be about 46%. A mix of indigenous tree species had been planted in the area. The plantations were being managed on the basis of JFM. The soil condition was generally poor in the entire area. As a result, the quality of afforestation was also not satisfactory. NVDA officials were unable to clarify as to why people affected by diversion of railway track were not being considered on par with other PAFs. Also rehabilitation of encroachers would need to be sorted out based on actual possession on the stipulated cut-off date. This aspect would have to be looked into by NCA also.

Visit to plantation site Maujvadi

Again, this visit was undertaken as suggested by ${\tt NBA}$ to ascertain status of afforestation. The following issues came up.

Land initially transferred to the est department for raising compensatory afforesta: n was about 167 Of this 167 ha., works of ripping and planting were carried out over 142 ha. of land. When work was in progress villagers raised disputes regarding title/status of a portion of the land. The dispute was settled by the DFO who allowed cultivation on 55 ha. of land (some of which was ripped and planted) by those who had ownership rights. This resulted in reduced area being available for compensatory afforestation (from 167 ha. to 112 ha.). The NBA contends that some ecroachers who had been evicted have re-occupied their lands thereby reducing area under afforestation. In fact, the land left out of afforestation has actually been occupied by the rightful owners and there appears to be a communication gap between the NVDA & NBA.

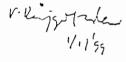
The quality of plantation in general was poor. Bald patches were also visible. Given the soil condition and health of crops in the neighbourhood, it is unlikely that the quality of afforestation would improve substantially in the near future.

4. Visit to forest village Sarai

A visit to Sarai, a village coming under total submergence in taluk Harda of district Khandwa was

undertaken to ascertain the problems being faced by the FARs of this village. The visit was suggested by NHA. The following issues came up during discussions.

- * The rehabilitation package provides land for land lost. However, PAFs ere-paid cash compensation. Land for land was not offered at all.
- * GOMP has offered compensation through a process called 'Sauda Chitthi' under which 50% is paid in cash and the PAF is asked to enter into a purchase agreement for the land of his choice anywhere in the State. On production of this agreement (Sauda Chitthi), the balance 50% is released. Difference. if any, in the cost of the land acquired by the Govt. and the one purchased by the PAF is given as long term interest free loan to the PAF.
- * It was brought out by the NVDA that cash compensation was being distributed as per consent given by the villagers and that most of them have bought land for themselves. This was refuted by the NBA stating that villagers have accepted the Sauda Chitthi procedure under compulsion and are even ready to refund the compensation in case they get land from NVDA. This was confirmed by the people present.
- It was mentioned that many of the agreements to sell are fake. The PAFs have no option but to produce these agreements in order to obtain the balance compensation amount. Given the high price of land vis-a-vis compensation, it would not be possible for PAFs to purchase viable land holdings. This has led to fake agreements being produced. This is a serious matter requiring immediate attention in order to avoid alienation of land from PAFs and their consequent pauperisation.

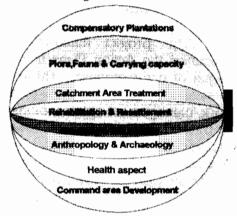


Status Report on Environmental aspects March 1999 Vol. XI No 4

STATUS REPORT SARDAR SAROVAR PROJECT (SSP) ENVIRONMENTAL ASPECT March, 1999

The Action Plans and status of studies and implementation of Environmental Safeguard Measures upto quarter ending March, 1999 are summarised in this report.

The parameters: The suggested environmental safeguard parameters are indicated in the figure below:



While resettlement and rehabilitation is dealt with separately, current status of other suggested parameters is presented hereunder.

1. CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

- more detailed surveys for prioritisation of the sub-catchments in the SSP area should be undertaken;
- A phased CAT programme should be prepared and implemented ahead of reservoir filling.

GOI issued a directive in July 1992 that, for the SSP, the project would bear the

costs of the treatment of all critically degraded sub-watersheds draining directly into the reservoir. These watersheds were identified amongst those classified as either very high or high-priority categories by the All India Soil & Land Use Survey Organisation (AISLUSO). The project would also be responsible for the treatment of those areas of the catchment, which are directly damaged by the project activities.

In addition, plans are required to be prepared for the treatment of the balance of the critically degraded subwatersheds but the cost of this will be met from other ongoing schemes and in a timeframe to be determined.

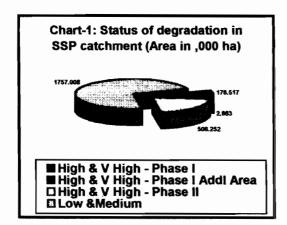
Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the SSP catchment. They are: -

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), 1985.
- Report on Prioritisation of Subwatersheds in Sub-catchments of Narmada Catchment, 1991 by AIS&LUSO, New Delhi.

According to the above studies, the total catchment area of Sardar Sarovar Project below Narmada Sagar Dam is 24,42,440 ha. Out of this, 6,82,769 ha area spread to 500 sub-watersheds having silt yield index 1,200 and above was identified as critically degraded.

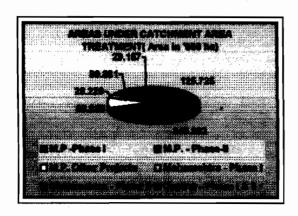
Charle, Status of degraded areas in the SSP catchment.



PLANNING:

Project authorities were required to prepare the plans, as phase-I programme, for treating those critically degraded sub-watersheds which were identified as directly draining into the reservoir. The balance sub-watersheds were to be treated as Phase-II programme.

Chart-2, Allocation of CAT works.



I. PHASE-I: DIRECTLY DRAINING SUB-WATERSHEDS

Project authorities have prepared the plan for treating total area of 1,79,180 ha. as shown in the *table* - 1 on next page. This area will be treated at the cost of the project and pari-passu with the project works

ACTION PLANS:

The project authorities have submitted the Action Plans in varying stages of completeness. These plans contained information related to survey work, management options, monitoring & phased programme of treatment besides provisions for annual budget. The various stages in planning for each item of the plan are given in the Fig.-1.

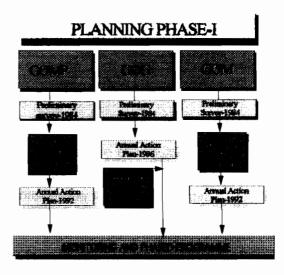
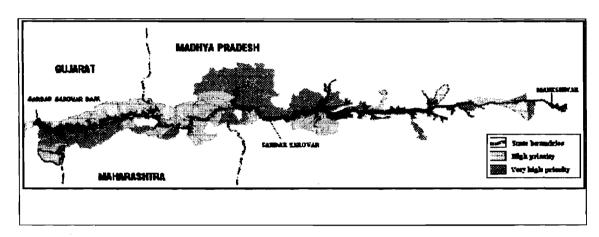


Fig. 1. Flow chart of CAT planning by Gujarat, Madhya Pradesh and Maharashtra.

	Particulars		Madhya Pradesh	Gujarat	Maharashtra	Total
Very High	Planned to Treat	Phase- I	125725	29157	24298	179180
& High	Tiont	Phase-II	349892		77568	427460

Table 1: Area Statistics of Very High & High Priority Sub-watersheds in the Catchment of Sardar Sarovar Project



Map: Showing critically degraded directly draining sub watersheds of SSP

Elements of Action Plan:

Key elements of the Action Plan which includes time-table, menu, budget etc. received from GOG, GOMP & GOM are depicted in *Fig.-2*

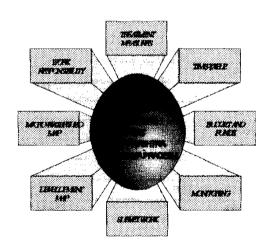


Fig 2: Action Plan components -

IMPLEMENTATION:

Project authorities have prepared the plans for treating 1,79,180 ha area in about 10 years time. Govt. of Gujarat started the treatment works w.e.f. monsoon of 1990 whereas Govt. of Maharashtra and Govt. of Madhya

Pradesh could start the work in the year 1992. The progress of treatment works is detailed in the table – 2 &3 and the bar chart-I drawn below:

Area under treatment Progress

Balance

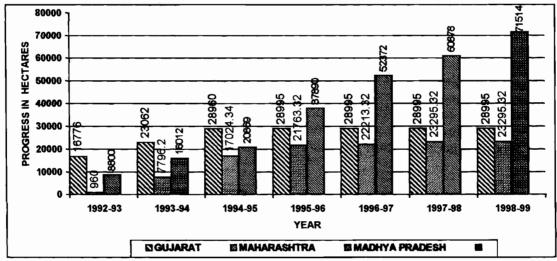
1,79,180 ha 1,23,804 ha 55,376 ha

Table -2: Year wise progress of CAT Works

YEAR	GOG,		GOG, GOM				GOMP		
TARG ETS	F A 27204	N FA 1953	TOTAL 29157	FA 21122	N FA 3176	TOTAL 24298	F A 51930	N FA 73795	TOTAL 125725
90-91	4,28.00	898.00	5,426.00	0.00	0.00	0.00	0.00	0.00	00.00
91-92	4,770.00	230.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
92-93	6,014.00	336.00	6,350.00	960.00	0.00	960.00	0.00	8,800.00	8,800.00
93-94	6,000.00	286.00	6,286.00	6,514.50	321.71	6,836.20	966.00	6,246.00	7,212.00
94-95	5,730.00	168.00	5,898.00	6,541.97	2,686.17	9,228.14	4,263.00	594.00	4,857.00
95-96	0.00	35.00	35.00	4,735.00	3.98	4,738.98	N/A	N/A	17,021.00
96-97	0.00	0.00	0.00	450.00	0.00	450.00	N/A	N/A	14,482.00
97-98	0.00	0.00	0.00	1082.00	0.00	1082.00	N/A	N/A	8,506.00
98-99	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	10,636.00
Total	27,042.0	1,953.00	28,995.0	20,283.47	3,011.86	23,295.32	N/A	N/A	71,514.0

Table -3: Cumulative Progress of CAT Works

YEAR	MADHYA PRADESH	GUJARAT	MAHARASHTRA
1990-91	0	5426	0
1991-92	0	10426	0
1992-93	8800	16776	960
1993-94	16012	23062	7796.2
1994-95	20869	28960	17024.34
1995-96	37890	28995	21763.32
1996-97	52372	28995	22213.32
1997-98	60878	28995	23295,32
1998-99 upto 3/99	. 71514	28995	23295.32
Balance	54211.00	162.00	1002.68



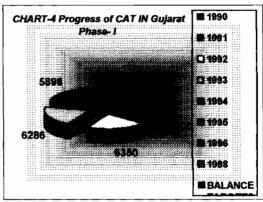
Bar Chart-1: Cumulative progress of the CAT works in the States of Madhya Pradesh, Gujarat and Maharashtra

Govt. of Gujarat:

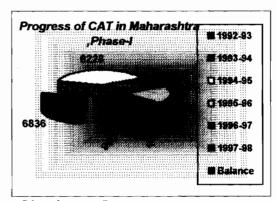
As the Catchment area of Sardar Sarovar was little in Gujarat, GOG accepted the recommendations of Diwan Committee and commenced the work of treating entire catchment area in the year 1990. By the end of 1994 forest area of 27,042 ha & nonforest area of 1953 ha were treated. Treatment work is almost completed except for 162 ha of non-forest area. Graphic presentation of the progress is given in the pie chart-4.

Govt. of Maharashtra:

Treatment works in Maharashtra could commence in the year 1992. By the end of March 1998 forest area of ha and non-forest area of 20,283.47 ha and non forest area 3,011.86 ha. were treated. Graphic profile of the progress is given in *pie chart-5*.



Pie chart - 4



Pie chart - 5

Govt. of Madhya Pradesh:

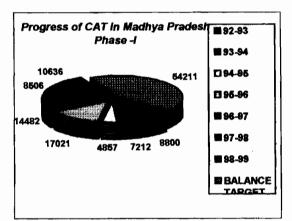
Treatment works in Madhya Pradesh could commence after submission of the revised work plan in 1992. By the end of December 1998 a total of 71,514 ha area including both, forest & non-forest areas was treated-up. Progress is depicted in *pie chart-* 6

Me chart - 6

Balance Targets:

Against the planned target of 179,180 ha of CAT works for the SSP as a whole, an area of 1,23,804 ha was treated up by the end of March 1999. It is proposed to treat the balance area as shown in pie-chart-7 and detailed in the table-4.





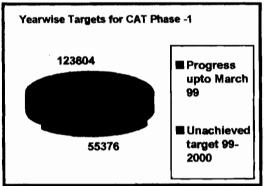


Table 4: CAT Works remaining

	J. 1,0 1,1 1	THE TOTAL TO											
	YEAR		GUJARAT		MAHARASHTRA			MADHYA PRADESH					
	1	F.A.	N.F.A	TOTAL	F.A.	N.F.A.	TOTAL	F.A.	N.F.A.	TATOT			
1	Total	162	0.00	162	838.53	164.14	1002.68	N/A	N/A	54,211			

II PHASE-II: INDIRECTLY DRAINING SUBWATERSHEDS:

Project authorities were required to prepare plans for treating balance of the critically degraded sub-watersheds.

State Govts. of Maharashtra and Madhya Pradesh have submitted the plans. The summary of the plan is given

in the Fig.-3. The funds for treating these areas have been promised by the RVP Scheme of Planning Commission, National Afforestation and Ecodevelopment Board etc. The plans are being revised in a phased manner in

accordance with the guidelines of the funding agencies. The RVP and NAEB have approved some of these plans. Works have commenced.

Planning Commission has agreed for inclusion of Narmada River catchment for treatment under its programme of River Valley Project Scheme. MOE&F also promise funds from National Afforestation & Eco-Development Board. Work commenced on 6 schemes in Maharashtra & a few others in Madhya Pradesh. Further 7 more schemes were approved during 1997-98.

Madhya Pradesh:

Catchment area of Sardar Sarovar below Narmada Sagar Madhya Pradesh is 5,44,505 ha. area includes the freely draining area attributable to Jobat, Man, Maheshwar, and Omkareshwar Projects also as per the details given in the table-5. After subtracting such areas, the gross area of critically degraded sub-watersheds is 4,75,617 ha. Out of this, Govt. of Madhya Pradesh has prepared plans for treating 1,25,725 ha area, as Phase-I already described above, under directly draining category at the cost of the project. Therefore, the gross area for which plans are required to be submitted for Phase-II programme was 3.49.892 ha.

→ Phy -3 Summary of Status of CAT Planning

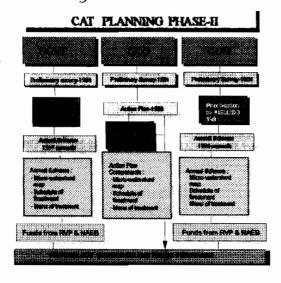


Table 5

Total Area of Freely Draining Critically Degraded Sub- watersheds	5,46,702 ha
Catchment below NSP	3,52,089 ha
Net Treatable area	3,18,118 ha

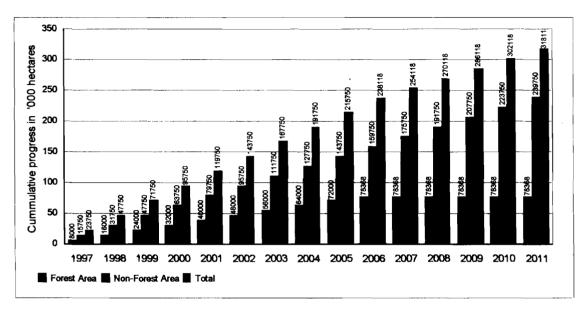
Project	Phase-I	Phase-Il	Total
	(Directly	(Balance	Area
	Draining)	area)	
Jobat			28,211
Man	1		12,720
Maheshwar			13,209
Omkareshwar			14,748
SSP	1,25,725	3,49,892	4,75.617

Schedule of Treatment

Project authorities have prepared the plans for treating the 3,49,892 ha of catchment in 139 sub-watersheds of Phase-II areas by the end of year 2011. The schedule of treatment planned is given in Bar Chart-8 on next page. However, annual micro-watershed plans are under implementation as presented below.

Progress of Implementation:

Project authorities have submitted schemes covering 30,881 ha of the catchment to RVP schemes, of which 23,210.78 ha area is proposed to be treated at a cost of Rs.1062.67 lacs during current year. By the end of December, 1998, an area of 9152 ha was treated. Schedule of implementation is given in the Bar Chart-8.



↑ Bar Chart-S Showing schedule of Implementation of Phase-II CAT works in M.P.

B. Maharashtra:

Project authorities have submitted macro-watershed plans for critically degraded freely draining net area for about 77,568 ha as Phase-II programme, during 1994. The net area proposed to be treated includes 40,619 ha of forest land and 36,949 ha of non-forest land.

However, for seeking funds, as per the discussions in the Environment Sub-group of NCA, Government of Maharashtra have recasted their plans on the basis of the guidelines of the NAEB/RVP.

The status of submission of the revised schemes to the funding agencies and the progress achieved by the end of December, 1998 is presented below:

•	Gross area	=	80,881 ha
•	Unworkable area	=	3,313 ha
•	Area available for planning	=	77,568 ha
•	No. of watersheds	=	35

Status of preparedness for Phase-II works. (area in ha)										
Schemes	sub-water	Land-use	d-use Area Available for planning		Planned Area	Achieve-				
sheds		1	Macro-plans	Micro-plans	(State Plans)	ments				
Planning	35	Forest	40619	42867	22576	7050				
_		Non-forest	36949	Not ready	Not ready	15656				
Progress	13	Forest	14290	15224	7050	3646				
	[Non-forest	15310	15656	15656	7854				

2. COMPENSATORY AFFORESTATION

Approval for the diversion of forestland for the SSP was granted by the MOEF in 1987, 1990 & in 1993 (including for R&R works) but several conditions • were attached relating to the planning and implementation of CAF. Principals amongst these are the following stipulations.

- For every hectare of forestland submerged or diverted for construction of the project there should be Compensatory Afforestation on one hectare of non-forest land plus reforestation on two hectares of degraded forest.
- For the 4,200.00 hectares of forestland in Maharashtra, which is to be used for R&R, an equal area of of non-forest land or double the area of degraded forest should be planted.
- The governments of the three states involved should prepare plans detailing their proposals for Compensatory Afforestation and submit these to the MOEF before work in the forest area is due to commence.
- The project should supply firewood to its construction workers, at its own cost, to prevent them from having to meet their fuel needs from the surrounding forests.

STUDIES

There have been a number of studies in three states aimed at assessing the extent and significance of the loss of forestland attributable to the SSP.

Sardar Sarovar (Narmada) Project
 Development Plan, Volume-II •
 prepared by the Narmada Planning
 Group (NPG) in 1983.

Studies on Ecology and Environment by M.S. University of Baroda (MSU) in 1983.

Sardar Sarovar Project: Preparation of Environmental Work Plan by the Forest Department of Maharashtra in 1988.

Eco-Environmental and Wildlife Management Studies on the Sardar Sarovar Submergence Area in Gujarat 1992 by MSU.

Impact Assessment of Madhya Pradesh Land to be submerged Under Sardar Sarovar Project and Adjoining Ecosystems by State Forest Research Institute, Jabalpur (1989-92).

Draft Final Report on Flora and Fauna In and Around Sardar Sarovar Project, Maharashtra by the University of Pune, Aug.1997.

ACTION PLANS

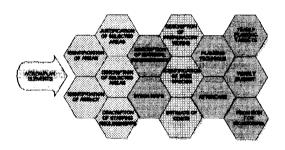
In compliance with the conditions set by the MOEF, each state has prepared an action plan for the CAF of areas within its boundaries. The relevant documents are:

Government of Gujarat Work Plan for Management of Environmental Effects, Section on Forests and Wildlife: The Compensatory Afforestation Plan for the Rann of Kutchchh, 1986.

Project for Afforestation in Sardar Sarovar Project Impact Areas due to Diversion of forestlands for Sardar Sarovar Project (GOG), 1991.

Compensatory Afforestation Scheme in Lieu of Sardar Sarovar Project in Dhule District, Maharashtra State (1989). Government of Madhya Pradesh Forest Department Action Plan of Compensatory Afforestation for Sardar Sarovar Multipurpose River Valley Project (1989).

These plans were submitted in varying stages of completeness but each has now been revised and updated. Action plans of Three State Govt. contained following components:



Implementation

The Action Plans spell out a programme of tree planting in the three states on both non-forest and degraded forest areas as shown in bar Chart-12 and Table-6 & 7.

Planning

An area of 13386 ha was diverted by MOEF vide its order of 1987. It was

stipulated in this order that plantations shall be carriedout in equal non forest land in addition to the plantations on degraded forest land double in extent of the area diverted. Thus for every ha of the area diverted three ha of plantations were to be carried out by the project authorities.

In addition to the area diverted by the MOEF in 1987 an area of 357 ha was diverted by GOG earlier.

State Govts. have prepared the plans for plantations of 46,358 ha besides reforestation of 28,830 ha area including plantations over 4,200 ha of non-forest land in lieu of the land released for R&R works in Maharashtra. Statewise details of the total area taken for SSP and the planning in lieu thereof are given in the chart-11.

In Maharashra State 4200 ha forest land was released for R & R works in two phases. In 1990 an area of 2700 ha was released in Taloda taluka. Further 1500 ha was released during 1993 in the same taluka. State Govt. was required to carry out plantations on equal non forest land. Detailed programme and progress of plantations is given in the table 6 below

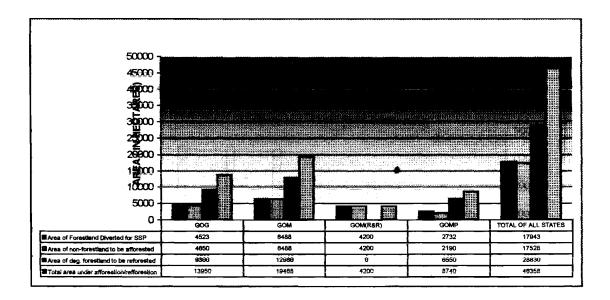


Chart-11: Showing forest areas taken for SSP. This includes 357 ha taken for SSP in Gujarat prior to formal clearance under FCA, 1980 besides the area diverted for R&R works in Maharashtra and targets for afforestation/reforestation

Table-6. Compensatory Afforestation against 4200 ha forest land released for R&R works in Maharashtra vide MOEF order dated 1990 (2700ha) and 1993 (1500 ha).

Year	Land	Progress	Progress	Progress	Progress	Progress	Cumulative	Target
	released	1993 -9 4	1994-95	1995-96	1996-97	1997-98	Progress	1997-98
£990	2,700.00	2,192,37	311.00	184.50	0.00	0.00	2,687.87	12.13
1993	1,500.00	0.00	0.00	896.00	0.00	0.00	896.00	604.00
TOTAL		2,192.37	311.00	1,080.50	0.00	0.00	3,583.87	616.13

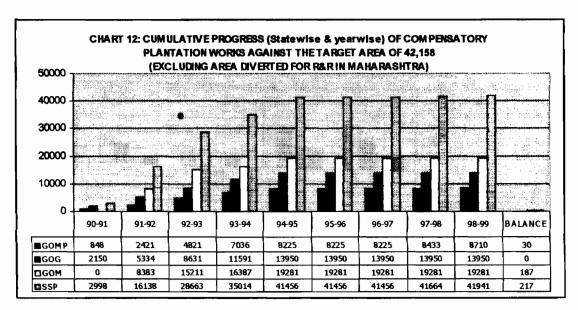
Table-7: Showing detailed progress of CAF, against the target area of 42,158 ha. in lieu of 13,386 ha. diverted for submergence of SSP vide MOEF order dated September, 1987.

(Area in ba)

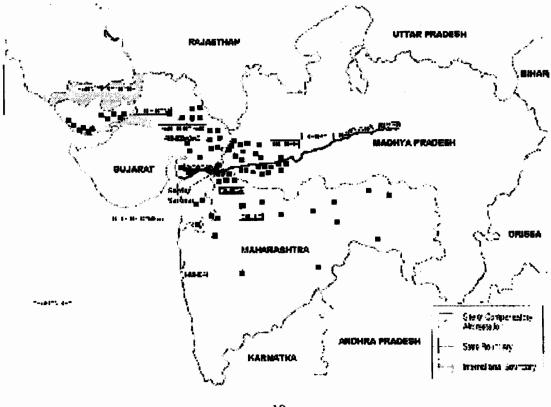
Monsoon	GUJARAT		MAHAI	MAHARASHTRA		MADHYA PRADESH	
year	Degraded forest	Non-forest	Degraded forest	Non-forest	Degraded forest	Non-forest	
90-91	<u>-</u>	2,150.00	-	-	132.00	716.00	
91-92	2,834.00	350.00	8,383.00	-	1,200.00	373.00	
92-93	2,450.00	847.00	4,552.00	2,276.00	2,400.00	-	
93-94	2,500.00	460.00	20.00	1,156.00	2,215.00	-	
94-95	1,516,00	843,00	-	2,894,00	1189 *		
95-96	Completed	Completed	Completed	NIL	NIL	NIL	
96-97		-	-	NIL	NIL	NIL	
97-98	_	_		NIL	208 *		
		i			277 *		
Sub-total	9,300.00	4,650.00	12,955,00	6,326,00			

Total	13,950.00	19,281.00	8,710.00

^{*} Area Classification Not Reported



Map: 2 Showing locations of sites of plantations in the States of Gujarat, Maharashtra and Madhya Pradesh



Additional Plantation Activities

(a) Plantation along Canal Banks
The total potential of canal bank plantations is estimated to be 5,300 ha. A project report prepared for this purpose by Gujarat Forest Deptt. is under scrutiny by SSNNL. The plantation programme was launched from the year 1990-91. Plantations on 1,424 ha have already been established till monsoon of 1998.

(b) Dam Vicinity Plantation (240ha)

An area of 240 ha in the vicinity of the dam had also been planted. Forest Deptt. completed this work and is now being maintained by project authorities.

(c) Ravine Land Afforestation (200

On the left bank of river Sabarmati an area of 200ha in two villages i.e. Ratanpur (120ha.) and Phirojpur (80 ha) Table-8. STUDIES COMPLETED

was taken up for model plantation. Entire work has now been completed

(d) Project area plantations

An area of 311 ha. had beun planted in the project area and the work is completed.

3. COMMAND AREA DEVELOPMENT (Including Drainage Studies)

(A) Government of Gujarat

Government of Gujarat have undertaken several studies rélated to the command area development. Most of these have been completed and the remaining are in progress. Govt. of formed an Guiarat have expert Multidisciplinary group to coordinate the studies & for drawing up the needed plans. The various studies are listed in table-8 and table-9.

1.	Pre-Feasibility Study for Low Level Canal	Jyoti Consultants Ltd., Vadodara.	
2.	Mathematical Modeling of Ground Water for System Single Layer Model- Narmada-Mahi Doab.	Operation Research Group Vadodara.	
3.	Pre-Feasibility Level Drainage Study of Narmada Mahi Doab of SSP Command.	Core Consultants Ltd. Ahmedabad	1982
4.	Some Aspects of Role of Panchyats and Institutional Arrangements for Canal Irrigation in Two Tahıkas of Ahmedabad District	Institute of Cultural and Urban Anthropology, Ahmedabad.	
5.	A Study of Settlement Pattern (6 Talukas in the Narmada Command Area of Mahesana Distt. of Gujarat).		A control objects, and in the control of the control of the control objects of the control
6. 7.	Regionalisation of Narmada Command Marginal Cost Study of Two Typical Distributeries and Two Typical Branches.	Operations Research Group, Vadodara. Dr. C.R. Shah, Vadodara	1982 1983
8.	Socio-Economic Bench Mark Survey of 62 Talukas (Sub-districts) of Narmada Command Area.	-	Belines 1982 & 1983
9.	Population Projection and Migration Study for Narmada Command Area.	Operations Research Group, Vadodara.	1983
10	Study on Water Demand for Non-Agricultural Use from Narmada Project.	Gujarat Water Supply and Sewerage Board, Gandhinagar	anticles and an experience of the second sec

11.	Consumer Expenditure, Assets and Indebtedness of Rural Households of the C□mmand Area of Sardar Sarovar (Narmada)	Directorate of Economics & Statistics, Gandhinagar	175
	Project		
12.	Wasteland Development Project for Command Area of Narmada Canal (Region 11 and 12).	Gujarat State Rural Development Corporation Ltd., Gandhinagar.	. 1984
13.	Mathematical Modeling of Ground Water System Narmada Mahi Doab.	Operations Research Group, Vadodara	1985
14.	Additional Work on Mathematical Modeling of Ground Water System-Single Layer Model Narmada Mahi Doab	Operations Research Group, Vadodara.	49 - 29 - 24 - 24 - 24 - 24 - 24 - 24 -
15.	State of Adoption of Improved Technology in Narmada Command and Rest of Gujarat State (Based on Analysis of Crop cutting Experiments Data).	Operations Research Group, Vadodara	298
16.	Computer Aided Planning of Conveyance and Delivery Network.	Indian Institute of Management, Ahmedabad.	Winners 1994
17.	Land Use and Cropping Pattern Survey and Mapping of Narmada Command Area Zone 4A & 4B.	Department of Geography, M.S. University, Vadodara.	
18.	Survey and Investigation Work of Ground	Gujarat water Resources Development	1987
	Water Resources in Narmada-Mahi Doab.	Corporation Ltd., Gandhinagar.	145/461 44 <u>1_</u>
19.	Cropping Pattern and Waste Demand Study in Narmada Command Area.	Operationw Research Group, Vadodara.	
20.	Inter-Regional Water Allocation and Determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1989
2 1.	Extended Study on Inter Regional Water Allocation and Determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	
22.	Growth of Agro-Processing Industries in Phase-I of the SSP.	Gujarat Industrial & Technical Consultancy Organisation Ltd. Gandhinagar	
23.	Consultancy Work for Control, Telemetry and Communication Network on Narmada Canal	Gujarat Communication & Electrical Ltd. Vadodara	-1991
•	System for SSP.		Company of the Compan
24.	Techno-Economic Study for Utilising Village Tanks as Borrow Area for Construction of Canal Network	Operations Research Group, Vadodara.	
25.	Studies in Water Rates Policy, in 3 parts:		
	Pricing of a Public Utility Survey of Literature.	Department of Economics, South Gujarat University, Surat	1992
27.	Financial working of Irrigation Projects - A Case of Four Projects in Gujarat.	Department of Economics, Sardar Patel University, Vallabh, Vidyanagar.	1992
28.	Some Policy Issue for Canal Water Rates in	Department of Economics, Sardar Patel	1992
	Gujarat.	University, Vallabh, Vidyanagar.	The state of the s
29.	Mathematical Modeling of Ground Water	Consultancy Engineering Service, New Delhi.	1993
	System for SSP Command Between Rivers Shedhi and Sabarmati.		
30.	Mathematical Modeling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati.	Operation Research Group, Vadodara	1993
31.	Mathematical Modeling of Groundwater	Dalai Consultants, Ahmedabad.	1993
	System for SSP Command Beyond Banas up to Rajasthan Border.		

32.	Pre-feasibility Level Drainage Study for SSP Command Beyond Mahi.	Consultancy Engineering Services, New Delhi.	51111111111111111111111111111111111111
33.	Study on Preparation of a Detailed Integrated Command Area Development Plan for SSP.	M/s. Wamana Consultants Pvt. Ltd., Hvderabad.	May, 1994
34.	Environmental Impact Assessment Studies on	M.S. University, Vadodara.	Nov. 1994
	Inland and Marine Fisheries relevant to the		
	Command Area of Sardar Samovar (Narmada) Project		
35.	Environmental Impact Assessment (EIA)	Commissionerate of Health, Medical Services	Oct. 1995
	Studies on Water Related Diseases in Sardar	& Medical Education, Govt. of Gujarat,	
	Sarovar Project (SSP) Command Area including the Area Down Stream of the SSP	Gandhinagar	
	Dam.		
36.	Study of Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project:	Sardar Patel University, Vallabh Vidyanagar.	Nev. 1995
	Lying Between the Narmada & Sabarmati		
	Rivers (EIA Studies).		
37.	EIA on Downstream of Sardar Sarovar Dam up to Gulf of Cambay.	H.R. Wallingford.	April, 1995
38.	Economic Dimension of the Sardar Sarovar	S.P.Institute of Social & Economic Research,	May, 1995
••	Project.	Ahmedabad.	1 1/21, 22, 34, 32
39.	Study on Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project	Saurashtra University, Rajkot.	Jan. 1996
	Lying in Saurashtra and Kachchh Area (EIA		
	studies).		
4 0.	Review of Ground Water Drainage Study	H.R. Wallingford	Feb. 1996
41.	Agro Pollution Aspect of Command Area.	H.R. Wallingford	The state of the s
42.	Environmental Impact Assessment of Black	GEER Foundation -	Dec. 1993
	Buck National Park located at Velavadar in the command area of SSP.		Commission of Colors of the Color of the Col
43.	Study on Flora and Fauna of the Command	Gujarat University, Ahmedabad.	Mar., 1998
	Area of SS(N) Project: Lying Between		
	Sabarmati River and Rajasthan Border, EIA Studies.		
44.	Ecological Study of Wild Ass Sanctuary and	Gujarat. Ecological Education & Research	March 1998
	Surrounding Area Using Relote Sensing	Foundation (GEER Foundation),	Naviga and
15	Technology for EIA. Environmental Impact Assessment of Nal	Gandhinagar. GEER Foundation	18 1000
43.	Sarovar Bird Sanctuary	GEEV LORUGATION	March, 1998
	•		

▼ Table-9: ON GOING STUDIES

1.	Agricultural Research Studies. Gujarat Agric	ultural Univ.	Stu	dy commen-ced	in
1			198	7	
2.	Survey and Investigation Work of Ground Gujarat	Water Resou	ırces	1	989
	Water Resources Beyond River Mahi in SSP Development	Corporation	Ltd.		
	Command. Gandhinagar.				
3.	Action Research on People' Participation in Gandhi Labour	Institute, Ahmedal	bed.	1	991
1	Water Management in SSP.				

(B) Government of Rajasthan

The Government of Rajasthan had submitted a report on Environmental & Ecological aspects and remedial measures for 'Narmada Canal Project'. Copy of the report was submitted to Ministry of Environment and Forests. Govt. of Rajasthan have assigned studies on EIA of Command area in Rajasthan portion to WAPCOS. Revised draft final report is available, which is in the process of approval by State Govt.

4. FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

The guidelines of the MOEF require that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present can be assessed, listed (rare and endangered) species can be detected, if present, and appropriate conservation measures devised.

On the basis of relevant details supplied by the various states, MOEF issued clearance for the SSP in 1987. A condition of this clearance, as far as it related specifically to the Flora & Fauna, was that the Narmada Control Authority would ensure in-depth studies on flora & fauna needed for implementation of Environmental Safeguard measures.

STUDIES/SURVEYS:

Important survey work included the following:

- The Environmental Impact Study of 1983 prepared by MSU.
 Preliminary Report on First Botanical Exploration and Plant Collection from Narmada Valley by the Botanical Survey of India in 1986.
- Report on the Survey of the Narmada Sagar Area by Zoological Survey of India, 1988.
- Note on Sardar Sarovar Project Preparation of Environmental Work Plan for Forest and Wildlife by the State Forest Department, GOM, 1988.
- Status of Flora and Fauna in and Around Sardar Sarovar Project, Maharashtra is studied by the University of Pune (1992-94). Final report is received in NCA.
- Eco-Environmental and Wildlife Management Studies in the Sardar Sarovar Area in Gujarat, 1992, by MSU.

- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems. The study was conducted by the State Forest Research Institute (SFRI) in Jabalpur and financed by the NVDA. This study was completed & report was submitted in 1994.
- Workshop on Approaches to Integrated Wildlife Management in Gujarat: A Report by the SSNNL, October 1990.
- People's Involvement in Wildlife Management, by VIKSAT in 1991.
- Wildlife Management Studies in the Submergence and Catchment Area of Narmada Project: With Special Reference to Shoolpaneshwar Wildlife Sanctuary, by the SSNNL, 1992.
- Narmada Basin Water Development Plan: Development of Fisheries, 1987, was prepared by the Narmada Planning Agency, GOMP.
- Rapid Reconnaissance Survey of Limnological Aspects Part I, II and III, 1987, were undertaken by the Bhopal, Vikram and Rani Durgavati Universities for GOMP.
- The Central Pollution Control Board, Central Water Commission, the State Pollution Control Boards and the National Institute of Oceanography have collected water quality data. Narmada River Basin Development Project: Fisheries Component, 1991 by the German Consultants to the World Bank, GOPA.
- Sociological Survey of the Fishing Families of the Narmada River by CICFRI, 1991.
- Aquatic Fauna (Fish) Studies in Indira Sagar Sub}ergence Area, prepared by the Friends of Nature Society in 1991 on behalf on the NVDA reported on the fish fauna of the Narmada.
- Pre-and Post-Impoundment Limnological Studies of Narmada Basin, by three universities coordinated by Barkatullah University for the NVDA. (1989-92) Study report was available in 1994
- Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream, is a desk review sponsored by the NCA and undertaken by CICFRI, 1993.
- Ecology and Fisheries of the Narmada Estuarine System with Special Reference to Proposed Impoundment (Sardar Sarovar Dam) is an ongoing study begun in 1988 by CICFRI.

ACTION PLANS

A) Wildlife (Terrestrial)

To ensure that the wildlife conservation measures are implemented effectively, action plans for the three states were prepared as follows:

- Felling plans for the forest area coming under submergence in Maharashtra and Madhya Pradesh will avoid the possibility of animals being trapped in the submergence area
- Plans for improvement works in the wildlife sanctuaries of Gujarat. Shoolpaneshwar sanctuary development action plan prepared by GOG in 1996 and submitted to Forest Deptt. GOG and submitted to forest department, GOG.

B) Fisheries (Aquatic):

Three state Govt. (s) submitted the fisheries development plans, which are as follows:

- The Narmada Basin Water Development Plan: The Development of Fisheries, 1984. This comprehensive plan for GOMP addressed the development of fisheries in the Omkareshwar, Maheshwar and SSP areas. Phasing and programming with respect to pre and post-impoundment, clearance of the forests, training of fishermen, cooperative societies and post-impoundment management was proposed.
- Environmental Work Plan Sector Fish and Fisheries, GOG, 1986. This work plan, prepared in compliance with the agreement with the World Bank included the establishment of fish hatcheries and fish farms, training of fishermen, establishing primary cooperatives, and

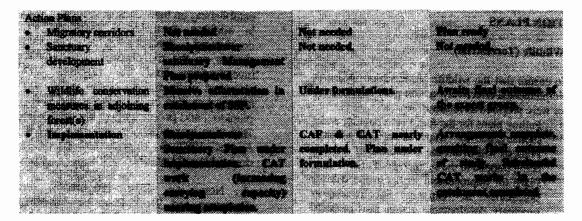
establishing an Inter State Fisheries Board. In addition, it included proposals for conducting hydrobiological studies, studies on the morphology of the river, investigations into the physical and chemical characteristic of the water and soil, and studies on flora, fauna, fish yield, plankton, and productivity in the reservoir. This plan was again revised by GOG in August 1997 & re-submitted to NCA during November 1997.

 A Note on SSP: Preparation of Environmental Work Plan for Fisheries Development in Maharashtra, 1987.

This plan included proposals for the felling in the reservoir submergence zone, fish seed, hatcheries, stocking, fishing, manpower requirements, and training and management through the Inter-State Board. Some more studies have been proposed by GOM through CICFRI. Subsequently, the state governments have revised their plans with a view to address to issuus as they arose. The revised plan for GOM included proposals for the fishing population to be resettled on the periphery of the reservoir or in R&R sites in Maharashtra. In addition, the establishment of low-cost hatcheries and irrigation tanks, the development of pen cage culture fisheries, and intensive fish farming wure proposed. GOG also revised their plan by end 1994. The plan contained four volumes covering upstream, downstream & command areas. In view of the progressive impoundment which commenced in March 1994. NCA has constituted an expert group to lay down the guidelines for conservation & development of fisheries & its ecosystem. The plans submitted by state governments are under scrutiny of this expert group. The summary of status of planning is given in table-10 and table-11.

Table-10: Summary of Status of Environmental Planning: Wildlife

Preiningry Surveys In-depth Studies Complete Complete	Gujarat	Maharashtra	Madhya Pradesh
	Prehiminary Surveys in-depth Studies	Complete Completed, Draft Fig. report available	nal Service (Transparent), restricts.

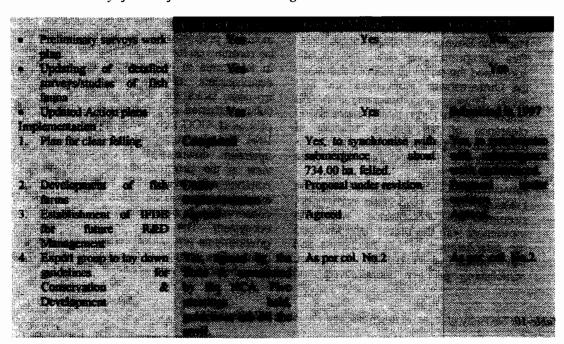


The SSP will also provide an opportunity to enhance nature conservation outside the immediate catchment area of the Narmada. In particular three wildlife sanctuaries located in the command area of the project will benefit from the increased freshwater availability resulting from

The project and there are plans by the GOG to further develop these. They comprise:

- Nal Sarovar, Bird Sanctuary;
- Wild Ass Sanctuary in the Rann of Kuchch.
- Velavadar Black Buck National Park.

Table-11. Summary of Status of Environmental Planning: Fisheries



IMPLEMENTATION

CICFRI have also been commissioned to monitor the whole of the estuary and their study has been extended to examine pollution and to undertake Modeling studies in the downstream environment.

An expert group has been constituted by NCA to lay down the guidelines for fish conservation & devel-

opment during progressive filling of the reservoir to advise the state executive agencies for follow-up action. Guidelines are on the anvil.

Creation of an Interstate Fisheries Development Board has been agreed to by party States, which is expected to be setup and fully functioning prior to reservoir filling. This Board would implement the guidelines for conservation of fisheries recommended by HLEG.

The Organisation is expected to be set up and fully functioning prior to reservoir filling.

On-going Fisheries Activities in the Sardar Sarovar

Some fisheries development activities are already going in the Sardar Sarovar from the year 1992 onwards. From 1993-94, these programmes received the financial support from the Sardar Sarovar projects. These activities are:

- Seed Stocking in the Sardar Sarovar
- Development of Rearing space for Fish Seed Production
- Mangrove Plantation Programme.

Till the year 1997-98, the State Fisheries Department and other Fisheries Development Agencies have stocked 363.92 lakh fingerlings in the dykes of Sardar Sarovar, as a part of reservoir development programme of the State Fisheries Department. During 1997-98, 59.36 lakh fingerlings were stocked.

There is a provision to create rearing space for seed rearing in the Sardar Sarovar and the funds have been provided by the SSP.

The total amount for the rearing ponds is at present Rs.64.36 lakh. The site selected for the rearing ponds initially in the reservoir premises was found to be unsuitable on account of higher water permeability of the soil. Hence, another site has been located in the village of Timbi (Nanded Taluk) of Bharuch district, in the Survey No.303. The soil samples have been sent for analysis to decide the suitability.

In Gujarat, reservoir bowl is already cleared of all vegetative growth. Execution of felling in M.P. & Maharastra, as per felling plans prepared, awaits the commencement of impounding.

5. SEISMICITY

STUDIES

Studies of reservoir induced seismicity (RIS) and rim stability have been carried out by the Geological Survey of India (GSI), Central Water and Power Research Station (CWPRS), University of Roorkee and World Bank Consultants. The principal studies are described below:

- University of Roorkee. 1980. Geological and Seismological Investigations of the Environs of Narmada Valley around Navagam Dam site in Gujarat.
- GSI. 1981-82 and 1982-83. A Geotechnical Report on the Reservoir Competency Investigations in Parts of Sardar Sarovar Area, Bharuch & Vadodara Districts. Volumes II&I.
- Shenoi et al. 1982. Shenoi et al presented at the New Delhi Conference on the significance of Seismotectonic Aspects on Reservoir Development.
- Balasundaram, M.S. 1982 Sardar Sarovar Project: A Geotechnical Report compiled and edited for the Government of Gujarat.
- MSU. 1983. The Sardar Sarovar Narmada Project Studies on Ecology and Environment.
- NVDA published a Position Paper on Seismic Studies in January 1986.
- Krishna, Dr. J. 1989. Dams and Seismicity.
- GSI.1990. Study of the Rim Stability of the SSP.
- GOI.1993. Sardar Sarovar Project Seismicity and Sardar Sarovar Dam.

IMPLEMENTATION

The various recommendations for modification of the dam design which have all been implemented are summarised as:

- Adoption of horizontal design coefficient of 0.125g on the recommendation of the Dam Review Panel
- installation of stress monitors in the main body of the dam
- Increase of the depth of the foundation to 18m below the lowest riverbed.

The Government of Gujarat has identified 9 locations for the installation of seismic monitoring stations, 4 each on either side and one at the downstream of the Sardar Sarovar reservoir, out of a total of 9 stations, 3 are in M.P., 1 in Maharashtra & 5 are in Gujarat. Construction work at all the 9 seismograph stations is completed and installation of instruments at all the stations, except at Sagbara, is completed The

seismological observatory at Kevadia Colony is in operation since 1973. The data of Kevadia Colony seismograph station for the period from 1973 to 1984 was analysed by CWPRS, Pune and GEAR, Vadodara. Also, Micro-earthquake surveys around Navagam Dam were carried out in the year 1980 by Dept of Earthquake Engineering, University of Roorkee. The Micro-earthquake activity was found to be of low level and was generally scattered in the Narmada basin.

The seismological network with latest instruments was established in the year 1989. After the installation of new seismic instruments at new sites, local micro-earthquakes as well as global earthquakes are being recorded. The events which are rucorded at network are analysed and located using the computer program 'FASTHYPO' incorporated with seismic Data processing and Analysis Computer (DAC -300). The progress of implementation is illustrated in Table below:

Table-12: Status of implementation of seismicity aspects

	ACTION	STATUS
•	Dam design modifications	Completed
•	Monitoring stations	All 9 stations constructed installation complete in 8.
•	GSI (Nagpur Division) Rim Stability studies	Completed
	Tracer Studies by CWPRS	Reports submitted.

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Map-2: Showing locations of seismological stationw on periphery of the Sardar Sarovar reservoir

6. HEALTH ASPECTS

STUDIES

A large number of studies have been carried out on the health profile of villages in the three affected states. The key studies are summarised below:

MONITORING STATIONS SEISMIC ZONES STATE BOUNDARY

- Narmada Programme Schistosomiasis -Back-to-Office Report, 1986, assussment carried out by Goodland, consultant to the World Bank, the National Institute of Communicable Diseases (NICD) and the World Health Organisation (WHO).
- Proceedings and Recommendations of the Meeting on Schistosomiasis Research and Surveillance held at NICD on 22nd November 1985.
- Disease Profile of Command Area by the State Commissariat of Health, Medical Services and Medical Education (SCHMS), 1986.
- Health Statistics< GOM, 1987. The State Department of Health, Report on the health

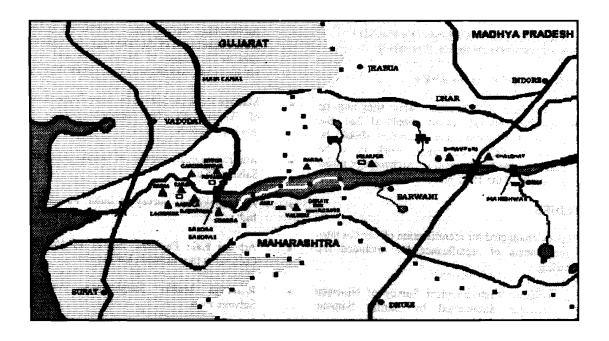
profile of 33 project-affected villages in Dhule district, Maharashtra.

- Health Statistics 1982-84, GOMP. This study published by GOMP in 1985 & updated in 1994.
- The Sardar Sarovar Narmada Project Studies on Ecology and Environment by MSU in 1983, considered public health in Chapter-3.
- Numerous studies have been conducted on the incidence of malaria in India, amongst others, by the Malaria Research Center (MRC).
- Revised Plan by GOM, 1995.
- Revised Health Plan by GOG, 1996.
- Draft Health Management Plan by GOG, 1997.
- Epidemiological Surveillance Studies by GOM, 1996.

 Epidemiological Surveillance Studies by Gandhi Medical College, Bhopal for GOMP. 5th Interim Report (1997).

Status of Implementation of Actions for Public Health

	4ction	Gujarat	Maharashtra	Madhya Pradesh
•	Baseline studies	Complete, 1986 updated '95	Complete, 1987 being updated.	Complete, 1994 being updated.
•	Preparation of state action plan	Submitted and modified in 1986; Urban Malaria Scheme proposed. Draft Health Management Plan submitted in 1997.	Original submitted in 1987 revised in 1991, 1992 & 1993.	Original submitted in 1986, revised in 1988 and final plan submitted in 1991. Cost details incorporated in 1996.
•	Survey of existing facilities	Complete	Complete	Complete
•	Establishmen t of new facilities	Hospital at Kevadia for workers; laboratory and mobile unit complete, drug dispensaries	Somawal village hospital; health centers and health units functioning.	Hospital, mobile unit and civil dispensaries for labour, detailed scheme for resettled population
•	Vector control measures in place	NMEP; SSNNL work - shop on malaria control; laboratory established, studies on health completed	NMEP; adoption malaria control guidelines of irrigation Department	NMEP, state malaria control organizations strengthened
•	Appointment of specialist staff	One senior health officer is posted at Kevadia	Yes one PHC, 3 dispensaries & one floating dispensaries established & 51 posts filled up & laboratory facilities Provided.	Needs identified.
	Disease monitoring and responsibility	Entrusted to SCHMS EIA report submitted. Draft Health Management Plan submitted in 1997.	Entrusted to regular health Deptt. Surveillance studies commenced. Phase-I survey report submitted by T.N. Medical College. Proposal for Phase-II study submitted.	Evaluation cell established monitoring by Gandhi Medical College, Bhopal. Five interim. reports received



Map-3: Showing status of implementation of health plan in SSP impact area.

Implementation

A) Govt. of Gujarat:

There is a dispensary at SSP dam site run by M/s Jai Prakash Associates. It has regular Medical Officer and other staff to diagnose and treat the malaria patient.

Generally labourers and staff at dam site and their families take benefit of this dispensary. Respective district panchayat health staff for malaria and water borne diseases looks after affected villages and rehabilitation sites of Bharuch Vadodara and Kheda District. Health worker and A.N.M. visit these sites regularly. Sr. Health Officer is visiting these villages and rehabilitation sites and coordinating functions of Health Department.

B) Govt. of Madhya Pradesh

GOMP have already submitted cost breakup of Health Plan pertinent to SSP. The work of locating a suitable site for the hospital at Nisarpur is under progress.

C) Govt. of Maharashtra:

The following Health Schemes have been sanctioned by Government of Maharashtra vide Govt. Resolution No.1 (PHC -1593 / 2038 / CR268 / 93/ PH4 dtd. 4.4.1994 and No. MISC 1095 / 5 / CRI / PH 4 dtd. 15th November, 1995. The position is depicted in the fig.-4

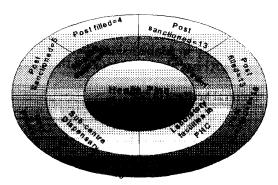


Fig-4: showing the current status of the implementation of the action plan in Maharashtra

7. ARCHAEOLOGICAL SURVEY AND ANTHROPOLOGICAL STUDIES

ARCHAEOLOGICAL SURVEY

In the case of SSP, where some sites may be submerged the NWDT award stipulated that, the entire cost of relocation and protection should be chargeable to GOG. Relocation work is to be supervised by the Department of Archaeology under the provisions of the 1958 Act.

STUDIES

Survey conducted for identification of various sites & monuments of significance has included the following:

 Gujarat: Archaeological Survey of Nineteen Villages Submerged by Sardar Sarovar Reservoir, 1989.

- Maharashtra: Survey by Department of Archaeology Survey was carried out by the State Department of Archaeology for cultural sites in 24 villages of Akrani taluk and nine villages from Akkalkuwa taluk, Dhule district.
- Madhya Pradesh: Survey by State Department of Archaeology and Museum (1992), in sixteen volumes.
- Anthropological Survey of India: Narmada
 Salvage Plan.
- Anthropological Survey of India: People's of India
- Adivasi Kala Parishad: Survey of Material Cultural in the Narmada Valley.
- Rashtriya Manav Sanghralaya: Narmada Salvage Plan.

Summary of Current Situation and Progress

		Gubrat	Madhya Pradesh	Maharashira *
	Survey of villages in Submergence Zone	"Con	nplete' for all item in all	the States: All and an arrival
•	Identification of Cultural Sites.	"Co	uplete' for all item in all	the States.
	Collection of Data and Documentation of Sites	Complete	In progress	Not required.
•	Selection of appropriate sites	Completu	In process	Not required
	Action plan	Complete	Finalised	Not required

• Survey in Maharashtra identified one temple, which was on the border with Gujarat. GOG has already relocated this temple 15 km. downstream of earlier location.

Cultural heritage in SSP

State	Relocation	of temple	Excav	ation	Sculp	tures
	Target	Completed	Target	Progress	Target	Progress
Gujarat Maharashtra Madhya Pradesh	2 NIL	l N.A.	NIL	N.A.	NIL 186	N.A. 118

A. Gujarat

Shoolpaneshwar temple which was on the border with State of Maharashtra is relocated 15 km. downstream of the SSP in village Gora. Relocation works already completed.

Relocation of remaining temple, i.e., Hampheshwar Temple is under progress. The stone monument of 'Garbhgrah' is completed upto 5.0 m height and about 18 columns of Rangmandap have also been erected. Stone monument work for two small temple namely: Ramji and Angaji adjoining to the main temple is done upto 51" level.

B. Madhya Pradesh:

Progress of relocation/protection/excavation/collection of the identified temples/monuments/ mounds/ sculptures is presented below

Relocation/protection

Village	Temple	RL in m	Land acquisition	Relocation
1. Barda	Shiv temple	130.970	Completed	Completed
2. Dehar	Narmadeshwar temple	134.665	In process	
3. Khujawa	Bhawani Mata temple	147.825	Completed	
4. Khujawa	Someshwar temple	129.530	Completed	
5. Khujawa	Shiv temple No.1	135.460	Completed	
6. Khujawa	Shiv temple No.2	135.475	Completed	
7. Khujawa	Shiv temple No.3	135.165	Completed	
8. Khujawa	Rock-cut-caves	133.075	Completed	
9. Khujawa	Big size statues	146.395	Completed	
10. Bodhwada	Shiv temple	138.685	In process	
11. Piplagarhi	Shiv temple	153.775	Completed	
12. Piplagarhi	Rock-cut-sculptures	130.440	Completed	Chemical treatment started.
13. Navadatoli	Baneshwar temple	137.765	In process	

Note: Protection works on Shiv temple, Roligaon excluded from the present Action Plan.

Excavation

	Village	Mound	RL in m	
1.	Kalyanpura	Copper & pre-historic	148.035	
2.	Katnera	Copperage	139.865	
3.	Maruchichli	Historic period	151.635	
4.	Ekalwara	Pre-historic	146.875	
5.	Khalghat	Pre-historic	156.310	

- Experimental excavations at village Khaperkheda & Brahmangaon were comleted earlier. Works at Kirmohi and Kheda were not conidered significant hence abondoned
- For excavation at village Utawad and Khaperkheda work was completed earlier by ASI, Govt. of India.

Collection & display at Museum

• Sculptures, 118 in nos were collected from the regions coming under the submergence area of the Sardar Sarovar dam. This sculptures were obtained from Pipladgarhi, Khujawa, Dharamapuri and different other villages. These are dislayed at Disstt Museum in Dhar Distt.

Since these sculptures were lying open for a very long time they bear traces of weathering effect on them like salt formation, red-oxide deposition, besides accumulating dust, dirt and fungus on them They were cleaned by the chemists using necessary chemicals like Ammonia, Sodium hydroxide, Benzene P.V.A. etc. After

cleaning the sculptures were coated with preservative for saving them from further deterioration.

Museum

- Narmada Park and Museum at Lalbagh at Indore, Besides Museum at Barwani and Kaserawad proposed. Land for museum at Barwani & Kasrawad requested.
- Construction of a section on 'Narmada Dirgha' in the museum at Bhopal has been started.
- Besides, Film documentation of all the monuments of SSP is in progress through an agency 'Madhyam', engaged by State Deptt. for Documentation of the important monuments.

ANTHROPOLOGICAL STUDIES

Government of Madhya Pradesh has informed that in view of the studies being carried out in connection with Narmada Sagar Project, no separate anthropological studies are required and the Director General. Anthropological Survey of India has also expressed the same view. M.P. State Adivasi Kala Parishad has submitted its report on Tribal arts & culture. Besides Anthropological Survey of India has informed that Narmada basin is already covered extensively under the project "Peoples of India". Besides Rashtriya Manav Sanghralaya has conducted needed studies in the past as follows. Further studies are

covered under R&R plan of the state Governments. The work done by An.S.I is being used.

- a study of the palaeo-ecology of quaternary fossils in the central Narmada Valley.
- excavation of upper Paleolithic
- site of Mehtakheda and further uxploration of Nimar;
- Collection of tribal artifacts in Madhya Pradesh.

Institutional responsibility for these actions was specified in the action plan whereby the first two elements were completed by Deccan College, Pune and the third by Adivasi Kala Parishad, for the Rashtriya Manav Sanghralaya, Bhopal.

The End

STATUS REPORT

INDIRA SAGAR PROJECT (ISP) ENVIRONMENTAL ASPECTS March, 1999

The Action Plans and status of studies and implementation of Environmental Safeguard Measures upto quarter ending March, 1999 are summarised in this report.

The parameters: The suggested environmental safeguard parameters are indicated below

- Phased Catchment Area Treatment
- ◆ Compensatory Afforestation
- Command Area Development
- Flora ,Fauna, Wildlife and Carrying Capacity
- ♦ Seismicity
- ♦ Health Aspects
- Archaeological Survey, and Anthropological Studies
- Resettlement and Rehabilitation

As 'Resettlement and Rehabilitation' is dealt with separately, current status of other suggested parameters is presented hereunder.

1. PHASED CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

- More detailed surveys for prioritisation of the subcatchments in the ISP area should be undertaken;
- A phased CAT programme should be prepared and

implemented ahead of reservoir filling.

GOI issued a directive in July, 1992 that, the project would bear the costs of the treatment of all critically degraded sub-watersheds draining directly [Phase I] into the reservoir. These watersheds were identified amongst those classified as either very high or high-priority categories by the All India Soil and Land Use Survey (AISLUS). The project would also be responsible for the treatment of those areas of the catchment, which are directly damaged by the project activities.

In addition, plans are required to be prepared for the treatment of the balance of the critically degraded sub-watersheds but the cost of this will be met from other ongoing schemes and in a timeframe to be determined.

Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the ISP catchment. They are: -

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), 1985.
- Report on Prioritisation of Subwatersheds in Subcatchments of the Narmada Catchment, 1991 by AIS & LUSO, New Delhi. Revised subsequently in 1994

According to the above studies the freely draining area of Indira Sagar Project down stream of Bargi Dam is about 39,75,982 ha. Prioritisation survey of watersheds was entrusted to the All India Soil & Land Use Survey Organisation, New Delhi. The Survey has been completed by AIS&LUSO. New Delhi and the survey reports have been received in the Narmada Development Authority Valley (NVDA) Government of Madhya Pradesh. Findings of the AIS&LUSO indicated that about 28% of the catchment was yielding SYI of 1200 and above . As such these were considered as critically degraded. Results of the prioritisation are summarised in pie chart -1.

AIS&LUSO in their final report have identified 508 no. of critically degraded sub-watersheds (having Silt Yield Index of 1200 and above). covering an area of about 1078381

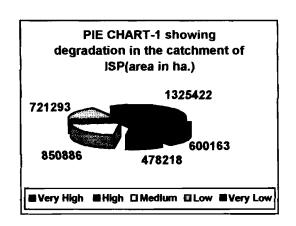
Phased Programme:

On the basis of their proximity to the reservoir these watersheds have

planned been for treatment in two phases namely Phase-I and Phase-II As per

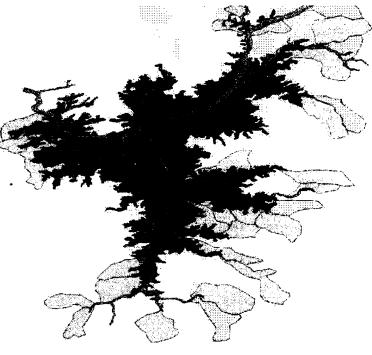
the guidelines of MOWR, directly watersheds draining of very high and high priority categories only, are to be treated pari passu with the construction of the dam and at the project cost.

Map-1 Showing submergence area of Indira Sagar Project and location critically degraded directly draining subwatersheds.



PHASE-I Programme

On the basis of the reports submitted by the AIS&LUSO, subwatersheds belonging to the very high and high priority categories and directly draining into the reservoir have been identified for treatment. There are 30 such subwatersheds. They cover an area of about 73,456 ha. Map showing the location of the identified sub-watersheds is depicted in Map-1 below.



Action Plan:

Macro-watershed plan for the ISP was submitted during 1993. This plan was subsequently revised and updated. The updated plan of work is under implementation. Various components of the Action Plan are depicted in the Figure-1.

According to the plan submitted by the NVDA, 30 subwatersheds covering an area of 73,456 ha have been identified as directly draining sub-watersheds. Out of the gross area of 73,456 ha, directly draining sub-watersheds, 57,697 ha is non-forest and the remaining 15,769 ha is forestland. The net area available for treatment, however, is 62,975 ha of which 51,927 ha area is non-forest and the balance 11,048 ha is forestland. Graphic presentation of the same is given below in Chart-1.

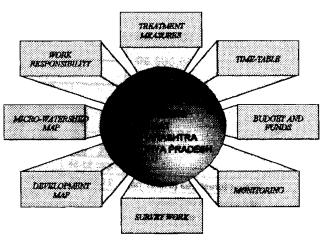


Fig. 1: Action Plan components.

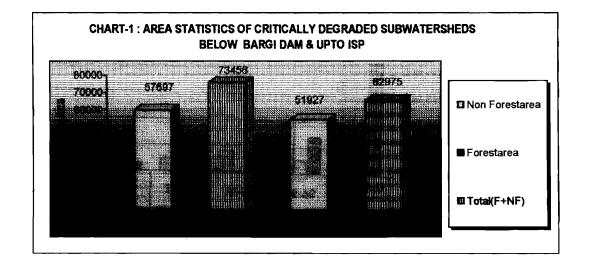
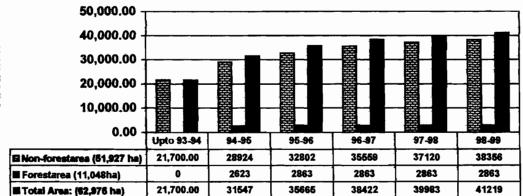


Chart-2: Cummulative Progress of CAT works

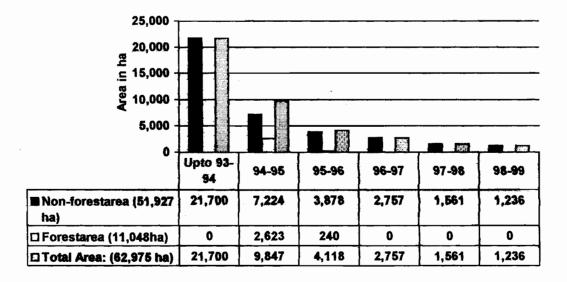
rea in ha



IMPLEMENTATION:

NVDA have planned to treat the Phase-I area in about 10 years' time commencing 1991, at the cost of the project and pari-passu with the construction work on the project. By the end of December, 1998, during the year 1998-99, an area of 1,236 ha of non-forestland was treated up. The cumulative progress as on 31st December 1998 was 2,863 ha in forestland and 38,356 ha in non-forestland. The net area treated so far is 41,219 ha. In addition an area of 1636 ha was treated up under pilot project earlier.

Chart-3: Schedule of treatment of Phase-I



II. FREELY DRAINING AREA (Excluding Directly Draining Subwatersheds)

According to the plan submitted by the NVDA, 478 subwatersheds, covering a gross area of 10,12,640 ha have been identified as

Freely draining (other than directly draining) sub-watersheds. The net available for treatment. however, is 9.15,150 ha of which 806720 ha area is non-forest and the balance 108430 ha is forestland. Above details are graphically presented in Chart-4.

ACTION PLAN:

NVDA have submitted macrowatershed plans covering the above area during 1993. NVDA have planned to treat the Phase-II area in about 30 years' time commencing 1994-95, as per the schedule of implementation given in Table-5 below.

However. detailed microwatershed schemes are required to be submitted to the funding agencies like NAEB, RVP etc. in accordance guidelines with the of A few schemes have schemes. been submitted and got approved while the remaining schemes are under formulation.

IMPLEMENTATION:

project authorities have submitted CAT Phase-II plans for NAEB/RVP funding for seeking funds. Five projects for subwatersheds covering an area of 53,709 ha. of forest were submitted by NVDA to National Afforestation & Eco-Development Board.

REQUIREMENT OF FUNDS:

The plan drawn up for treatment of Phase-II treatment works places requirement of total funds at Rs. 603 crores. It is proposed by GOMP to treat the non-forest area at an estimated cost of Rs.602.57 crores and forest area Rs.435.12 crores.

Chart-4: Area statistics of ISP catchment

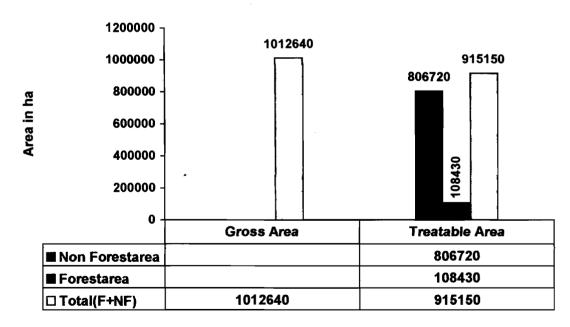
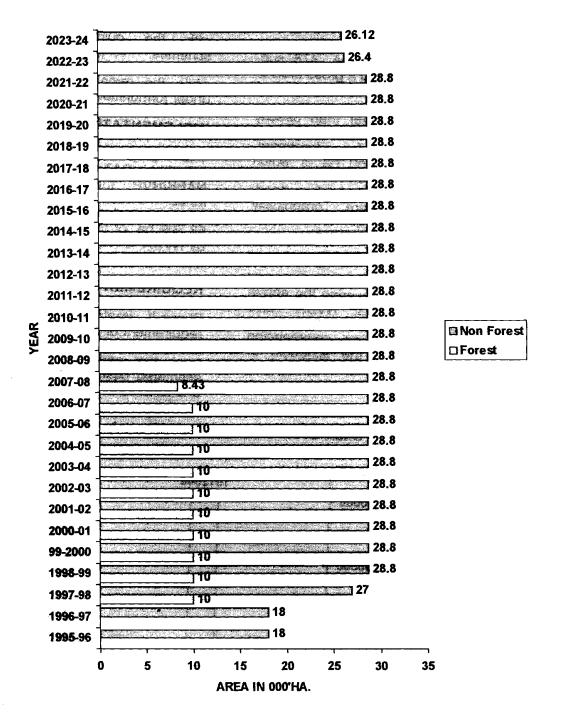


Chart-5: Schedule of treatment of CAT works, Phase-II



2. COMPENSATORY AFFORESTATION:

A total of 40,332 ha forestland would come under submergence and an additional 779.90 ha. of forestland has been diverted for the residential colony, powerhouse complex, main dam, saddle dam and approach roads.

Subsequently, another 308.40 ha. of forestland was permitted to be diverted for powerhouse. Thus a total of 41,420 ha of forestland has been permitted to be utilised for the construction of ISP. Area proposed to be utilised for the ISP covers three districts as shown in Table-1 below.

TABLE-1: Showing area taken by the ISP from three districts in M.P.

District	Area in hectares diverted for ISP
Khandwa	33,383
Dewas	4,528
Hoshangabad	3,678
Total	41,589

MOEF clearance granted in 1987 contained several conditions pertaining to Compensatory afforestation. The key condition among others was that

"Since the project involves violation of Forest (Conservation) Act, 1980, compensatory afforestation will be carried out over suitable degraded forest land double the diverted forest area in extent and in addition to the equivalent area in non-forest land. For this purpose, the area offered by the State Govt. vide their letter No.5/III/84-10-3, dated 14.10.1986 will be accepted and compensatory afforestation raised at the cost of the project in this area."

- State Forest Department reconveyed the forestland for the purpose of ISP vide it's letter dated 28th November 1987 clarifying that-
- " The plantations over the degraded forest, double in extent to the area

which has been worked upon without the permission of the Forest Department, violating Forest Conservation Act thereby, shall be carried out, in addition to the usual plantations over non-forestland equal in extent to the area diverted."

ACTION PLAN:

To compensate for this loss of forest the M.P. Forest Department had submitted an Action Plan for Compensatory Afforestation for the Indira Sagar Project in December, 1986. Area offered to this plan was accepted. The acceptance was acknowledged through the clearance order.

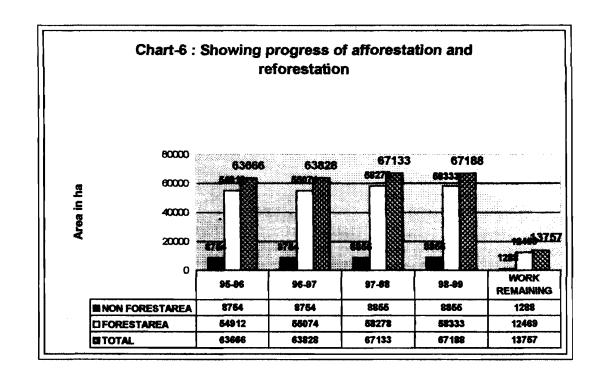
Accordingly, 10,1**4**3 ha. 70,802 non-forest and ha. degraded forest land has been identified for compensatory afforestation, the districts of in Hoshangabad, Dewas, Khandwa, Sehore, Dhar and Khargone as shown in Table-2.

TABLE-2: Showing the district wise areas identified for compensatory plantation

District	Degraded Forest (In Ha.)	Area other than forest (In Ha.)
Khandwa	30,572	2,314
Hoshangabad	22,739	2,842
Dewas	17,491	802
Sehore	-	1,247
Dhar	-	1,001
Khargone		1,937
Total	70,802	10,143

The M.P. Forest Department has added additional areas to the prescribed afforestation hectare as a account contingency for to unforeseen circumstances. In selecting forestlands the for plantations, local requirements for grazing, firewood, and other nistar needs were kept in view. However, considering that with the dedication of vast areas to the proposed

National Parks, some future adverse impacts on the local population's nistar needs may develop and that the wood from the submergence zone was expected to meet local fuel needs only for about 8 to 10 years, more emphasis was placed on fodder production in plantation areas in Khandwa and Dewas divisions. The plantations were to provide shelter and habitat to wildlife also



IMPLEMENTATION:

NVDA started the plantation works in the degraded forests within the Narmada catchment on the areas identified in the plan. Subsequently, however, many of these areas were included in the CAT program, as these areas were identified as critically degraded

3. COMMAND AREA DEVELOPMENT

The Command area proposed to be irrigated by the NSP spreads on the left bank of the Narmada River. It comprises territory falling in the Khandwa tehsil of Khandwa District and six tehsils of Khargone District. The Satpura Ranges flank the command on the south. The northern boundary is formed by the Narmada River itself. The land of the command comprises Forest:10,055ha; pastures: 10,498ha; Grasses and Cultivated land: 142,406ha; Culturable fallow: 8,116ha; Barren: 18,385 ha.

The command area has immense potential for development. The objectives of the command area development are:

- Optimum utilisation of created potential of irrigation.
- Introduction of multiple cropping patterns and increasing the levels of productivity and strengthening of agriculture research activities.
- Creation of adequate communication and storage facilities.
- Conservation management of integrated fisheries development.
- Intensification of dairy development.

areas within the catchment. Such areas were, however, excluded from the compensatory afforestation works. By the end of December, 1998, the progress of plantations on the non-forest area was 8855 ha and on forest areas, the progress reported was 58333 ha as shown in Chart-1 above.

The main components of the command area development program are

- On Farm Development,
- Conjunctive Use,
- Agro-Industries
- Regulated Market,
- Warehousing Facilities,
- Roads Etc.

STUDIES AND FINDINGS

In 1975, at the request of the Narmada Water Dispute Tribunal (NWDT), the Gwalior Campus of J.N.K.V.V. University undertook a reconnaissance survey of the Narmada Sagar Command, using a 2-mile grid. Nearly 265 soil profiles were examined.

Reports on the quality groundwater in the Indira Sagar Project are but the limited. assumption is that the quality is suitable for Limited water quality use in irrigation. testing was done in several blocks in the Indira Sagar Project area. These tests were apparently conducted in 1966 and 1967. In Barwaha block, five samples out of seven tested were of excellent quality.

During 1982-83, to appraise land irrigability, an area of about 2,80,000 ha. falling within parts of Khandwa and Khargone districts was surveyed by the Department of Agriculture, M.P. Surveys

were carried out on 1:50,000 – scale toposheets. Arial photo-interpretation was carried out wherever possible. About 366 profiles and about 2787 auger bores were examined. The rate of profile examination was about 1 per 1000 ha. A total of 30 soil series were mapped. Areas falling under different classes of depth, erosion, slope, texture, and land irrigability subclasses were identified. This report indicated that typical vertisols are not extensive in the surveyed area.

A detailed reconnaissance soil survey of the Narmada Sagar Command Area was also carried out in January 1984

by the Directorate of Agriculture in coordination with the Govt. of India, National Bureau of Soil Survey and Land Use Wing and the Agricultural Planning University, Jabalpur in the command area of 2.10 lakh ha. The soils of the areas have been classified into 26 soil series taking into account the morphological features, topography, and physical and chemical characteristics. As per soil taxonomy (1970), altogether three orders, three suborders, three great groups, eight subgroups and ten families have been identified. Soils have been classified into various recognised classes in terms of their suitability for irrigation.

Table -3: Showing land irrigability classification

SI. No.	Land Irrigability Class	Slope Percent	Depth of Soil (in cms.)	Percentage of gross command area
1.	2	0-3%	More than 90	29.5
2.	3	1-5%	22.5 to 90	21.5
3.	4	3-10%	7.5 to 45	25.7
4.	6	5-15%	0 to 22.5%	23.3

In order to study whether full irrigation would lead to water logging and salinity problems, state govt. of Madhya Pradesh commissioned special studies on subsurface drainage and groundwater behavior to the Indian Institute of Science at Bangalore. For study purposes, the entire Narmada Sagar complex Area was divided into 34 hydro-geological zones. The studies considered the following:

- Rainfall data from stations around the composite command.
- Runoff as measured in nearby gauging stations.
- Evaporation rate data.
- Climatological data.
- Groundwater-level data from all types of wells.

- Pump test data.
- Hydro-geological information on wells and aquifers.
- Soil and soil moisture data.
- Agricultural land use data, including information on crops and the seasonal nature and extent of surface water and groundwater irrigation.
- Proposed crop-water requirements.

Jawahar Lal Nehru Krishi Vishwavidhyalaya, Jabalpur through their research centre are carrying out studies on impact of agro-chemicals run-off from fields on underground and surface water in command area with an objective of assessing the residues of toxic agricultural chemicals from fields in the ground water and surface water of command areas and

ecological effects of the residues in irrigation water and their physiological effects on aquatic and terrestrial vegetation, crops, animal life and agroecosystem as a whole for devicing measures to mitigate the same under the fallow and cropped yield conditions. Studies are commenced and are making progress.

SUGGESTED STRATEGIES

The Bangalore institute's study concluded that conjunctive use of surface water and groundwater on a significant scale would be required to avoid water logging and salinity problems in the Composite Command Area. Study data indicated that a water balance of 70% surface water and 30% groundwater would be suitable in most project areas to avoid waterlogged conditions.

Natural drainage conditions in the Narmada Sagar Complex Command Areas are quite favourable as Narmada Sagar area has a well-developed natural drainage system. The command complex lies on both flanks of the Narmada River, with a number of tributaries draining the area towards the Narmada River. The slope of the cultivable land generally ranges from 1 to 3% and it has good natural drainage. The groundwater aquifers are deeply incised, and major problems of surface drainage do not appear to exist. Surface drainage will, however, be required after irrigation is implemented through the provision of a proper network of field drains so that excess water will be removed from the cultivated fields.

Irrigation water from the Narmada River will be of good quality, and normal irrigation applications are considered

sufficient to leach out the salts from saline/sodic soils. No additional leaching requirements will generally be necessary. Project planners do not expect any salinity problems if proper surface and subsurface drainage systems are installed.

ACTION PLAN:

The Government of Madhya Pradesh have submitted command area development plan, delineating the soil classifications and land irrigability in the Narmada Sagar Command Area showing the first three phases of irrigation development by area, the land irrigability map of the Narmada Sagar Command Area showing lands of classes 2 through 6 by location in the first three phases of irrigation development during 1986.

The project on completion will provide annual irrigation to 1.69 lakh ha. Waterlogging occurs when the groundwater table rises too close to the ground surface and the soils are unable to drain properly. This concern has been carefully planned to avoid the problems. The conjunctive use of surface and groundwater resources to the extent of 30% is proposed.

The provision of drainage systems to prevent the accumulation of excessive water in the soils, and water management planning and monitoring to control the proportions of surface water and groundwater used in irrigation and the water levels in the groundwater aquifers are some of the measures being planned for prevention of any such eventuality.

In keeping with the study conclusions, planning for the Indira Sagar Project includes maintaining a water balance of 70% surface water and 30%

IMPLEMENTATION

The Government of Madhya Pradesh has submitted command area development plan. The project completion will provide annual irrigation to 1.69 lakh ha. The implementation of the plan would be taken up in three phases for completion in September-2007. The study on impact of Agro chemicals, runoff from fields on surface & ground water quality in the command area has been assigned to J.L. Agricultural University, Jabalpur. An MOU for this work was finalised. An allocation of Rs.24.5 lakhs was made. Studies have commenced and are making progress. The works of on development will be started 2 years in advance of the start of irrigation from canal system in a phased manner in the entire command area.

4. FLORA, FAUNA AND CARRYING CAPACITY

The guidelines of the MOEF require that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present can be assessed, listed (rare and endangered)species can be detected, if present, and appropriate conservation measures devised. Important survey work undertaken for the purpose had included the following

- Preliminary Report on First Botanical Exploration and Plant Collection from Narmada Valley by the Botanical Survey of India in 1986.
- Report on the Survey of the Narmada Sagar Area by Zoological Survey of India, 1988.
- Narmada Basin Water Development Plan: Development of Fisheries, 1987, was prepared by the Narmada Planning Agency, GOMP.
- Rapid Reconnaissance Survey of Limnological Aspects Part I, II and III, 1987, were undertaken by the Bhopal, Vikram and Rani Durgavati, Universities for GOMP.
- Water quality data has been collected by the Central Pollution Control Board, Central Water Commission, the State Pollution Control Boards and the National Institute of Oceanography

On the basis of relevant details supplied by the various states, MOEF issued clearance in 1987. A condition of this clearance, as far as it related specifically to the Flora & Fauna, was that

the Narmada Control Authority would ensure in-depth studies on flora & fauna needed for implementation of environmental safeguard measures.

Further in-depth studies with focus on the following prime concerns were taken up.

- Relocating and protecting wildlife through setting up and maintenance of the permanent protection areas.
- Detailed surveys of both flora and fauna to determine the number of individuals of the various species, their habitat types and other needs, their status in terms of being endangered, threatened or protected under Indian Legislation, and recommendations for minimising project impacts and maximising opportunities for protecting and enhancing plant and animal life.
- Studies to ascertain the capacity of the surrounding areas to accommodate additional wildlife

The objective of the suggested studies was to assess the environmental impacts as a result of the Narmada Sagar Complex, consisting of the three dams: the Narmada Sagar, Maheshwar Omkareshwar, to ensure minimal adverse effects on wildlife as a result of the project development works. **Studies** were entrusted to Wildlife Institute of India and Friends of Nature Society. Institutes carried out exhaustive studies with a view to address the above concerns. Studies focused on the following

The reports submitted by the identified premier organisation during the period 1986 and 1997 included the following

- Sociological Survey of the Fishing Families of the Narmada River by CICFRI, 1991.
- Aquatic Fauna (Fish) Studies in Indira Sagar Submergence Area, prepared by the Friends of Nature Society in 1991 on behalf on the NVDA reported on the fish fauna of the Narmada.
- Pre-and Post-Impoundment Limnological Studies of Narmada Basin, by three universities coordinated by Barkatullah University for the NVDA. (1989-92) Study report was available in 1994.
- Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream, is a desk review sponsored by the NCA and undertaken by CICFRI, 1993.
- Wetland and aquatic flora of Narmada Valley in Madhya Pradesh was also published in 1991 in Vol 15 No.3 in J.Econ. Toxicology Bot.
- Studies on EIA of Flora & Fauna of NSP were entrusted to the Wildlife Institute of India, Dehradun in December, 1989 and were completed by March, 1994.

Key concerns addressed on the terrestrial ecosystem were as follows:

- A wildlife inventory giving reliable estimates of the numbers of various species of wildlife in the project impact area.
- A catalogue of habitat types found in the project area.
- A status report on individual species indicating ones that are endangered, threatened, or protected under prevailing Indian wildlife Laws. The report on these special status species was also included the recommendations for actions to be taken to safeguard threatened species
- Recommendations for the creation of new protected areas for wildlife in the

 An assessment of the impact of the project gene pool reserves of wildlife in the project area.

SUGGESTED STRATEGIES

Establishments of protected areas in many parts of the country in the last three decades has largely been and outcome of

the Govt. concern for mitigation of the environmental degradation specially for preservation of species diversity and the genetic valuation within them. Besides, maintaining productive capacities of Ecosystem and safeguarding habitat critically for the local range of species. Three new protected areas were proposed to mitigate the losses. This includes Narmada National Park, Suryamanya Sanctuary and Omkareshwar Sanctuary.

Name of the Sanctuary/Park

Narmada National Park

Suryamanya Sanctuary

Omkareshwar Sanctuary

Total Area

Area in ha.

47522

16370

11996

75888

It is suggested that the severity of the impact resulting from direct and indirect could minimised losses be through restoration of some aquatic of the vertebrates and delineation of substantial area of the contiguity forest which has similar conservation values that are being lost in submergence and to elevate its status to a protected area - a combination of a national park and sanctuary. Kev aguatic vertebrates species like otter is proposed to be restored and trans located. It was suggested to explore the possibility of capturing and translocation of impacted otters of Narmada Sagar into identified localities of the vacant niches in central Indian rivers. Besides. species restoration plan for aquatic reptile (turtle) Was aiso suggested within submergence zone and also in other stretches of the river with rocky structure and sandy banks. The restoration program for muggar crocodile as being practices in other districts of M.P. was also suggested.

ACTION PLAN AND IMPLEMENTATION

Actions have been taken by NVDA to implement the recommendation of the WLI regarding declaration of National Park & protected areas. Matter is under consideration of the State Govt.

The studies of certain aspects of fisheries and reservoir sciences have been included in the Limnological studies being conducted by the three Universities of the State. Studies in the Upper Narmada, (Bargi Reservoir) by Rani Durgawati University, Jabalpur, studies in the Middle Barna Narmada (Tawa, and Kolar Reservoirs) by Barkatullah University. Bhopal, studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have completed the studies in their respective areas as per MOU and final report is available. Accordingly Action Plan has also been drawn up

Since the topography in the reservoir area consists of rolling hills, NVDA expected the higher peaks to remain above the water surface level and constitute islands in the reservoir. These islands would contain remnant flora and fauna that would remain isolated and would be subjected to changes in microclimate by virtue of being surrounded by a large body of water. NVDA scientists have expressed an interest in the possible effects these special circumstances could induce.

In addition to these small islands, two large islands will be formed to the north and south of the Narmada River just upstream of the Indira Sagar Dam. Present plans are to reserve the northern island of 17 km², for people and to link it to the mainland and the highways leading to Indore and Bhopal. The southern island of about 23 km², however, is earmarked for conversion into a wildlife sanctuary. This prospective island would be considered large enough to preserve existing flora and fauna.

Plans have been drawn up for retrieval and conservation of terrestrial wild life.

Actions have been taken by NVDA to implement the recommendation of the WLI regarding declaration of National Park & protected areas. Matter is under consideration of the State Govt.

The studies of certain aspects of fisheries have been included in the limnological studies being conducted by the three Universities of the State. Studies in the Upper Narmada, (Bargi Reservoir) by Rani Durgawati University, Jabalpur, and

studies in the Middle Narmada (Tawa, Barna and Kolar Reservoirs) by Barkatullah University, Bhopal, and studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have completed the studies in their respective areas as per MOU and final report is available. Accordingly Action Plan has also been drawn up.

Aquatic fauna has also been covered under the studies completed by Friends of Nature Society, Bhopal. The draft report of FONS is also available. Action plan submitted earlier is being updated.

5. SEISMICITY AND RIM STABILITY:

The Narmada Sagar reservoir has a gross capacity of 12,200 million cubic meters, or about 9.9 million acre-feet, by far the largest-capacity reservoir planned in the Narmada River basin. Therefore the issues of seismicity , the potential for reservoir-induced seismicity (RIS)and the rim stability have been carefully studied and addressed.

STUDIES

Investigations have considered the Narmada Sagar complex dam sites at Sagar, Indira Omkareshwar and together for the studies. Maheshwar Geological Survey of India, the Central Water and Power Research Station of Pune, the University of Roorkee, GOG, and World Bank Consultants GOMP Pinkerton, Markwell and others have been closely associated with the studies and the mitigation planning. Several reports on seismological factors affecting design of the dam, including the following are available

Technical Memorandum 3.09, Evaluation of the Earthquake Parameters

of the Indira Sagar Dam, by the Department of Earthquake Engineering, Roorkee University. Technical Memorandum 4.12, Seismological Considerations for Indira Sagar Dam.Part-1: Evaluation of Earthquake Parameters for Design of Dam.

Part-2: Assessment of Potential Reservoir-Induced Seismicity in Narmada Basin. Induced Seismicity and Other Geodynamic Processes Associated with Man-made lakes, Guha, S.K., Visiting Seismology Consultant, North Eastern Council, Shillong, India, Sessional Report presented at IVth International Congress. International Association of Engineering Geology. New Delhi. India 10-15 December, 1982. Hazards Due to Reservoir-Induced Seismicity in India. Guha, S.K. (See item-3 above.)

SUGGESTED STRATEGIES

Major conclusions related to the effects of RIS considerations on seismic design requirements and the needed plans for seismic monitoring. As for design, it was suggested that reservoir impoundment's by general agreement can trigger significant earthquakes where only tectonic deformations already exist in the geological structures. Thus it was concluded that filling the Narmada Sagar reservoir might cause an earthquake to occur sooner, but it would not affect the magnitude or intensity of ground motion associated with the earthquake. Consequently, RIS was assumed to have no influence on seismic design requirements for structures near to the reservoir.

Detailed studies got done from the University of Roorkee, by consultancy with Dr. Guha and expert opinion obtained from Dr. Ray W.Clough, were placed before the

Dam Review Panel. The Indira Sagar Dam Review Panel considered all available reports and data and recommended that

To monitor seismicity during the pre and post-impoundment phases. Network of about five stations each be developed in the Narmada Sagar, Omkareshwar, and Maheshwar areas.

To record the ground motion intensity and response of the dams for any significant earthquake in the vicinity, installation of three strong motion seismographs at each dam site.

To record any significant ground motion that occurs during construction, one strong motion instrument near each dam site

Based on the recommendations of the Dam Review Panel, detailed designs for the dam have been prepared by the Central Water Commission.

Αt present, three experimental seismological stations have been established with the guidance of Central Water & Power Research Station, Pune, at Narmada Omkareshwar Sagar, and Maheshwar dam sites. The experimental station at Indira Sagar Dam site consists of a RV-320 Micro Earthquake Recorder, a Wood Anderson Seismograph and a Digital Recorder - 100 strong motion accellograph. The results are analysed by the Central Water & Power Research Station, Pune &

In order to study the seismic effects in the Narmada Sagar Complex Zone a network of 10 seismological observatories with sophisticated instruments are proposed to be established based on the recommendations of Erstwhile Dam Review Panel, Central Water and Power

Research Station, (CWPRS) Pune and Indian Meteorological department (IMD). It is proposed to monitor pre and post impoundment seismicity also at these seismic stations to help in assessing the adequacy of seismic parameters adopted for designs. The location of these seismic observatories finalised on the recommendations of IMD are (1) Bagli (2) Barwani (3) Chhanera (4) Harda (5) Indore (6) Kannod (7) Khandwa (8) Maheshwar (9) Narmada Nagar (10) Omkareshwar. Order has been placed and supply has commenced

The dam is, in effect, over-designed in the interests of public safety. As for the Indira Sagar Dam, Seismic design coefficients, though higher than needed, also meaning higher costs have been preferred.

RESERVOIR RIM STABILITY

The reservoir competency survey has been done by GSI and report is submitted. In the report, GSI suggested further studies for some patches of narrow water divide. However environment subgroup decided not to have further studies as experts were of the opinion that there was no water loss between Mandla & Raighat.

Establishment of 10 nos. of seismic observatories in the Narmada Sagar Complex area is taken up by NVDA. Order placed and supply has Besides, 12 nos. of Wood has been placed commenced. Anderson Seismometers and 6 nos. of photographic recorders are being procured from IMD supply has commenced. Procurement Micro Earthquake of recorders is completed. In the mean time on the initiatives taken by NVDA, CWPRS has already installed the instrument to pre-impounding data undertaking seismic studies at NSP. Omkareshwar & Maheshwar projects through Analogue micro earthquake recorder & strong motion occillograph as an interim measure. IMD will interpret data.

6. HEALTH ASPECT:

The Indira Sagar Project would create a 913 km 2 reservoir, a main canal of 332 km. and 1,820 km of distributories. Surveys have been conducted in the Indira Sagar impact areas to investigate existing levels of health and to gather information on specific diseases.

STUDIES AND FINDINGS:

Three specific diseases namely Malaria, Schistosomiasis, and Filaria were studied. Other diseases investigated were leishmaniasis and scabies and other waterwashed diseases. The geographical reconnaissance study, to identify the potential breeding sites of malaria vector, is being explored.

Pre-impoundment and postimpoundment Limnological studies carried out by three Universities take care of water quality aspect. These studies have been completed and the final report is submitted.

Further regarding preventive aspects, Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal are engaged for the epidemiological studies. Studies are making progress.

J.L.University which carried out initial studies for the planning commission on the aspects related with the use of insecticides and pesticides in the command through there research station at Khandwa have been entrusted with studies on impacts of application of insecticides etc.

- Malaria is increasing in Khandwa and Khargone Districts surrounding the Indira Sagar Dam site.
- Cholera and gastroenteritis are endemic in Indore, Dhar and Jhabua Districts for more than seven months each year.
- Other common diseases are typhoid and dengue fever, although they are not often found in the project area.
- Filarasis is endemic to at least eight districts of MP, including Chindwara, adjacent to the Narmada Sagar Site. The vector mosquito (mainly Culex fatignas responsible for this parasitic diseases proliferates in dirty water in ponded areas and artificial containers and also to a lesser extent in stagnant irrigation tributaries and lakes.
- Little or no autochthonous leishmaniasis exists at present in MP. This disease is not water related since it is spread by sand flies that do not need water to breed. However, according to NICD, Delhi, leishmaniasis flared up following the construction of the Rajasthan canal.
- Guinea worm disease (dracontiasis) affects 3,000 villages in MP. This disease is caused by a nematode worm and the vector for its transmission is Cyclops, the fresh water fleas.

SUGGESTED STRATEGIES:

Health problems related to these causes are expected to improve when the projects are implemented. The incidence of water-washed diseases should be reduced by the increased availability of water. The point has also been made that large water supply and irrigation projects often cause problems related to the expanded water environment. Plans have

been prepared in both project areas to increase public health-related facilities, staffing, and services during project implementation. The incidence of water borne diseases in the Narmada Valley, as elsewhere in MP, is constantly being monitored by GOMP's Directorate of Health Services (DHS).

Means to control schistosomiasis include physical, chemical, and biological Physical mitigation mitigation measures. measures include draining area with standing water, clearing vegetation from water channels and banks, utilising flushing flows, and manipulating water levels. The primary chemical mitigation measure is the use of molluscicides. Biological mitigation measures would include the use of predator species that would eat the secondary host snails. Schistosomiasis is to be kept out of the project area through vigilant monitoring and the prompt use of eradication measures when needed

Malaria is another disease that requires monitoring and control actions in the project areas. It was found that most of the existing diseases in the project area were related to prevailing socio-economic levels, mainly hygiene. Since the Anopheline mosquito vector has the potential to proliferate in the reservoir, the large draw down strip, and the canals and drains, preventive measures are to be in place to keep the mosquitoes in check. Some experimental resistance of adult mosquitoes to commonly used biocides been noted under laboratory has conditions. Thus research to maintain effective biocides will have to be continued on long term basis. Land levelling and land filling operations as well as appropriate vegetation clearing are being integrated. Control measures will include larvae-eating fish in water bodies, mosquito-inhibiting plants, and clearing of vegetation and other actions to destroy breeding sites.

ACTION PLAN:

NVDA has submitted the revised plan costing Rs.278.95 lacs for the preventive and curative aspects of health. The plan includes establishment a 30 bed hospital at Punasa. Other facilities includes the following:

- Mobile unit
- PHC 3 nos., equipped with 5 beds each, equipments, vehicles, staff etc.
- 2 civil dispensaries with labs
- 24 sub-health centres with equipments

Action Plan includes continued investigations of the Central and Western Zone of Narmada at selected sites for the identified parameters. In addition, plan proposes biological characteristic study, phytoplanktones. microphytes. zooplanktones, micro invertibrates, biomass etc. The proposal includes among others continued liminological studies, ecological studies. A note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and comments were sent for modifying the report. NVDA has submitted the revised plan costing Rs.748.73 Lac for the preventive and curative aspects of health. Regarding preventive aspects, a MOU has been signed with the Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal. Five half-yearly reports received. For studies on health aspect in project impact areas of SSP and NSP, work is proposed through a cell of monitoring and evaluation under the Directorate of Health Services, Bhopal. The approved plan is being implemented.

Pre-impoundment and postimpoundment Limnological studies carried out by three Universities will take care of water quality aspect. These studies have been completed and the final report is submitted. Action plan approved by NVDA is under scrutiny of NCA.

IMPLEMENTATION:

The above Action Plan is under implementation. For long term hydrobiological monitoring, one well equiped laboratory has been established Barwani.

ARCHAEOLOGICAL ANTHROPOLOGICAL SURVEY:

Archaeological Aspects

Investigations of the basin revealed that valley was rich in archaeological belongings:

- Paleolithic sites are to be found in Kannod. Punjapura. Nemayar. Dhardi. Chirapahad. Sitabau, Moretakka, Maheshwar, Kasrawad, Sahastradhara, Khalghat, Dharampuri, Kalibaodi, Manawar. Budada, Barwani, and Kukshi.
- Mesolithic sites are to be found all over the valley.
- Chaeolithic sites are to be found in Chikalda, Khedi, Badada, Mohipura, Khalghat, Hathnawar. Piplada, Maheshwar, Nawada, Todi, Kapila Sangam, Veda Sangam and Mardana.
- Rock-cut caves and sculptures are to be found at Piploda, Dharampuri, Bijagadha, Bagha and Mandogarh.

None of the archaeological sites mentioned above, that have special significance, would fall within the area of submergence of the projects.

SURVEYS:

A survey of the 254 villages for identification of the archaeological monuments falling within the submergence area was carried out by the State Department of Archaeology and Museum, Bhopal.

Archaeological Survey of India has also completed the survey for 167 villages for centrally protected monuments for identification of the monuments of significance. Implementation of the Action Plan is already initiated.

ACTION PLAN:

State Protected Monuments:

The State Department has submitted an Action Plan for relocation of monuments of archaeological significance earlier in 1993. This plan has been revised in 1997. This plan is being implemented.

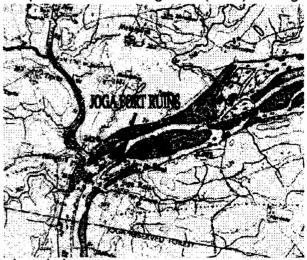
Centrally Protected Monuments:

Archaeological Survey of India have prepared a plan for protection of monuments coming under the submergence of Narmada Sagar, Complex area. According to this plan, in the area of submergence of Indira Sagar Project, only lower bastion in north of the Joga Fort is likely to be affected by scour action of water.

IMPLEMENTATION: Plan of Archaeological Survey of India

Environment Sub-group constituted a committee to look into the plans to protect the Joga Fort. The committee met twice and undertook field visits and observed as follows:

Map-2 Location of Joga fort (ruins)in village



Joga kalan

Field data collected was as follo	ows:		
R.L.of plinth of Joga Fort	+ 274.	<i>I</i> 08	1
R.L. of TOP of Joga Fort	+ 284.	75 N	1
R.L. of Main Gate of Joga Fort	+271.0)35 I	М
	+ 261.3		
F.R.L. of ISP	+ 262.1	O M	١
Observed Highest Flood Level	+ 264.2	27 M	
(54,000 cumecs)			
HFL corresponding to 1 in 100	+ 265.	52 N	Λ
year Flood (62,500 cumecs)			
HFL corresponding to 1 in 100	+ 266.	029	M
year Flood (83,366 cumecs)			
BWL corresponding to 1 in 100	+265.	00 N	1
year Flood			
BWL corresponding to 1 in 100	+ 266.	637	М
year Flood			
Water Level (20.7.98)	+ 252.	00	M
River Bank `	+ 259.	14	M
River Bed	+ 248.	00	M

From the above data, it was inferred that the, well situated in the midst of north bastion will be fully submerged at FRL + 262.10 M. However, this will remain submerged for 2-3 months during monsoon when reservoir might be at FRL.

As far as backwater effect is concerned, the temporary rise due to backwater will be about 0.60 M near well, above HFL.

Archaeological Survey of India is reviewing it's Action Plan for safeguarding the monument.

Plan of State Deptt of Archaeology and Museum

Cultural Heritage in ISP Area.

The action plan proposes shifting of 10 monuments listed below and excavation at five sites in addition to the earlier proposal of collection of sculptures & excavation at Khedinema.

Monuments	Progress
Shiv Mandir, Dhari Kotla, Khandwa	Documentation entrusted to
Shiv Mandir, Punghat, Khandwa	`Madhyam' an agency of GOMP.Plan
Shiv Mandir, Badkeshwar, Khandwa	under revision.
Shiv Mandir, Chandel, Khandwa	
Chhatri Ghisor, Khandwa	
Shiv Mandir, Khudia Mal, Khandwa	
Riddeshwar Mandir, Handia Mal, Khandwa	
Abdul Hasan's tomb, Hoshangabad	
Rock cut sculptures, Dayyat, Dewas	
Sant Singhaji's tomb, Khandwa	





About 134 statues were collected from districts Hoshangabad, Dewas and Khandwa and are displayed in the museums there. Photo(s) shown here are of the statute displayed at Dewas museum. About 100 statues were treated chemically. Construction of Museum is over.

Anthropological aspects:

The Narmada Valley can be divided into three physiographic units (3) Western Vindhyas (2) Narmada through West and South and (3) Western Satpuras. Some Indologists place the Narmada-Chambal civilisation of Malwa as a contemporary of Indus civilisation. Navada Toli is a site contemporary to Harappa where evidence of early farming villages were discovered. Findings of a hominoid skull from Hathnora indicated the possibilities of the existence of human bio-cultural remains within the basin.

SURVEYS/STUDIES:

A series of studies have been conducted for salvaging the Narmada Basin from anthropological point of view which includes Paleo-Anthropological, human ecological, ethnography and pre-historic aspects. Besides studies on contemporary culture and collection of ethnographic specimens were collected and leading anthropologists were associated.

- Rashtriya Manav Sanghralaya has constituted a working group for the retrieval of bio-cultural material in Narmada Basin this includes studies on taphonony and paleo ecology, excavation of upper paleo lithic sites, collection and documentation of material culture objects from tribal, artisan and folk culture.
- Survey of tribal art and handicraft entrusted to M.P. Adivasi Kala Parishad is completed and report is available. The report gathered details from the 24 submergence villages

and identified 75 sculpturists and eight groups of exhibitionists besides documentation of identified important sculptures. Cultural aspects of the tribes including marriages and their lifestyle were collected.

- The Bhil Track, a study of displaced tribal, sponsored by NVDA, of the 17 submergence villages of SSP compiled the information on their status, lavout resettlements. their construction of houses, social structure, division into clans, economic structure. in-depth. dependence on forests for living. inter-community relationship. leadership pattern, women's role, religion. superstitions festivals.
- Besides Anthropological Survey of India has covered these studies under its own project called "People of India". The report is in 61 volumes out of which 7 volumes are under final editing.
- A Narmada salvage plan is also launched by Anthropological Survey of India.

ACTION PLAN:

Archaeological Survey of India is carrying out excavation at selected sites. Reports are available.

State Department has reviewed the Action Plan and has proposed 5 excavation sites as shown in table – 4, in addition to the earlier proposal of collection of sculptures and excavation at Khedinama.

Table-4 Showing status of works at excavation sites

EXCAVATION SITES	STATUS
Bijalpur Khurd, Khandwa	
Chhalpa Kala, Khandwa	Plan under revision.
Gajanpur, Dewas	Flair under revision.
Nabalpura, Khandwa	
Gannaur, Khandwa	

Excavation works at Khedinama was completed earlier during 1993-94. Report is being published.

IMPLEMENTATION:

Excavation of the early historic mound in village Khedinama in Hoshangabad district is completed. Ancient tools and artifacts were found and report is available in NCA.

The entire area was scanned by the Anthropological Survey of India under Narmada Salvage Plan and some ancient tools have been found.

No.J.3-87/80 JA.1 Government of India Ministry of Environment and Forests

Paryavaran Bhavan CGO Complex, Lodi Road, New Delhi-110003.

February 23, 1999.

To

Shri Ravindra Sharma, Vice Chairman, Narmada Valley Development Authority, Narmada Bhavan, Tulsi Nagar, Bhopal-462 003.

Subject: Sardar Sarovar and Narmada Sagar Projects, Madhya Pradesh.

Sir,

This has reference to the Minutes of the 32nd meeting of the Environment Sub Group, Narmada Control Authority, held on 14th October, 1998 which were circulated by the Narmada Control Authority vide their letter No.3(32)/98/2233-66 dated Ist December, 1998.

2. During the discussion on Catchment Area Treatment (CAT) works, it was assured that CAT works would be completed within two years in SSP and four years in NSP areas. For further monitoring purpose and also to ensure pari-passu compliance of environmental conditions, we would like to receive the revised time schedule for CAT works. Similarly, there are other issues like finalisation of Terms of Reference for integrated Command Area Development, Notification for declaration of National Parks/Sanctuaries as suggested in the reports on flora and fauna, implementation of recommendations of ASI on protection of north bastion of Joga Fort etc. which need priority attention. I have, therefore, been directed to request you kindly initiate necessary action on the issues enlisted in the minutes of the 32nd meeting of the Environment Sub Group for Sardar Sarovar and Narmada Sagar Projects pertaining to Madhya Pradesh and inform the Ministry accordingly.

Yours faithfully,

(Nalini Bhat) Additional Diesetor

Copy for information to Shri N.D. Tiwari, Member (E&R), Narmada Control Authority, 121-BG, Scheme No.74-C, Vijay Nagar, Indore-452 010 (M.P.).

DBA

ANNEX-XXXIII-(V)

संशोधित कार्य योजना 1997 (1997 से 2004 तक)

कार्य योजना 1993 में प्रस्तावित कार्यों के समयाविध में पूर्ण न होने एवं उसमें उत्पन्न परिस्थितियों से निपटने एवं भविष्य में कार्यों को प्राथमिकता के आधार पर शीव्रतिशीव्र निष्पादित करने के उट्देश्य से नर्मदा घाटी विकास प्राधिकरण के अधिकारियों से चर्चा की गई. इस संबंध में यह सुझव सामने आया कि परियोजना के कार्यों को समय-सीमा में चरणबद्ध तरोंके से किया जाना आवश्यक है. अत: उचित होगा कि सबंप्रथम सरदार सरोवर परियोजना को प्राथमिकता देते हुए 436 फीट बांध की ऊंचाई में प्रभावित होने वाले स्मारकों के विस्थापन/ पुनस्थापन तथा टीलों के उत्खनन कार्य का प्राथमिकता के आधार पर किये जाये. चूंकि 455 फीट की ऊंचाई तक सरदार सरोवर बांध के निर्माण संबंधी प्रकरण माननीय उच्चतम न्यायालय के अधीन विचाराधीन है. अत: 436 फीट की ऊंचाई पर प्रभावित होने वाले स्मारकों के पुनस्थापन तथा टीलों के उत्खनन कार्य को प्राथमिकता दो जावे. तदुपरान्त 455 फीट बांध को ऊंचाई होने पर प्रभावित होने वाले कार्य यथा समय निष्पादित किये जावेंगे. तद्नुसार क्रमबद्ध रूप से इन्दिरा सागर, महेश्वर तथा ओंकारेश्वर, परियोजनाओं के पुरासम्पदा/स्मारकों के पुनस्थापन का कार्य निष्पादित किया जाय.

इस संबंध में यह भी मुद्दा सामने आया कि सरदार सरोवर परियोजना के कार्यों को समय सीमा में कराये जाने के उद्देश्य से कतिपय स्मारक पुनर्स्थापन के लिए तथा कितपय टोले उत्खनन के लिए भारतीय पुरातत्व सर्वेक्षण विभाग को सींगे जाना है. तद्विषयक विशद् कार्य योजना तैयार किया जाना नितांत आवश्यक है.

नयं कार्य योजना 1997 में नमंदा बचाओं अभियान, इन्टेक, भारतीय पुरातत्व सर्वेक्षण विभाग एवं अन्य एजेन्सियों द्वारा पुरासम्मदा के संरक्षण एवं पुनस्थापन के संबंध में उठाये गये मुद्दों को ध्यान में रखते हुए कार्य योजना में आवश्यक संग्रोधन किये गये हैं. सरोवर परियोजना के लिए प्रस्तावित स्मारकों में से किन्हों स्मारकों को सूची से पृथक् किया गया है तथा कितपय अन्य पुरातत्वीय स्मारकों को स्थानांतरण के लिए नवीन संशोधित सूची में सिम्मिलित किया गया है.

इसी प्रकार कार्य योजना 1993 में उत्खनन के लिए प्रस्तावित टीलों को सूची में परिवर्तन करते हुए कितपय अन्य पुरातत्वीय टीलों को उत्खनन के लिए नवीन सूची में सम्मिलित किया गया है.

संशोधित कार्य योजना के अनुसार प्राथमिकता के आधार पर पुनर्स्थापित किये जाने वाले स्मारकों उनके जलस्तर, अनुमानित व्यय पुनर्स्थापन कार्य प्रारम्भ करने का समय सम्बन्धी विवरण (Pert Chart) संलग्न है.

इस प्रकार संशोधित कार्ययोजना में सरदार सरोवर परियोजना के अंतगत कुल 13 स्मारक एवं प्रतिमाओं का पुनर्स्थापन तथा पांच पुरातत्वीय टीलों का उत्खनन कार्य के लिए प्रस्तावित है. जबिक इन्दिरा सागर परियोजना के अन्तगत कुल 10 स्मारक पुनर्स्थापन एवं 5 टीले उत्खनन के लिए उपयुक्त पाये गये हैं. महेश्वर परियोजना के अन्तगत कुल तीन स्मारकों को पुनर्स्थापन तथा एक टोला उत्खनन के लिए चयन किया गया है. ओंकारेश्वर परियोजना के अन्तगत मात्र छ: स्मारक पुनर्स्थापन के लिए उपयुक्त पाये गये. परियोजनावार प्रस्तावित कार्य एवं उनके कार्यान्वयन के लिए आवश्यक व्यय की जानकारी यथा स्थान आगामो पृष्ठों में दो गयी है.

भारतीय पुरातत्व सर्वेक्षण को पुनस्थापन के उदूदेश्य से स्मारक एवं उत्खनन स्थल निम्न प्रकार है, जिसके विरुद्ध कार्य-योजनः भारतीय पुरातत्व सर्वेक्षण द्वारा बनायी जाना है. इस विभाग द्वारा स्मारकों के पुनर्स्थापन हेतु बजट सूची बनाकर दर्शायी गयी है.

स्मारकों की सूची एवं अनुमानिक व्यय (रुपयों में) :

. 1	शिवमंदिर, रोलीगांव		9,20,000.00
2.	जलालेश्वर मंदिर, खुजावा	•	6,60,000.00
3.	कलंजेश्वर मंदिर, सेमल्दा		7,40,000.00
4.	नोलकंठेश्वर मंदिर, चिखिल्दा	`	8,31,000.00
5.	विल्वामृतेश्वर मंदिर, धरमपुरी		8,40,000.00
6.	पशुपतेश्वर मंदिर, चिखिल्दा		6,38,200.00
7.	कोटेश्वर मंदिर, कोठरा, जिला धार		4,70,000.00
8.	नागेश्वर मंदिर, धरमपुरी		5,20,000.00
9.	भोलखेड़ा स्थित 6 छत्रियाँ		5,00,000.00
10.	शिवनंदिर, छोटी कसरावद, जिला खरगौन		4,60,000.00
	•		error organization
		कुल	64,79,200.00
पुरातत्वीय टीलें :		•	
1.	खेड़ा, जिला धार		50,000.00
2.	नावदाखेड़ी, जिला खरगौन		50,000.00
3.	कवटो, जिला धार		50,000.00
4.	नावदाटोली, जिला खरगौन		80,000.00
5.	जागंरवा, जिला खरगाँन		60,000.00
6.	छोटो बड़दा, जिला खरगाँन		50,000.00
		कुल	3,40,000.00

कार्य योजना (एक्शन प्लान) 1997 के अनुसार परियोजनावार स्मारकों का पुनर्स्थापन कार्य एवं उनकी समयाविध

परियोजना का नाम	स्मारक का नाम	जिला एवं तहसील	अनुमानित काल	समुद्र तल से ऊंचाई	न्यूनतम जल स्तर	अधिकतम जल स्तर	पुनस्थीपन के लिए अनुमानित समय	अनुमानिक व्यय	अभी तक किया ग व्यय (लाख रुपयों	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
रदार सरोवर 1.	शिवमंदिर, बड़दा	मनावर, जिला धार	15 वीं शती ई.	344.40 फीट	421.91 फੀਟ	463.56 फीट	जून 1997 से अक्टूबर 97 तक	9,42,663.00	4.30	
2.	शैलोत्कीर्ण प्रतिमाएं	धरमपुरी (धार)	12-13 वीं शती ई.	399.89	462.12	491.21	अक्टूबर-नवम्बर 1997	2,20,000.00	20,0	
3.	शैलीत्कीर्प ग़ुफाएं खुजावा 🗹	-"-	15-16 वीं शती ई.	377.20	473.56	481.27	-"-	2, 21,000/-	-	
4.	विशाल प्रतिमाएं खुजावा	-"-	12-13 वीं शती ई.	377.20	473.56	481.27	H	2,30,000.00)	
5.	शिव मंदिर क्र. 1 खुजावा	_"_	15~16 वीं शती ई.	377.20	473.56	481.27	फरवरी-मार्च 1998	2,15,000/-	-	
6.	शिव मंदिर क्र. 2	''	15-16 वीं शती ई.	377.20	473.56	481.27	"	2,51,000/~	-	
7.	शिव मंदिर क्र. 3	''	15~16 वीं शती ई.	, 377.20	473.56	481.27	. मार्च 1998	2,34,000/-	-	
8.	नर्मदेश्वर मंदिर डेहर	मनावर धार	16-17 वीं शती ई.	367.43	439.02	448.34	अप्रैल-मई 1998	6,15,500/-	-	
9.	वाणेश्वर मंदिर	कसरावद	18-19 वीं शती ई.	-	-	,	. ="-	10,36,500/	हें न क	न्दिर बांध की ऊंचाई 455 र ोने पर प्रभावित होगा परन्तु मं दी के बीच में स्थित होने तरण 436 फीट पर ही डून गावेगा.
10.	भवानी माता मंदिर खुजाथा	धरमपुरी, धार	12-13 वीं शती ई.	377.20	473.56	481.27	अप्रैलः मई 1998	4,35,000/-	ये	दिर के शिल्पर्शांशें के नम्ब : लिए चूने का प्लास्टर हटाय का है.
. 11.	देवप्रतिलिंग शिव मंदिर, बोधवाड़ा	मनावर, धार	16- 17 वीं शती ई.	380.73	446.40	457	जून-जुलाई 1998	8,63,500/-	र हो	ाह मई 1998 तक भूमि उपर ाने के उपरान्त कार्य प्रकार ि । सकेगा

(1)		(2)	(3)	(4)	(5)	(6)	(/)	(H)	(9)	(10) (11)
	12.	सोमेश्चर मंदिर, खुजावा	धरमपुरी, धार	15-16 मीं शती ई.	377.20	473.56	481.27	जून-नवम्बर 1998	2,74,500/	
	13.	शिवमंदिर, पिपल्दागढ़ी	-"-	15 -16 वीं शती ई.	399.89	462.12	491.22	अप्रैल, 1998	7,80,990/-	- -
देरा सागर (र्मदा सागर) रेयोजना		शिवमंदिर, धारी कोटला	खण्डवा 🐾 जि. खण्डवा	18 वीं शती	220.90	226.50 मीटर	226.70 मीटर	जनवरी-फरवरी 1998	5,26,500/-	मंदिर 225 मीटर बांध की ऊंच होने पर डूब प्रभावित क्षेत्र स्थित
(पाजना	2.	शिवमंदिर (2) खुदिया माल	हरसूद खण्डवा	16 वीं शती ई.				अप्रैल-मई 1998	9,73,000/-	जल स्तर 225 मी. जल स्तर ऊंचाई पर लिया गया है.
	3.	शिव मंदिर, पुनधाट	हरसूद (खण्डवा)	18 वीं शती ^ई .	244.07 भीटर	247.50	• 250.05 मीटर	नवम्बर-दिसम्बर 1998	9,36,000/-	मंदिर 230 मीटर बांध की ऊंन होने पर डूब से प्रभावित है.
	4.	शिव मंदिर, बडकेश्वर	हरसूँद जि. खण्डव।	15- 16 थीं शती ई.	-			मार्च, 1999	11,41,200/~	यांध की ऊंचाई 239 मी. सं अधि होने पर डूब से प्रभावित होगा.
	5.	छत्री घिसोर	-"-	18 वीं शती ई.	242.00	-	-	मार्च, 1999	6,78,000/-	बांध की ऊ. 239 मी. से अधि होने पर दूब से प्रभावित होगा.
	6.	सिंगाजी की समाभि सिंगाजी	खण्डवा जिला खण्डवा	18 र्वी शती ई.				अप्रैल-मई 1999	*13,00,000/-	जिलाध्यक्ष एवं शासन द्वारा भू उपलब्ध कराये जाने के उपरा स्मारक का स्थानान्तरण प्रारा
	7.	रिद्धेश्वर मंदिर हण्डिया	हरदा होशंगाबाद	12-13 वीं शती ई.	,			नवम्बर-दिसम्बर 1999	11,68,500/-	किया जा सकेगा. वर्तमान में मंदिर को मूल स्थान सुरक्षित रखना है जिसके लि सुरक्षा प्राचीर का निर्माण करा जावेगा.
	8.	अब्दुल हसन का मकबरा, हण्डिया	_''_	16 वीं शती ई.				जनवरी मार्च 2000	15,45,000/~	
	9.	शिव मंदिर, चन्देल	खण्डवा जिला खण्डवा	12-13 र्बी शती ई	-	•	-	नवम्बर-दिसम्बर 2000	10,64,000/-	
		शैलोत्कीर्ण प्रतिभाएं देद्यत	खातेगांव देवास	12-13 र्वी शती ई.	-	-	•	. नवम्बर, 2000	3,03,500/-	प्रतिमाएं नदी के मध्य में स्थित अत: पुनर्स्थापन/स्थानान्तरण व दृवने के पूर्व किया जाना है.

(1) (2) (3) (4) (5) (7) (6) (8) (9) (10) (11)

							 				
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
गॅकारेश्वर रियोजना	1.	शिव मंदिर पंधिया	खण्डवा जि. खण्डवा	12-13 र्वी शती ई.			•	दिसम्बर 2000 ई.	9,71,000/~	-	
	2.	पशुर्पात नाथ मंदिर पंथिया	11	18 चीं शती ई.				जनवरी गार्च 2000 ई.	10,95,000/-		मंदिर में 13 शती के शिल्पकण्डों का उपयोग किया गया है ज्वे प्रतिमाएं संलग्न हैं.
	3.	कुबेर भण्डारी मंदिर (गोदडपुरा, ओंकारेथ्रवर)	<u></u>	18 वीं शती ई.		<i>,</i> ·		मार्च, २००० ई.	10,61,000/-		मंदिर 13 वीं शती के मूल मंदिर के अभिष्ठान पर 18 वीं शती में निर्मित हैं भागिक महत्व का होने के कारण महत्वपूर्ण हैं.
	4.	सतमाता गंदिर सैलानी	-"	18 वीं शती ई.				मार्ग, 2003 ई.	14,56,000/		मंदिर के दीवार में प्रतिपाएं चुनी हुई होने के एवं भागिक महत्व के कारण महत्वपूर्ण हैं.
	5.	शिवमंदिर प्रेमगढ़	_"_	18 वीं शती ई.	•			अप्रैल ा र्म 2002 ई.	5,06,000/-	-	
	6.	रेणुका मंदिर	घोघलगांव खण्डया (खण्डवा)	18 वीं शती ई.			-	अक्टूबर गवम्बर, २००३ ई.	7,47,000/-	-	-
महरवर परि योजना	1.	विमलेश्वर मंदिर बेलसर	महेश्वर जिला खरगोन	15 : 16 वीं शती ई.				·I·II·제4, 2002 북.	21,31,000/-		ग्राम बेलसर का नारतिका जलस्तर प्राप्त नहीं हो सका है जिसके कारण वरियता निश्चित
	2.	चन्द्रशंखर महादेव मंदिर, बेलसर	_"_	15·16 वीं शती ई .		·		जनवरी, 2003 ई	2,56,500/-		करना संभन नहीं हो सका है.
	3.	शिवगंदिर मरदाना	_''_	15-16 वीं शती ई .				जनवरी, 2004 ई.	9.30,000/-		

नोट :--(1) इंदिरा सागर परियोजना के 239 मीटर से अधिक बांध की ऊंचाई होने पर तथा ओंकारेश्वर तथा महेश्वर परियोजनाओं के जलस्तर की पूर्ण जानकारी उपलब्ध नहीं है.

⁽²⁾ इंदिस सागर परियोजना के अन्तर्गत संतरितमां जी की समाधि के मुनस्थापन को दर्शित अनुमानिक सशि अन्य अपूर्णानिकों के आधार पर आंकी गयी है. अनुमानिक तैयार नहीं हैं.

ANNEX-XXXIII-(VI).

GOVT. OF INDIA Central Public Works Deptt.

State - M.P.

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Division - Bhopal

Sub Division - Bhopal

Branch - Archaeological Survey of India

Estimate No.

Note - The entries of each item below should be made in accordance with the classification prescribed in Appendix No.4 C.P.W.D. Code.

Name of Work :- Estimate for Safeguarding the bastion of Joga Fort at Joga, District Hoshangabad (M.P.)

FUND - 49 Central

Major Head	!	Minor Head	:	Details Head
Civil deposit work.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Indira Sagar Project	; ; · I	Deposit work of Narmada Valley Development Authority

Estimate framed by Er. <u>G.R. Ramchandani, Asstt. Superintendin Archaeological Engineer and Devendra Singh Sood, Sr. Conservation Assistant</u> of a probable cost of Rs.1,66,93,000-00.

REPORT

This estimate amounting to Rs. 1,66,93,000-00 has been framed to save the bastion of Joga fort which will come under the submergence of the back waters of Narmada due to Construction of Indra Sagar Dam. The Project has already been approved by the Govt. of India. In this connection a meeting was held at Joga and Nemawar on 20.7.98 between the Sr. Officers of the Archaeological Survey of India, N.V.D.A. and Narmada Control Authority Indore. Sequel to it. ASI have decided to provide a safeguard R.C.C. wall 5 mt. away around the Northern bastion of the fort to a height of 266.00 F.R.L. which will be above the water level of the dam. The safeguard wall will be almost similar and look like the existing bastion, and on the recommendations of the Archaeologists/ Archaeological Engineers of ASI the estimate has been framed in separate parts.

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Part I Development of area, approach road and security measures

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In this part the provision for making approach road, construction of temporary bridge over the river and Temporary change of flow of the river has been provided including the provision for electrification, tools and plants which are required during the work.

<u>Part II Scientific excavation and General clearance of the surroundings of monument</u>

In this part the provision has been made for scientific excavation near the bastion, to find out the archaeological remains, alongwith the documentation of antiquarian remains, jungle clearance of the fort and necessary scientific instruments which are required for the same.

<u>Part III Establishment and Tools and Plants required to carry out the work</u>

In this part provision for required staff, their expenditures, tools and plants have been made for carrying out the work.

part IV Construction of safeguard wall around the bastion of Joga fort.

In this part the provision for construction of safeguard wall in R.C.C. and Random rubble masonry, watertightening of the top surface and around the foundation, removal of silt from Baodi, surface recesses pointing and removal of fallen debris have been included.

The rates adopted in this estimate are as per current market rates of Bhopal and indore. The material and labour provided in the estimate are as per minimum wages rates of M.P. Govt. The work will be executed departmentally in the presence of senior officers of the A.S.I.

ANNEX-XXXIII-(VII).

N.D. TIWARI

Member (E&R)

D.O.No.Env-4(11)/99/ (≤ ₹ ₹ August 20, 1999.

Dear Dr. Romila Thapar,

This has a reference to your letter addressed to Dr. Shekhar singh Faculty Member, IIPA received through Dr. (Mrs.) Nalini Bhat, Addl. Director Ministry of Environment & Forests. Dr. Singh has brought to the notice to this authority, the concerns expressed by you in the above referred letter. We got this issue checked-up by the concerned organisations and also got this examined in our office.

While at Delhi, I tried to contact you for exchange of information in this regard but somehow this could not materialise. I am, therefore, enclosing a brief note on the issues. Your concern for cultural heritage and archaeologica monuments has been taken care of in planning and implementation for programme. A copy of latest plan is enclosed for your perusal.

Thanking you,

Yours sincerely,

SJ/

(N.D. TIWARI)

Dr. Romila Thapar succeed second second SNO Nevi Delim

N.O.O.

Copy to:

 Dr. (Mrs.) Nalini Bhat, Addl. Director, Ministry of Environment & Forests. Paryavaran Bhawan, CGO Complex, Lodhi Road, New Delhi-110 003 for favour of kind information.

2. Dr. Shekhar Singh, Faculty Member, Indian Institute of Public Administration Indrapastha Estate, Ring Road, New Delhi – 110 002.

(N.D. TIWARI)

ARCHAEOLOGICAL INVESTIGATIONS IN SUBMERGENCE AREA OF NARMADA (INDIRA) SAGAR DAM

Ref: 1) D.O.No.3-87/80-I.A.I., dated May 1, 1997.

2) Letter dated 23.3.97 of Dr. Romila Thapar addressed to Prof. Shekhar Singh.

Dr. Romīla Thapar vide her letter addressed to Dr. Shekhar Singh listed out important archaeological and historical sites for exploration in detail. She has referred to an article written by Dr. S.B.Otfa of Pre-historic Branch, ASI. She has identified about 43 sites which needs further investigations. The factual position on these issues is as follows:

- 1. EPCO prepared a brief on existing archaeological sites to be impacted by the proposal of ISP.
- 2. Dr. Ofta in his article has referred to the above report generated by EPCO during 1984-87.
- 3. Detailed investigations on archaeology and anthropology were taken up by the ASI during 1987 and a report for the first 20 villages was submitted during 1988.
- 4. Project authorities further entrusted the detailed investigations to the State Department of Archaeology & Museum in 1988-89 for all the projects in the Narmada basin including Sardar Sarovar, Omkareshwar, Maheshwar and Indira Sagar. Detailed investigations were carried out and comprehensive survey report in 16 volumes was submitted during 1992.
- 5. Committee of the experts constituted by the State Department of Archaeology & Museum considered the report and recommended key monuments for protection/relocation etc. Accordingly, State Department prepared an Action Plan for such identified monuments during 1993. The Action Plan has been revised in 1999. It is comprehensive and takes care of significant cultural heritage of the Narmada valley. The plan includes the following:
 - Relocation of ten archaeological monuments.
 - Excavation of five archaeological mounds.
 - Collection of sculpture findings from submergence area.
 - Film documentation for safety of records.
 - Publication on relocation and excavation.
- 6. State Department of Archaeology & Museum was provided with geocoordinates of the sites identified and published in the Archaeology Review of 1987-88 by the ASI, New Delhi which includes all the sites mentioned in Dr. Romila Thapar's letter for rechecking and revisiting the areas.
- 7. This exercise of rechecking is nearing completion. Action will be taken to include any more archaeological and the culturally important(s) site in the future plans.

MINUTES OF THE FIFTH MEETING OF HIGH LEVEL EXPERT GROUP ON FISHERIES DEVELOPMENT AND CONSERVATION IN SARDAR SAROVAR RESERVOIR HELD ON 5TH JANUARY, 1999 AT KRISHI BHAWAN, NEW DELHI.

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ANNEXURES

Annex-V.Min(1)	List of participants.	1

MINUTES OF THE FIFTH MEETING OF HIGH LEVEL EXPERT GROUP ON FISHERIES DEVELOPMENT AND CONSERVATION IN SARDAR SAROVAR RESERVOIR HELD ON 5TH JANUARY, 1999 AT KRISHI BHAWAN, NEW DELHI.

INTRODUCTION

The 5th meeting of the High Level Expert Group on Fisheries Development and Conservation was held on 5th January, 1999 at 1700 hrs. under the Chairpersonship of Joint Secretary, (Fisheries), Department of Animal Husbandary & Dairying, Government of India at Krishi Bhawan, New Delhi. List of participants is enclosed at *Annex-V-Min.1*.

The Chairman welcomed the members and invitees to the 1st meeting of the reconstituted High Level Expert Group. He explained in brief the reasons for changes in the composition.

Discussions on agenda items was taken up thereafter.

Item No. V-1(12): Confirmation of the minutes of 4th meeting.

Minutes of the 4th meeting on fisheries development and conservation held on 11th July, 1997 at Bhopal were circulated to all members and invitees vide letter No. Env-4(10)/97/1271-87 dated 22.8.1997.

No comments were received from any member or invitee. Minutes as circulated were, therefore, confirmed.

Item No. V-2(13): Review of action taken on the decision of previous meeting.

A) Nomination of member(s) & invitee(s) to the expert group.

Regarding appointing substitute for Dr. S.N.Chatterjee, the Member (Environment & Forests), Narmada Valley Development Authority (NVDA) informed that the action is being taken for appointing substitute of Dr. Chatterjee on to the High Level Expert Group as nominee of Government. of Madhya Pradesh (GOMP). However, for the present meeting, services of Dr. Chatterjee have been retained.

B) Scope of the Expert Group.

The issue of enlarging the scope of the Expert Group was discussed in detail and it emerged from the discussions that the guidelines being issued by the Ministry of Agriculture on conservation and development of fisheries shall be directional in nature and the State policy on fisheries development shall have to be compatible with guidelines specially in case of Inter-State reservoir like Sardar Sarovar which are organically connected and in cases where conservation of fisheries have to be optimised.

It was further pointed out that the concern raised by Ministry of Environment & Forests (MOE&F) will have to be addressed by the State Govts. in time irrespective of the territorial limitations. It was agreed that the guidelines being framed shall be sent to the State Govts. for their widespread application.

C) Status of the studies & action plans on fisheries development & conservation.

Government of Gujarat (GOG) and Government of Maharashtra (GOM) generally agreed with the contents of the status paper. It was pointed out by GOG that considering the current status of development, the stage where

impacts on down stream were expected to be severe was not likely to be reached. The GOMP, however, pointed out that Central Inland Capture Fisheries Research Institute (CICFRI) in their study report have compiled a list of rare and endangered species and stated that *Notopterus chitala* was not available in the river system as such. However, it was clarified that the CICFRI study was only a desk review study and this report quoted from the available literature. Dr. P.V.Dehadrai suggested that considering the issues related with the germ plasm of available species, it would be desirable to keep a watch on those species whose occurence is reported even if in low numbers and occurence of the commercial species only should not be considered as guiding factor. It was also pointed out that the hatchery established by CICFRI for Hilsa fish was not commercially viable and is only at the experimental stage.

D) <u>Guidelines for development and conservation of aquatic ecosystem of Sardar Sarovar Reservoir.</u>

1) Short terms strategies and guidelines.

It was informed that in accordance with the decision taken during the 3rd meeting, a field visit to the dam site for on-the-spot assessment on the needs to address to the fisheries development and conservation aspects during progressive filling of the reservoir was undertaken on 21st & 22nd August, 1998 by Dr. Y.S. Yadava, Fisheries Development Commissioner, Ministry of Agriculture, Government of India and Dr. P.V. Dehadrai. Officials of NCA and GOG also accompanied the team. Test fishing was carried out to ascertain the status of ictheofaunal assembledge in the dykes of the Sardar Sarovar Project (SSP). FDC (Fy.), MOA, GOI informed that the outcome of the inspection is being built into the draft guidelines under finalisation under his supervision. Member (E&R), NCA requested an expeditious finalisation of the guidelines.

2). Long term strategies and guidelines.

a) Report of the working group(s)

It was informed that a meeting of their working group formed during 4th meeting by the Chairperson for preparing the draft guidelines was held on 6.8.98. This was followed by the visit of the officials of the GOI and the GOG to the dam site. The draft guidelines have been framed and are being given a final touch. It was agreed that these guidelines would be made available to the NCA for circulation among the members within a month's time and it may then be examined by the State Govts. The draft guidelines along with observations of the members shall be discussed during the next meeting of the Expert group to be convened soon thereafter.

b) Inter-State Fisheries Development Board

The formation of a joint body of the three State Govts. for addressing development and conservation of fisheries in the Sardar Sarovar reservoir was discussed in the light of the facts presented in the Agenda papers. Member (E&F), NVDA stated that the proposal of GOMP for formation of an apex cooperative was already agreed to by the GOM, the response form GOG was however, awaited. He pointed out that the proposal of GOG under consideration of this Expert group for formation of a joint stock company was a deviation from the proposal of GOMP. Further, referring to the decision of the Cabinet, he pointed out that deviation in the composition and function of the joint venture as proposed by GOG will have to be taken to the Cabinet for approval.

The issue was discussed by the members and it emerged that it would be desirable to frame a mutually agreeable structure of the joint venture (for regulating fisheries in the reservoir), before placing it to the Cabinet for a consideration. The Chairman suggested that, keeping in view the composition and functions of the organisations existing elsewhere if any, a working paper, may be framed by Member (E&R), NCA and Dr. Y.S.Yadava and this may be put up for consideration of the Expert group during its next meeting. Once the draft

finds approval of the Expert group, this may be taken up by the officials for approval of the respective State Govts.

E) <u>Clearfelling of trees from the Reservoir Bowl.</u>

State Govts. agreed to provide detailed information on the status of clear felling from the submergence area of the SSP within one month's time.

F) Stocking of the reservoir during it's initial impoundment.

It was informed that GOMP and GOM have not yet started the stocking of the reservoir and were awaiting the directions of the Expert group. GOG have, however, have taken steps for stocking of the reservoir as per the standard norms of the States.

G) TOR for the studies in Maharashtra

It was informed by GOM that the study was entrusted to the CICFRI much earlier. They have however pointed out that it may take more time. He requested the help of MOA, GOI in pressing CICFRI for early completion of the assignment. The Chairman suggested that CICFRI should complete this work by June, 1999 and agreed to address the CICFRI in this regard. He, however, suggested that GOM need to pursue the matter at their level also.

The meeting ended with a vote of thanks to the chair.

Annex-V.Min.1

List of participants attended the 5th meeting of High Level Expert Group on Fisheries Development and Conservation in Sardar Sarovar Reservoir held on 5.1.99 at 5 p.m. at New Delhi.

GOVT. OF INDIA

Ministry of Agriculture & Cooperation

- Shri N. Rama Rao, Joint Secretary (Fisheries) Govt. of India, Ministry of Agriculture, Krishi Bhawan, New Delhi.
 Chairman
- 2. Dr. P.V.Dehadrai, OSD (DIPA), ICAR, New Delhi.
- 3. Dr. Y.S. Yadava, Fisheries Development Commissioner, Govt. of India, Ministry of Agriculture, Krishi Bhawan, New Delhi.
- 4. Dr. C.J. Juneja, Asstt. Commissioner (Fy.), MOA, New Delhi.
- 5. Shri G.M. Pai, Sr. Tech. Asstt. (Fy.), MOA, New Delhi.

Narmada Control Authority

- 1. Shri N.D. Tiwari, Member (E&R), NCA, Indore.
- 2. Dr. Pawan Kumar, Specialist (Env.), NCA, Indore.

GOVERNMENT OF GUJARAT

- 1. Shri L.Mansingh, MD, SSNNL.
- 2. Shri V.C.Trivedi, Specialist (Env.), NPG.
- 3. Shri N.A.Vhora, Commissioner of Fisheries, GOG.

GOVERNMENT OF MADHYA PRADESH

- Shri Suresh Chandra, Member (E&F), NVDA, Bhopal.
- 2. Shri R.K. Behre, Subject Matter Specialist (Hydrolody & Sedimentation), NVDA, Bhopal.
- Shri R.K.Nigam, Director of Fisheries, M.P.

GOVERNMENT OF MAHARASHTRA

- 1. Shri Satyabir S. Dodd, Secretary (R&R), GOM, Mumbai.
- 2. Shri K.A. Dongre, Dy. Director (Fishries), GOM, Mumbai.
- 3. Shri C.K. Jadhav, Under Secretary, GOM, Mumbai.

EXPERT MEMBER

- Dr. S.P. Ayyar, Expert Member, Bangalore.
- 2. Dr. S.N.Chatterjee, Expert Member, Bhopal.

MINUTES OF 33RD MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 28th SEPTEMBER, 1999 AT PARYAVARAN BHAWAN, NEW DELHI.

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MINUTES OF 33RD MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 28TH SEPTEMBER 1999 AT PARYAVARAN BHAWAN, NEW DELHI.

INTRODUCTION

The 33rd meeting of Environment Sub-group of Narmada Control Authority was held at Paryavaran Bhawan, Ministry of Environment & Forests, New Delhi on 28th September 1999. A list of participants is enclosed at **Annex-XXXIII-Min-I.**

Shri K.Roy Paul, Additional Secretary, Ministry of Environment & Forests chaired the meeting and welcomed the participants. Discussions on the agenda items were taken up thereafter.

Item No.XXXIII-1(153): CONFIRMATION OF MINUTES OF THE 32ND MEETING.

Minutes of the 32nd meeting were confirmed as circulated through letter No.Env-3(32)/98/2233-66, dtd. 1.12.98.

Item.No. XXXIII-2 (154): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

1. PARI-PASSU CONTEXT & COMPLIANCE [XXI-4(148)].

The Member (E&R), NCA presented the report of the committee. He informed that compensatory afforestation (CAF) works were practically over and catchment area treatment (CAT) works are also nearing completion, in the States of Gujarat and Maharashtra. Though there is some slippage in M.P., however, overall works by and large are on schedule. All other works on health, flora, fauna & carrying capacity, archaeology etc. were making satisfactory progress. Observations and recommendations of the committee are placed at Annex-XXXIII-Min-II.

The Director (CAT), GOMP explained the reason for some slippage's in CAT works and assured that works would be accelerated to complete them in four years time. He submitted a revised schedule for treatment of the balance works.

The CCF Western Region, MOEF suggested that while assessing the targets of CAT works, it's quality may also be considered. The Chairman suggested that different item of works in CAT planning/implementation may also be looked into during the future visits.

2. JOINT INSPECTION BY MOEF AND NCA OFFICIALS TO THE NSP AREAS [XXXI-4(148)].

GOMP vide their letter No.PAMR/99/311/Status/1080, dtd. 11.6.99 (copy placed at Annex-XXXIII-Min-III) sought to clarify the issues raised in the joint inspection note. However, the Chairman desired that since the issue is being looked after by the R&R Sub-group of NCA, the issue may be discussed there and the outcome of the discussions may be informed to the Environment Subgroup.

Regarding the issues related with compensatory afforestation (CAF), of ISP, CCF Western Region, MOEF informed that the issue of the extent of forest area was resolved. He pointed out to a reference (enclosed as **Annex-XXXIII-Min-IV**) of MOEF whereby the extent of land offered by GOMP was accepted. Regarding quality of afforestation, Member (E&F), NVDA informed that during the visit, except at two places which were chosen as per the wishes of NBA, the plantation works were in good condition. At these two places also, he informed that efforts were being made to improve the quality of afforestation and it was submitted that with the advancement of the monsoon, plantations would definitely improve.

3. .SUBMISSION OF CATCHMENT AREA TREATMENT (CAT PLANS FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS [ITEM NO.XXII-2(112).]

Govt. of Gujarat

Sub-group noted the progress made in Gujarat.

Govt. of Madhya Pradesh

The Member (E&F), NVDA informed that GOMP have submitted 32 number of schemes spread over an area of 60,000 ha. Out of this, 22 schemes covering an area of 36,373 ha were related to the SSP and balance schemes to the ISP. He further informed that all these schemes have been approved under RVP scheme. About 9,973 ha area from these schemes in SSP and 7,102 ha area under ISP have been treated by the end of March 1999.

The Director (CAT), NVDA pointed out to the limited release of funds for the schemes under RVP. He desired that considering the increase in the wage rate, the unit cost of treatment is getting higher and higher with each passing day. He, therefore, requested the Sub-group to emphasis the upward revision of the cost.

Govt. of Maharashtra

The Deputy Secretary, GOM informed that out of a total of 35 subwatershed schemes, 22 were submitted to the GOI, against which 19 schemes are still awaiting approval and that only three have been sanctioned so far.

The GOM requested the revision of the cost norms to take up the CAT works properly. There was general discussion on paucity of fund for Phase-II CAT works, it was pointed out that with this pace of work, it may not be possible to treat the areas even by 2011 as outlined in the plan of GOMP. The Vice-Chairman, SSNNL informed that large portion of the fund are available with National Watershed Programme, Ministry of Agriculture and Ministry of Rural Development which if utilised, may be helpful in treating the remaining catchment. After some discussion, it was agreed that the issue would be taken up by the GOMP and GOM with the Ministries of Agriculture and Rural Development.

4. Duration of treatment in catchment areas

Regarding the issue of increasing the duration of CAT works from the present three years to the five years. The Member (E&F), NVDA informed that they are pursuing the issue with the concerned department of Central Govt. However, they requested the help of MOEF in this regard.

5. Silt Monitoring

Govt. of Gujarat

The CCF, SSPA informed that Central Soil & Water Research Station have expressed the inability to take up their entire area. Gujarat Engineering Research Institute (GERI) was also approached. GERI have also expressed their inability to take up the study. Therefore, the work was proposed to be taken up with help of Chief Engineer (Design) and forest field staff. Further progress in this regard would be informed soon.

Govt. of Madhya Pradesh

Subject Matter Specialist, GOMP informed that it was proposed to establish two centres, however, the work has not progressed much because the imported instruments to be used in Indo-German technique, are not readily available. However, the data was being collected from the silt monitoring stations already established in RVP project. Further progress would be informed after receiving information from the concerned manufacturers. Executive Member, NCA suggested that possibility of using indigenous equipments might also be explored.

6. COST ESTIMATES FOR PREPARATION OF ACTION PLANS AND IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD MEASURES.

The Member (E&R), NCA requested the State Govts. to provide details of the estimates and expenditure at the price level of 1995-96.

GOMP and GOG furnished the information. Updated picture on the cost estimates received during the meeting is placed at **Annex-XXXIII-Min-V**.

Deputy Secretary, GOM informed that the funds for CAF and CAT are being received by them from the project whereas on account of other safeguard measures, no such funds are forthcoming and that they have already spent about Rs. 55 lakh on the studies of flora and fauna alone.

He further informed that there was difficulty in getting the funds for the various additionalities on account of health plans, fisheries development plans, flora, fauna plans etc. and cited shortage of funds as one of the reason for the delay. It was agreed that GOM should send their request for the budget related to implementation of various safeguard measures along with yearly indent to the Vice-Chairman, SSNNL so that the same could be provided in the budget of the project and made available to GOM.

7. ESTABLISHING A SEPARATE AUTHORITY FOR COORDINATING ENVIRONMENTAL WORKS IN MAHARASHTRA.

The Deputy Secretary, GOM requested the Sub-group that considering that most of the works in Maharashtra on CAT and CAF were already over and that plans are under way on the environmental safeguard measures like flora, fauna & carrying capacity, fisheries, health etc., formation of an authority as desired may not be necessary.

Sub-group discussed the issue in detail and it was agreed that the recommendations of the sub-group for creation of an authority/cell was based on its experience where there was difficulty in getting proper response from GOM on crucial issues in time. Member (E&R), NCA informed that earlier Sub-group had recommended creation of an elaborate authority for which terms of reference were already framed and sent to Maharashtra. The Member (E&R), NCA informed that earlier Sub-group could not review the progress of survey, studies and implementation on environmental safeguard measures in Maharashtra due to lack of proper inter-departmental coordination in Maharashtra and emphasised the need for a Director (Environment) for the SSP along with supporting staff in office and in field. Subgroup endorsed this view.

8. PUBLICATIONS ON ENVIRONMENT

Copy of draft publication on Indira Sagar Project prepared by Environment Unit of NCA was circulated to all members vide office letter No.Env-3(33)/99, dtd. 22nd September 1999. Steps are being taken to get this book published for wider circulation soon.

A copy of the population publication brought out by NVDA was presented during the meeting which is annexed with the minutes and placed at **Annex-XXXIII-Min-VI**. It was informed that more publications were in the pipeline.

The CCF, SSPA suggested that regarding publication on bio-diversity as the issue concerned with the three States, services of the Specialist (Environment), NCA would be needed for completion of the required publications.

. On the issue of identification of thrust areas for writing popular publications, the Chairman suggested that the Environment Unit of NCA should identify these areas and communicate to the State Govts. besides to help them for preparation of publications.

9. MONITORING OF R&R ASPECTS OF ISP

The Member (E&F), NVDA reiterated views expressed by the Chief Secretary, GOMP in his letter dtd. 15.7.99. The stand of the GOMP was that Sub-group of NCA which monitored the R&R of SSP might also monitor the ISP, however, there was no need for inclusion of officers from the Maharashtra, Gujarat or Rajasthan in the group expected to monitor the R&R of ISP. He pointed out that the committee on Narmada Main Canal which monitored the SSP canal aspects was devoid of the members of the States of Maharashtra and M.P.

It was felt by the Sub-group that as the issue was already before the NCA, further discussion may be deferred.

Item No. XXXIII-3(155): PRESENT STATUS OF STUDIES, SURVEYS AND ENVIRONMENTAL ACTION PLANS.

1) PHASED CATCHMENT AREA TREATMENT

Government of Madhya Pradesh

The Director (CAT), GOMP informed that the remaining CAT works have been re-phased and are now expected to be completed within a period of four years for both the SSP and ISP. Accordingly, it proposed to treat 13,000 ha during 1999-2000 and 14,000 ha each during next couple of years and the balance by 2002-2003 for the SSP whereas for the ISP 4,800 ha is proposed to be treated during 1999-2000 and 5,000 ha each during the next couple of years and the remaining by 2002-2003.

Progress reported by the GOMP was 44,276 ha for the ISP and 75,885 ha for SSP.

Govt. of Maharashtra

The Deputy Secretary, GOM submitted details of the treatment works carried out for the Phase-I catchment treatment. Copies are placed at **Annex-XXXIII-Min-VII**. He informed that all the works have been completed in Maharashtra and that divisions created have been winded up and that the maintenance works have been entrusted to the regular CAT divisions in Maharashtra.

2) COMPENSATORY AFFORESTATION

Govt. of M.P.

The Member (E&F), NVDA informed that CAF works over an area of 67,180 ha were completed by the end of June 1999 for the ISP whereas for the SSP except for 30 ha area, all works have been completed.

Govt. of Maharashtra - Sardar Sarovar Project

Sub-group noted the progress.

Govt. of Gujarat - Sardar Sarovar Project

Sub-group noted the progress.

3) COMMAND AREA DEVELOPMENT

Govt. of Madhya Pradesh - Indira Sagar Project

The Member (E&F), NVDA informed that terms of references for the command area development plan was being prepared on the basis of terms of references of GOG and GOR as far as they related to agro-climatic and terrain conditions revealed by various studies for Narmada Sagar Complex. He further informed that an inter-departmental committee was constituted to look into the issues of environmental impacts likely to be faced under the command area conditions prevailing in respect of Indira Sagar Project.

Study pertaining to the effect of agro-chemical run-off from agricultural fields on surface and groundwater was assigned to J.N.Krishi Vishwa Vidyalaya, Jabalpur. The model for the preventive measures was expected from the investigator. Sub-group noted that the studies were making progress.

Dr. D.L. Kauraw, Prof. & Head, Soil Science, J.N.Krishi Vishwa Vidyalaya, Jabalpur presented the findings of his study group. He expressed difficulty in collection of samples due to lack of vehicle and suggested that study have to be utilised for long term benefits. He emphasised the need for integration of studies with similar studies in other parts of the world and cautioned that if precautions were not taken, the groundwater may get polluted. He stressed the need for coordination among various agencies even outside the Narmada valley.

Dr. Katti suggested that a steering committee should lay down the optimum level of application of insecticides/pesticides. For the degree of risk that country would be facing should also be included in the study reports.

The Chairman stated that there was a need (1) to estimate as to how much insecticides percolates down or goES out as run-off (2) the likely impacts (3) the awareness required among the users and (4) mitigatory practices among others the agricultural practices need to be assessed. He desired that this may be brought to the notice of Ministry of Water Resources and a proper coordination amongst the various organisations involved may be ensured to avoid future problems.

The Commissioner (PP), MOWR suggested that one way to reduce application of insecticides was through reduction in subsidy and increase in cost.

THE PHY WELLT A FIRM

Govt. of Gujarat - Sardar Sarovar Project

GOG presented the physical and financial position of canal works. Copies placed at Annex-XXXIII-Min-VIII. It was agreed that based on recommendations, by WAMANA Consultants, policies have been framed for participatory irrigation management to form the basis for on farm development activities.

It was planned to complete canal system first, in all respect and with the matching OFD works. It was planned to entrust the construction of field channels (FC) and OFD structures on FC to the registered WUA and necessary guidance will be given by the SSNNL. SSP authority had formulated construction procedure and management policies for distribution network.

The drainage was planned as a part of OFD works to avoid waterlogging, soil salinity and inundation of command. Construction of internal roads for transport of farm products was also included under the OFD works of integrated development of command area.

Regarding the scope on irrigated agro-forestry, it was informed that discussion with the Gujarat Agriculture University scientist and Prof. of Horticulture and Forestry College, Navsari has been done and details have been collected. Regarding agro-forestry plan for Phase-I area of SSP command it would be formulated after discussion with officers of ICAR, New Delhi.

Vice-Chairman, SSNNL briefly summarised the strategies for command area development works. He stated that the command area development includes (1) the main canal branch & distributories (2) field channels, drainage etc. (3) cropping pattern (4) development of infrastructure including agro-based industries, supply of seeds etc. (5) quality of water. The group of farmers would be supplied water on volumetric basis for conjunctive use, to avoid waterlogging.

In response to a question related to waterlogging in command and installation of drainage network, Vice-Chairman, SSNNL was of the view that the problem of drainage might arise 10-15 years later. However, members of the Sub-group were of the opinion that drainage aspect should not be neglected and should be implemented side by side.

Regarding realignment of the canal in sanctuary reach where it bisects the run-off Kutchh, the greater with the smaller one, Vice-Chairman, SSNNL stated that steps for providing safe passage through corridor is under consideration.

Regarding submission of integrated command area development plan, it was informed that this was under formulation.

Govt. of Rajasthan

Principal Secretary (Environment), GOR informed that environmental studies for the Narmada command area in Rajasthan was completed by the WAPCOS earlier and that report was accepted by the GOR. GOR had undertaken an exercise of floating the International Competitive Biddings for consultancy to decide the further course of action in this regard. He agreed to provide more information on this soon.

4) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

Govt. of Madhya Pradesh

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Indira Sagar Project

The Member (E&F), NVDA informed that all formalities related to declaration of national park and sanctuary were being examined by the finance department for further submission to the Cabinet of GOMP.

Sardar Sarovar Project

The Member (E&F), NVDA information that the Action Plan for SSP was already presented to the State Wildlife Committee for approval.

Government of Gujarat - Sardar Sarovar Project

The CCF, SSPA presented the information on development works carried out in Shoolpaneshwar sanctuary. A copy of the details are placed at **Annex-XXXIII-Min-IX**.

Govt. of Maharashtra - Sardar Sarovar Project

The Deputy Secretary, GOM informed that main recommendations of the study group can be categorised into six types, three each for forests and agriculture department. These are being looked at for formulations of a plan.

5) .ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Government of Gujarat – Sardar Sarovar Project

The CCF, SSPA informed that the cost of construction of new Hamfeshwar temple having plinth RL of 103.22 m is revised to Rs. 264 lakh and so far Rs. 276.25 lakh was spent. The construction of super structure was in progress and that about 31% of works was over. He further informed that the work would be completed by June 2000.

The Member (E&R), NCA informed the Sub-group that in response to the concern raised by Dr. Romila Thapar in her letter addressed to Dr. Shekhar Singh, he held discussions with her at her residence and that an invitation was also extended to her for attending 33rd meeting of the Environment Sub-group. He informed that she was of the view that proper documentation of the historic sites should be undertaken carefully and that sample representative sites may be excavated carefully. She sought the reports on anthropological and historical findings and that she was satisfied with the plan prepared by GOMP. A summary records of the discussion is placed at **Annex-XXXIII-Min-X**.

6) SEISMICITY & RIM STABILITY OF RESERVOIR

Government of Gujarat - Sardar Sarovar Project

Sub-group was informed that installation of seismic instruments at 9th observatory, i.e., Sagbara was completed on 23rd January 1999 and that the observatory started functioning from 23rd January 1999. With this, all works on observatory have been completed and they were functioning.

Regarding analysis of the data collected by these observatories and it's application, it was suggested that SSNNL or NVDA may get in touch with Earthquake Research Institute, Roorkee or Indian Meteorological Department or GSI.

7) HEALTH ASPECTS

Sardar Sarovar Project & Indira Sagar Project

Govt. of M.P.

Regarding identification of some districts for inclusion in the annual programme of NICD, GOMP informed that they have identified two districts namely Khandwa and Hoshangabad. A formal letter in this regard would be

addressed to the NICD soon. Dr. R.C. Sharma, Director, NICD informed that regarding inclusion of identified districts from M.P. in the annual programme of the NICD, he would pursue for inclusion of these districts in a phased manner in the programme of NICD.

The Member (E&F), NVDA informed that final report of Gandhi Medical College, Bhopal was still awaited. However, the baseline data was included in the report. A copy of the abstract of the report is enclosed with the minutes and is placed at **Annex-XXXIII-Min-XI**.

Govt. of Maharashtra

The Deputy Secretary, GOM informed that the detailed health plan has been drawn up by the Deputy Director of State Health Services. He, however, could not make it to the meeting and the details in this regard would be made available soon.

Regarding delay in purchase of launch due to non-commitment of funds by the concerned department of GOM, it was suggested that GOM may get in touch with Vice-Chairman, SSNNL for provision in the budget of SSP.

Govt. of Gujarat

The Member (E&R), NCA requested the information on status of Malaria in the peripheral Gujarat villages surrounding Sardar Sarovar reservoir, to which GOG agreed.

8) FISHERIES DEVELOPMENT OF SARDAR SAROVAR PROJECT & INDIRA SAGAR PROJECT RESERVOIR

Govt. of Maharashtra

Regarding submission of report by the CICFRI, Vadodara, it was stated that another 8-10 months would be required to submit a detailed report. The Assistant Director (Fisheries) stated that the CICFRI Scientists are finding it difficult to submit the report in time basically due to difficult terrains and that the GOM was pursuing the matter and report was expected soon. He further informed that there was no endemic endangered species in the Maharashtra reach.

Regarding issuance of draft guidelines on conservation and development of fisheries, Assistant Fisheries Development Commissioner informed that the draft guidelines are in final stage and shall be sent to the NCA soon.

Item No. XXXIII-4(156): WORKSHOP/ SEMINAR/ SYMPOSIUM

The Additional Director, MOEF stated that a large number of studies have been conducted on various parameters. There was need for more interaction among project authorities, planners and administrators specially in the areas of health, fisheries, command area development etc. She suggested that the experts, concerned officers of the State Govts., premier institutes etc., may be involve through organising of workshops for discussion and bringing out the preventive and curative or managerial aspects of environment safeguard measures.

The Executive Member, NCA emphasised the need for adoption of conjunctive use and the drainage aspect. He suggested that the drainage channels are to be provided parallel to the irrigation channel in time. The Executive Member, NCA further stated that the canal automation was a novel idea, however, it's performance under the given condition was not known.

Dr. Katti suggested that the drainage channels were to be provided simultaneous to the irrigation channels and he emphasised the need for laying down specifications for vertical as well as surface drains.

The Chairman summed up the discussion by saying that the NCA should organise workshops on the identified subjects for detailed discussions and should come out with suitable recommendations for crystallising the ideas for mitigation/management of the resources. This was agreed to.

The meeting ended with a vote of thanks to the chair.

ANNEXURES

ANNEX-XXXIII-Min-I

LIST OF PARTICIPANTS OF THE 33RD MEETING OF ENVIRONMENT SUB-GROUP OF NCA HELD ON 28TH SEPTEMBER 1999 AT PARYAVARAN BHAWAN, NEW DELHI.

GOVERNMENT OF INDIA

Ministry of Environment & Forests

<u>S/Shri</u>

- 1. K. Roy Paul, Additional Secretary, MOEF, New Delhi
- 2. V. Rajagopalan, Joint Secretary, MOEF, New Delhi
- 3. V.P. Singh, CCF, Western Region, MOEF, Bhopal
- 4. Dr. Nalini Bhat, Additional Director, MOEF, New Delhi

Narmada Control Authority

- 1. Suresh Chandra, Executive Member, NCA, Indore
- 2. N.D. Tiwari, Member (E&R), NCA, Indore
- 3. Dr. Pawan Kumar, Specialist (Environment), NCA, Indore
- 4. R.G. Pandey, Deputy Director (Environment), NCA, Indore
- 5. Rakesh Gaurana, Asstt. Director (Environment), NCA, Indore

Sardar Sarovar Narmada Nigam Ltd.

1. A.K. Mahana, Secretary, SSCAC, Vadodara

Ministry of Water Resources

1. B.S. Ahuja, Commissioner, MOWR, New Delhi

Ministry of Agriculture

1. C.J. Juneja, Assistant Commissioner, MOA, New Delhi

Indian Council of Agriculture Research

1. Dr. P.S. Pathak, ADG (Agroforestry), ICAR, New Delhi

National Institute of Communicable Diseases

1. Dr. R.C. Sharma, Joint Director, NICD, New Delhi

Botanical Survey of India

1. Dr. S.K. Srivastava, Botanist, BSI, Allahabad

GOVERNMENT OF GUJARAT

- 1. V.B. Buch, Vice-Chairman, SSNNL, Gandhinagar
- 2. Dr. S.A. Chavan, CCF, SSPA, Gandhinagar

GOVERNMENT OF MADHYA PRADESH

- 1. Suresh Chandra, Member (E&F), NVDA, Bhopal
- 2. K.N. Dubey, Director (CAT), NVDA, Bhopal
- 3. R.K. Behre, Subject Matter Specialist (H&S), NVDA, Bhopal
- 4. Dr. K.L. Kauraw, Prof. & Head, Soil Science, J.N.Krishi Vishwavidhyalaya, Jabalpur
- 5. R. Nagal, D.E., State Department of Archaeology & Museum, Bhopal

GOVERNMENT OF MAHARASHTRA

- 1. G.N. Warade, Scientist Grade-I, GOM, Mumbai
- 2. Shalendra Bahadur, Nodal Officer, GOM, Nagpur
- 3. Dr. S.D. Wankhede, Joint Director of Agr., GOM, Pune
- 4. Nandkishor N.Magar, Deputy Director of Fisheries (Inland), GOM, Mumbai

GOVERNMENT OF RAJASTHAN

1. Anil Vaish, Principal Secretary (Environment), Jaipur

EXPERT MEMBERS

1. Dr. R.K. Katti, Prof. Emeritus, IIT, Mumbai and Director & Consultant, UNEECS, Mumbai

Annex-XXXIII-Min-II

OBSERVATIONS & RECOMMENDATIONS MADE DURING FIELD VISIT (JUNE 1999)

1. CATCHMENT AREA TREATMENT

Only a limited sample areas of catchment area treatment sites were visited in the States of Madhya Pradesh and Maharashtra as indicated above. First site of sub-watershed No.Ng1z, village Pipaldagarhi was visited. In this area, medium and deep ravines were seen to control the erosion, bounder check dams, run-off management structures, constructed in the year 1994 were in place. In some areas silt was deposited upto the brim of the bunds. However, vegetative barriers were very rare. On interaction with the local officers, it was gathered that due to high biotic pressure in the area, an extremely harsh condition, vegetative measures specially during the dry months when agriculture crop is not in place are difficult to maintain. It was further gathered that plantations of khus grass over a vast area failed earlier due to the same reason. Local officers were of the view that engineering measures would be easier to maintain than vegetative measures specially in the refractory areas.

Committee observed that while works in Maharashtra in Phase-I and Gujarat were completed much earlier, there is a need for maintenance of the engineering structures and replacement of casualties. Therefore, some provisions for maintenance and upkeep of the area may be explored. In Phase-II areas, it was observed that works are progressing in line with the approvals accorded by the funding agencies. There is a need for reconciliation of the area treated under forest and non-forest heads in Maharashtra.

2. COMPENSATORY AFFORESTATION

Only a limited sample areas of afforestation and reforestation sites were visited in the States of Madhya Pradesh and Maharashtra as indicated above. Committee observed that on the whole the sites of afforestation being the revenue lands taken over for compensatory afforestation, the soil cover (depth and texture) was poor, thereby the growth of the plants was limited due to these factors. Check dams and *gully* plugs have been provided to prevent soil erosion wherever plantations were carried on sloppy hillock riddled with formations of rills, gullies and ravines. However, as most of the work was completed much earlier, piping in

the check dams was observed at a few places. At some rare places, it was observed that the contour bunds/check dams provided on slopes of about 30% were breached. Committee also observed that the seedlings of Acacia auriculiformis in Maharashtra and Prosopris juliflora in Madhya Pradesh formed the dominant stock of the plantations. Field officers stated that due to harsh conditions prevailing in the area and also due to heavy biotic pressure non palatable species have been planted up comparatively in larger areas. They also showed the members plantations of trees yielding minor forest produce like Chironji (Buchnania lanzan), bamboo (Dandrocalamus strictus), Khair (Acacia catchu) etc. It was informed that some of the revenue areas where the Someshwar temple (16th - 17th century) are existing at 377.20 ft. R.L. These monuments are proposed for relocation. Numbering on the stones of Shiv temple was carried out.

3. ARCHAEOLOGY

Most of the sculptures scattered in the riverbed around village Pipaldagarhi were collected and shifted to the proposed R&R sites at village Limboda, 9 such statues were inspected by the committee at village Limboda. In addition, one Shiv temple of 18th Century which was located at 399.89 ft. was in the process of relocation at the above site.

- At village Khujava at the confluence of river khuj with Narmada 6 rock cut caves belonging to 15th 16th Century were located at 377.20 ft., were inspected. Most of these caves were filled up with silt. Each of this cave had one statue of Lord Shiva. State Department of Archaeology & Museum have prepared plan to relocate these caves at an estimated cost of Rs.2,49,000/-.
- Little above these caves there is one temple of 16th to 17th Century referred to as Someshwar temple. This is also proposed to be relocated. It was observed that numbering of the stones of dismantling the monuments was completed.
- There is one temple of goddess Durga 13th Century. There are three more Shiv temple belonging to 18th Century at RL 377.2 ft. in the nearby areas. All these are proposed for relocation. Near to above site, there are three

large size statue of Lord Vishnu, Narsingh and Balram belonging to 12th to 13th Century. In addition, one statue of lord Hanuman found near the temple of Goddess Durga. It was observed that stone indicating the zone of submergence is little below than the levels of the large statue and temple of Goddess Durga. Most of these monuments are located at or above the R.L. of 377.2 ft. Committee was informed that the works on relocation of these monuments was obstructed by the residents. According to the residents, they desired that the monuments should be relocated at a place where people of this area are likely to be resettled.

It is suggested that the sculptures and the temples may be shifted to a place where local residence are expected to be resettled. Alternatively these may be housed in a museum where proper protection and care can be extended. It was felt that need for relocation of temple located well above the FRL may be reassessed before actual relocation. Considering logistic costs and sentiments of the local residence.

4. HEALTH ASPECTS

Committee interacted with a local MLA Mr. Padvi at Shahada camp and the Additional District Health Officer, Zila Parishad, Nandurbar, at Dhadgaon Camp in Maharashtra and ascertained the information regarding progress of works in Maharashtra. He informed that in addition to normal preventive measures like medicated nets spray of insecticides etc. *Gappi* fish which eats up the mosquito larvae are being propagated in ponds as a preventive measure. He informed that launch for mobile dispensary is yet to be purchased. However, in the absence of this launch, regular medical facilities are being provided to the villagers through regular visits by the qualified staff. It is recommended that all preventive measures including acquiring of launch may be expedited and designed measures for prevention and cure of the disease may be regularly followed up.

5. FLORA & FAUNA

While traversing the catchment in Maharashtra, good number of Palm trees growing in the area were observed. Considering that Palm trees are an indicator of presence of ground water, this area may be developed for wildlife through providing of water holes and salt licks. It was suggested that Government of

Maharashtra may like to expedite preparation of Action Plan in accordance with the recommendations of the study groups. Committee interacted with District Fishery Officer of Dhule District, Maharashtra. Regarding time-bound study on fish conservation entrusted by Government of Maharashtra to the CICFRI, it is suggested that these may be expedited and keeping in view the results of the study, Action Plan on fisheries development and conservation may then be revised.

Annex-XXXIII-IVIIII-III

.C.Mazunder

D.O.letter No.PAMR/99/311/shalis/10

Dear Shri

Please refer to your D.O.letter No.R/17/ISP/99/357 dated 4.3.99 regarding Field Visit Report pertaining to Indira Sagar Project undertaken by team officials from Ministry of Environment and Forests, Govt. of India during 22nd and 23rd December, 1998.

- 2) In the aforestated Field Visit Report the team raised the following issues for consideration of the state government:
- (1) The relocation sites including the Satwas relocation site which are being developed for the R&R of 2200 PAFs of 12 villages to be affected by Indira Sagar Project, the consent of the PAFs have not been obtained.
- (ii) The Satwas relocation site which is not having any avenue for the PAFs to earn their livelihood in its vicinity in terms of agriculture or industry. Sources of wage employment in the neighbourhood also appear to be meagre.
- (iii) The afforestation work in revenue areas of Malgaon, Barkheda and Manjvadi, the status thereof is not satisfactory except that of Malgaon. The quality of plantation in general is poor.
- (iv) The Souda Chitthi System adopted by state government for providing land for land package to the PAFs has resulted in Zake agreements being produced by the PAFs and consequently lands are not being purchased by them. This procedure is compelling the PAFs to opt for cash compensation.
- 3) In regard to issue No.(1) & (11) as mentioned in Para 2 Supra, the consents from the PAFs are being taken in a phased manner. The R&R Policy adopted is to resettle the PAFs as a Community/as a Village Unit. So far out of 107

families and their 88 major cons, thus totally 195 PAFs of village Pariadeh who have been planned to be resettle at relocation site Satwas, 97 PAFs have considered for resettlement in Satwas. Most of them either landless agricultural labourers like artisans, patty traders, fishermen etc. As per R&R Policy of the state of M.P. allotment of land in lieu of the land being submerged and acquired is only to be made to those PAFs who are loosing morethan 25% of their land holding. The present PAFs who have opted for resettlement in Satwas relocation site do not belong category. However, some of the PAFs of Pariadeh who are cultivators and loosing morethan 25% of land are being promoted to purchase land as per their choice. at the places they prefer to, preferably in the vicinity of Satwas relocation site, some of them actually purchased land the in Panakheda near the site.

4) As regards avenue for providing employment including wage employment to the landless labourers PAFs, an ambitious handicraft centre for imparting them training in the various crafts including the local ones and other non-agricultural pursuits is being established at a initial cost of &. 50 lakhs. The objective behind establishing such a Handicraft Centre is that the PAFs after their training, they would be able to establish themselves in self employment. The RER Policy of M.P. provides for financial assistance of Rs. 40,000/- to landless agricultural labourers PAFs, Rs. 25,000/- to other landless agricultural labourers for purchase of productive assets in establishing oneself in self employment. Besides, the Satwas relocation site itself is a great handi specially for agricultural produces like Cotton. The PAFs are surely to get wage employment in the Mandi.

- 5) Regarding afforestation the Member (Env. & Forests), NVDA is being requested to send a status report of the issue included in the report.
- As regards the complaints and lacunae in respect of Souda Chitthi System for helping the PAFs to purchase land in lieu of land being submerged and acquired, verification whether the land has been purchased by the PAFs or not is under process. Until the report is available it will not be proper to brand the system unacceptable.
- 7) If any further information is needed please do write to us.

Yours sincerely,

(Dr. S.C.Hazunder)

To,

30.

Shri N.D.Tiwari, Member (E&R), Narmada Control Authority, 79 BG Scheme No.74-C, Vijay Nagar, INDORE (M.P.) PIN: 452 010.

-0-0-0-

PHONE NO. : 0755 569249

OCT. 15 1999 Ø5:42PM P1

ANNEX-XXXIII-Min-IV

No.4-446/84-FC(Part)Val-22

GLE MER 12, 1998.

Ta

The Sucrebary, Provet Department, Congression of Medica Presents

Subjects- Miveralon of forest Land for Harmada

str,

I am directed to refer to your letter No.F.\$/111/04/10/2 dated 18:11:1987 on the above subject and to say that compensatory afforestation echomo submitted to this Ministry vide your above referred letter is hereby approved.

2. Further, additional compensatory afforestation over 150 had degrated forest may be undertaken as a penalty for violation of the Forest (Conservation) Ast, 1980.

Yours falthfully,

DEPUTY INSPECTOR GENERAL OF FORESES LFC)

OPPY 101

1. Principal Chief Conservator of Forests, Government of Madays Products, Shopal.

THE TAX PROPERTY OF THE PARTY O

2. Harmodo Yalley Merekennent Antherity,

Sey's STAB

(Soso PATRASK) DIG(FG) 12-10-1990-

Annex-XXXIII-Min-V

ENVIRONMENTAL COST OF SSP, GOG (At price level 1996-97)

A) Expenditure by project authorities

i) Cost of survey and studies (in Rs. lacs)

	Estimate	Expenditure
CAF	4.52	4.52
CAT	8.77	8.77
F&F	101.84	80.47
Health	2.5	2.5
Arch/Anth	1.3	0.6
Seismicity	5.05	5.07
CAD	11.25	11.25

ii) Cost of Implementation (in Rs. lacs)

	 Estimate	Expenditure
CAF	1938.82	1763.47
CAT	3445.76	3636.50
F&F	75.31	64.42
Fish	-	-
Health	3800.00	303.47
Arch/Anth	329.00	131.92
Seismicity	219.57	335.20
CAD	NA	-

(Status June 1999)

Environmental Cost of Sardar Sarovar Project

GOMP.

RELATED TO UNIT I DAM:

[A] Expenditure by Project Authorities :-

(I) Cost of Survey & Studies (in lacs)-

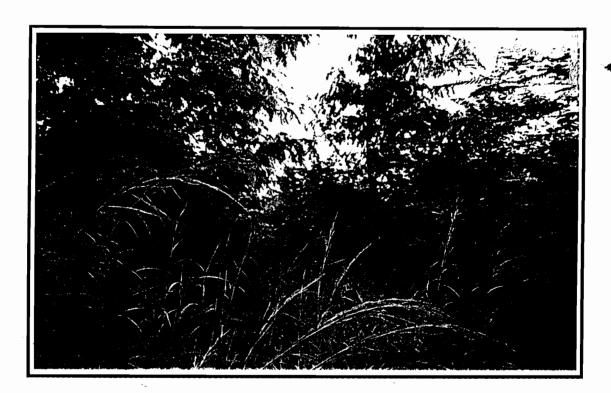
S.No.	Component	Estimated/Actual Expenditure
1.	Compensatory Afforestation	<u>2.44</u> 2.44
2.	Catchment Area Treatment	3.28 2.80
3.	Flora & Fauna	20.33 20.33
4.	Health	<u>29.63</u> 27.84
5.	Archaeology/Anthropology	<u>59.00</u> 36.33
6.	Seismicity & Rim Stability	23.00 12.50

(ii) Cost of Implementation (in lacs)-

S.No.	Component	Estimated/Actual Expenditure
1:	Compensatory Afforestation	1800.00 1014.00
2.	Catchment Area Treatment	8835.05 4802.43
. 3.	Flora&Fauna	<u>1650.00</u> Nil.
4.	Health	848.48 N.A.
5.	Archaeology/Anthropology	. <u>6819.20</u> 74.90
6.	Seismicity & Rim Stability	<u>N.A.</u> N.A.

Annex-XXXIII-Min-VI

इंदिरा सागर परियोजना एवं पयविरण संरक्षण



क्षतिपूर्ति वनीकरण



वनीकरण कार्यक्रम - जनभागीदारी

A STATE OF THE STA

इंदिरा सागर परियोजना एवं पर्यावरण संरक्षण

नर्मदा मध्यप्रदेश की सबसे बड़ी नदी होने के साथ ही पूर्व से पश्चिम की ओर बहने वाली भारत की सबसे लम्बी नदी है। यह आदिकाल से परम पवित्र एवं पूज्य है। इसके तट पर अनेक तीर्थ स्थल एवं प्रसिद्ध मंदिर हैं। मान्यता है कि गंगा नदी में स्नान के बाद जो पुण्य लाभ होता है वह इसके दर्शन मात्र से ही प्राणियों को सहज प्राप्त हो जाता है।

इसका जलग्रहण क्षेत्र मध्यप्रदेश में 24 जिलों में फैला है। ये जिले निम्नलिखित हैं -

1.	कवर्धा	2.	शहडोल	3.	डिन्डोरी
4.	मंडला	5.	जबलपुर	6.	कटनी
7.	दमोह	8.	सागर	9.	नरसिंहपुर
10.	होशंगाबाद	11.	हरदा	12.	सीहोर
13.	रायसेन	14.	बालाघाट	15.	सिवनी
16.	छिंदवाड़ा	17.	बैतूल ^{:-}	18.	देवास
19.	इंदौर	2 0.	खंडवा	21.	बड़वानी
22.	खरगौन	23.	धार	24.	झाबुआ

यह मैकल पर्वतमाला में अमरकंटक, जिला शहडोल से निकलती है। इसकी कुल लम्बाई 1312 किलोमीटर तथा जलग्रहण-क्षेत्र लगभग 98,796 वर्ग किलोमीटर है। मध्यप्रदेश में 1077 किलोमीटर बहने के बाद 35 किलोमीटर तक मध्यप्रदेश तथा महाराष्ट्र राज्यों की सीमा एवं 39 किलोमीटर तक महाराष्ट्र तथा गुजरात राज्य की सीमा बनाती हुई यह नदी गुजरात राज्य में बहकर खंभात की खाड़ी (अरब सागर) में गिरती है। इसका लगभग 82 प्रतिशत बहाव तथा 87 प्रतिशत जलग्रहण क्षेत्र मध्यप्रदेश में है।

नर्मदा जल पंचाट के निर्णय अनुसार 75 प्रतिशत निर्भरता पर इसकी जल संपदा 28 मिलियन एकड़ फुट आंकी गई है और इसमें से 18.25 मिलियन एकड़ फुट जल ग्रिश मध्यप्रदेश को मिली है। इस जलियि के समुचित दोहन के लिये 29 वृहद योजनायें, 135 मध्यम योजनाएं और 3000 लघु योजनाएं नर्मदा एवं इसकी सहायक नदियों पर बनाई जाना प्रस्तावित हैं। मध्यप्रदेश में स्थित नर्मदा घाटी (क) बरगी बांध से ऊपर का भाग (ख) बरगी

बांध और नर्मदा सागर बांध के बीच का भाग तथा (ग) नर्मदा सागर बांध के नीचे का भाग क्रमशः तीन अंचलों जैसे ऊपरी अंचल/कछार, मध्य अंचल/कछार तथा निचले अंचल/कछार में बांटा गया है। निचले अंचल में नर्मदा सागर संकुल (इंदिरा सागर, ओंकारेश्वर और महेश्वर परियोजनाएं) मध्यप्रदेश में तथा सरदार सरोवर परियोजना गुजरात राज्य में निर्माणाधीन है।

इंदिरा सागर परियोजना -

यह नर्मदा घाटी विकास की एक महत्वपूर्ण बहुउद्देशीय-जल विद्युत तथा सिंचाई परियोजना है जो मुख्य नदी पर ग्राम पुनासा, जिला खंडवा में निर्माणाधीन है। इस परियोजना का शिलान्यास स्व. श्रीमती इंदिरा गांधी तत्कालीन प्रधानमंत्री द्वारा 23 अक्टूबर 1984 को किया गया था। जल भंडारण क्षमता की दृष्टि से यह भारत की विशालतम नदी घाटी योजना है। जल संग्रहण क्षमता की श्रेष्ठ स्थिति के कारण इस परियोजना से विद्युत उत्पादन के बाद छोड़े गये पानी से नीचे स्थित ओंकारेश्वर और महेश्वर तथा गुजरात में सरदार सरोवर परियोजनाओं में भी बार-बार विद्युत उत्पादन होगा और सिंचाई भी होगी।अंतत: 8.12 मिलियन एकड़ फुट जल सरदार सरोवर परियोजना हेतु नियंत्रित जल प्रवाह के रूप में छोड़ा जायेगा।

इस परियोजना के प्रमुख विवरण निम्नानुसार हैं -

क्र.	अवयव	विवरण
1.	बांध स्थल	जिला खंडवा में पुनासा गांव के पास
2.	नदी उद्गम से बांध तक	61642
	जलग्रहण क्षेत्र-वर्ग कि.मी. में	. :
3.	औसत वर्षा- मि.मी. में	1288
4.	उपलब्ध जल की मात्रा-	
	75 प्रतिशत निर्धारिता पर एम.ए	.एफ. 21.47
	90 प्रतिशत निर्धारिता पर एम.ए	.एफ. 14.74
5.	जलाशय स्तर -	
	ऊपरी बांध सतह - मी.	267
	अधिकतम जल सतह - मी.	263.35
	पूर्ण जलाशय की सतह - मी.	262.13

पूर्ण जलाशय की सतह पर पानी	
का फैलाव वर्ग कि.मी.	913.48
6. जलाशय क्षमता - एम.ए.एफ.	9.900
उपयोगी क्षमता - एम.ए.एफ.	7.90
7. बांध (कांक्रीट)	
कुल लम्बाई - मी.	653
अधिकतम ऊंचाई - मी.	92
बांध के निकास द्वार	
(20 मी. x 17 मी.) - संख्या	20
8. विद्युत गृह प्रकार	सतह के नीचे
स्थापित विद्युत क्षमता - मेगावाट	1000 (8×125
9. डूब से प्रभावित ग्राम	249
10. डूब से प्रभावित जनसंख्या	80572
11. डूब से प्रभावित भूमि - हे.	
ू. कृषि भूमि	44363
अन्य भूमि	6653
वन भूमि	40332
12. रेल्वे लाइन का प्रत्यावर्तन-कि.मी.	57
13. नहरें	उद्वहन/बहाव
उद्वहन/बहाव	,
लम्बाई - कि.मी.	83
14. कमांड क्षेत्र	
प्रस्तावित सिचित क्षेत्र	1.23
लाख हेक्टेयर में	
15. प्राक्कलन (1988 मूल्य स्तर) - व	रोड़ रु. में
यूनिट -1 शीर्ष कार्य	832.32
यूनिट - 2 नहरें	541.98
यूनिट- 3 विद्युत	619.37
कमांड क्षेत्र विकास	50
जल ग्रहण क्षेत्र उपचार	124
योग-	2167.67
16. लाभ	
स्थापित विद्युत क्षमता - मेगावाट	1000
नियमित विद्युत क्षमता	
प्रारंभिक अवस्था में - मेगावाट	223.50
अंतिम अवस्था में - मेगावाट	118.30
ऊर्जा उत्पादन - जी.डब्ल्यू.एच	2015

संभावित सिंचाई - लाख हे. कमांड क्षेत्र में लाभान्वित ग्रामों की	1.23
संख्या	564
खाद्यान्न फसलों का उत्पादन	
लाख टन में	4.00
अन्य फसलों का उत्पादन	
लाख टन में	10.55
नगरपालिकाओं एवं औद्योगिक	
इकाईयों को जल प्रदाय -	
एम.ए.एफ.	0.06

- मध्यप्रदेश शासन द्वारा इस परियोजना को प्रशासनिक स्वीकृति दिनांक 5.11.1990 को प्रदान की गई। भारत सरकार से परियोजना को निम्नलिखित स्वीकृतियां मिल जाने पर बांध निर्माण कार्य प्रारंभ किया गया -

1. पर्यावरणीय दृष्टिकोण	भारत सरकार पर्यावरण एवं वन
से स्वीकृति	मंत्रालय से दिनांक 24.6.87
	को प्राप्त हुई। :
2. वन भूमि के गैर वनी	भारत सरकार पर्यावरण एवं वन
उपयोग की स्वीकृति	मंत्रालय से दिनांक 7.10.87
	को प्राप्त हुई।
3. परियोजना में धन	योजना आयोग द्वारा परियोजना
निवेश की स्वीकृति	दिनांक 6.9.89 को स्वीकृत
	की गई।

पर्यावरण संतुलन हेतु सुरक्षात्मक उपाय -

मानव अस्तित्व वनस्पित एवं अन्य जीव जन्तुओं के साथ ही अन्य भौतिक तत्वों के अस्तित्व पर निर्भर है। सृष्टि में सभी प्राणियों का अन्योन्याश्रित संबंध है। बड़े जलाशयों के निर्माण से एक ओर वर्षा की अनिश्चितता से निपटना संभव होता है और बड़े क्षेत्र में सिंचाई उपलब्ध हो जाती है तो दूसरी ओर बहुत बड़े क्षेत्र डूब में आते हैं। कई पारिस्थितिकीय परिवर्तन भी होते हैं और परियोजना निर्माण के साथ-साथ संभावी पर्यावरणीय हानियों से बचाव आवश्यक हो जाते हैं।

इस परियोजना के डूब में सुरक्षा की दृष्टि से जो भी बातें ध्यान में आईं उन पर समुचित विचार किया गया। भारत सरकार, पर्यावरण एवं वन मंत्रालय द्वारा जारी पर्यावरणीय स्वीकृति में निम्नलिखित पर्यावरणीय पहलू इंगित हैं।

- 1. जलग्रहण क्षेत्र उपचार
- 2. क्षतिपूर्ति वनीकरण
- 3. सैंच्य क्षेत्र विकास
- फलोरा एवं फौना, तथा परियोजना के आसपास के क्षेत्र की संवाहन क्षमता
- 5. भूकंपीयता एवं जलाशय संपन्नता
- 6. स्वास्थ्य
- 7. पुरातत्व एवं मानव विज्ञानिकी
- 8. विस्थापितों का पुनर्वास

परियोजना को भारत सरकार से मिली स्वीकृतियों में उपर्युक्त पहलुओं से संबंधित विभिन्न अध्ययनों एवं कार्यों के क्रियान्वयन की अनिवार्यता अंकित है। इन पहलुओं पर संपन्न कार्यवाही निम्नानुसार है -

1. चरणबद्ध जलग्रहण क्षेत्र उपचार -

इंदिरा सागर परियोजना का स्वतंत्र जलग्रहण क्षेत्र बरगी बांध तक 39,25,422 हेक्टर है। जलाशय एवं जलग्रहण क्षेत्र का घनिष्ट संबंध है। जलग्रहण क्षेत्र की जल संचय क्षमता बढ़ाने तथा जलाशय में मिट्टी भराव की दर घटाने के लिये इसमें भूमि एवं जल संरक्षण हेतु उपाय किये जाना आवश्यक हैं। भारत सरकार, जल संसाधन मंत्रालय द्वारा जारी मार्गदर्शिकाओं के अनुसार जलाशय में केवल सीधे जल निकासी करने वाले अतिउच्च प्राथमिकता युक्त उपजलग्रहणक्षेत्रों, का उपचार बांध निर्माण के साथ-साथ परियोजना लागत पर किया जाना है। इतने बड़े जलग्रहणक्षेत्र में उपचार किये जाने के पूर्व क्षरणशील क्षेत्रों की पहचान की जाना आवश्यक था। अतः उपजलग्रहणक्षेत्र स्तर पर प्राथमिकता निर्धारण भारत सरकार, कृषि एवं सहकारिता मंत्रालय के अंतर्गत अखिल भारतीय मृदा एवं भूमि उपयोग संस्थान द्वारा किया गया। अंति उच्च एवं उच्च प्राथमिकता युक्त उपजलग्रहणक्षेत्रों में से जलाशय तट पर सीधे जल निकासी करने वाले 30 उपजलग्रहणक्षेत्र चिन्हित किये गये हैं। इनका क्षेत्रफल 73,456 हैक्टर है जिसमें 62,975 हेक्टर उपचार योग्य है। स्वतंत्र जल निकासी करने वाले अति उच्च प्राथमिकता युक्त उपजलप्रहणक्षेत्रों की संख्या 478 तथा क्षेत्रफल 10,12,650 हेक्टर है जिसमें से 9,15,150 हेक्टर में उपचार किया जाना प्रस्तावित है। इन स्वतंत्र जल निकासी उपजलग्रहणक्षेत्रों का उपचार परियोजना के अलावा

अन्य स्रोतों से किया जाना है। सीधे जल निकासी करने वाले उपजलग्रहणक्षेत्रों की कार्यप्रगति निम्नानुसार है -

क्षेत्र का प्रकार	जलप्रहणक्षेत्र उपचार		
	लक्ष्य हेक्टर	प्रगति हेक्टर (मार्च,1998)	
वन क्षेत्र	11048	2863	
गैर वन क्षेत्र	51927	37120	

उपरोक्त के अतिरिक्त जलाशय में स्वतंत्र जल निकासी करने वाले उपर्युक्त उपजलग्रहणक्षेत्रों का उपचार भारत सरकार की नदी घाटी योजना से प्राप्त धन राशि से प्रारंभ हो चुका है। इसमें 1674 हेक्टेयर में उपचार कार्य किये गये हैं।

जलग्रहण क्षेत्र उपचार कार्यों के अंतर्गत भूमि एवं जल संरक्षण के उपाय जैसे सर्वोच्च बंधान (खेतों की मेड़ों से यथा संभव सामंजस्य रखते हुए), नाला बंधान, व्यपवर्तन बंधान, बोल्डर बंधान, चारागाह विकास, वानस्पतिक बंधान- मिट्टी की आधार मार्गदर्शिकाओं सिहत, पेरीफेरल बंधान, रन आफ मेनेजमेंट स्ट्रक्चर्स, मार्जिनल बंधान इत्यदि कार्य गैर वन भूमि पर तथा वन भूमि पर वृक्षारोपण/वनीकरण कार्य, चारागाह विकास, गली अवरोधक बंधान, बोल्डर बंधान, कंटूर ट्रेंच इत्यदि बनाये जाते हैं।

उपर्युक्त कार्यों से वर्षा स्थान पर भूमि एवं जल संरक्षण होने के कारण भूमि कटाव रुकेगा तथा भूजल स्तर/उपलब्धता - जल संचय क्षमता बढ़ेगी। चारागाह विकसित हो जाने से स्थानीय लोगों को घास चारे की पूर्ति प्रारंभ हो गयी है। वनीकरण से ईंधन लकड़ी एवं फलोद्यानों/फलदार वृक्षों से फलों की जरूरतें भी पूरी हो सकेगी। इसके अतिरिक्त उपचार कार्यों के दौरान स्थानीय लोगों को रोजगार उपलब्ध तो हुआ ही है वरन् जमीन में बेहतर भूमि और जल संरक्षण के दौरान कृषि कार्य बढ़े है एवं उत्पादन में पहले की अपेक्षा वृद्धि भी प्रत्याशित है।

2. क्षतिपूर्ति वनीकरण -

इंदिरा सागर परियोजना के अंतर्गत डूब एवं अन्य कार्यों में काफी बड़े वन क्षेत्र प्रभावित होंगे। इस प्रकार गैर वनी उपयोग से वनों की होने वाली हानि की पूर्ति के लिये एक विशाल क्षतिपूर्ति वनीकरण योजना हाथ में ली गई है। इसके अनुसार 70802 हे. बिगड़े वन क्षेत्रों में तथा 10143 हे. राजस्व भूमि में वनीकरण

कार्य किये जाना हैं। इसके लिये क्षेत्रों की पहचान की जाकर कार्य प्रारंभ किये गुये हैं।

इन क्षेत्रों के जिलेवार विवरण निम्नानुसार हैं -

क्रमांक	जिला	बिगड़े वन हे.	गैर वन क्षेत्र- हे.
1.	खंडवा	30,572	2,314
2.	होशंगाबाद	22,739	2,842
3.	देवास	17,491	802
4.	सीहोर	_	1,247
5.	धार	_	1,001
6.	खरगौन	_	1,937
	योग	70,802	10,143

कार्य प्रगति :

मार्च, 1998 तक 67,133 हे. क्षेत्र में क्षतिपूर्ति वनीकरण किया जा चुका है। स्थानीय लोगों की आवश्यकता को ध्यान में रखते हुए वृक्षों की प्रजातियां लगाई गई हैं जिससे पर्यावरण में सुधार होगा और भविष्य में ग्रामीणों की जरूरतें पूरी हो सकेंगी। रोपित क्षेत्रों में उत्पन्न घास कृषकों तथा स्थानीय लोगों को निशुल्क दी जाती है। वनीकरण की इस योजना के क्रियान्वयन से उन्हें बड़े पैमाने पर रोजगार भी उपलब्ध हो रहा है। इन कारणों से स्थानीय लोगों का वनों के प्रति लगाव बढ़ रहा है। जंगलों की सुरक्षा के लिये उनसे अपेक्षित सहयोग में वृद्धि हुई है। इस संबंध में कई वन सुरक्षा समितियां स्थापित की गई हैं और उनका उद्देश्य सफल पाया गया है।

3. सैंच्य क्षेत्र विकास -

इंदिरा सागर बांध में 1,23,000 है. कृषि भूमि सिंचित होगी। सिचाई जल को खेतों तक पहुंचाने के लिये नहरों का जाल बिछाया जाना है।

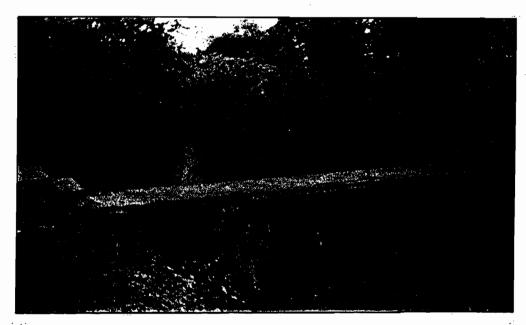
सिद्धांतत: सिंचाई जल का उपयोग इस प्रकार किया जाना चाहिए कि खेतों में पानी के फैलने का समय जमीन के अंदर जड़ क्षेत्र (root zone) में पानी पहुंचने में लगे समय के बराबर हो। ऐसा करने के लिये जमीन का ढाल घटाना आवश्यक होता है किन्तु वर्षा की तीव्रता अनिश्चित होती है और जमीन पर बहने वाला पानी सिंचाई सुविधा आने के पहले उपलब्ध ढाल से कम ढाल होने के कारण जल्दी नहीं निकल पाता है। कृषि भूमि में 72 घंटे से अधिक समय का जल भराव पैदावार के लिये हानिकारक होता है। इस बात को भी ध्यान में रखते हुए कन्सिल्टिंग इंजीनियरिंग सर्विसेज, नई दिल्ली से सतही एवं उपसतही जल निकास संबंधी अध्ययन कराया गया है। इसके निष्कर्षों को सैंच्य क्षेत्र विकास कार्यक्रम बनाने में ध्यान में रखा गया है।

सिंचाई जल आसानी से उपलब्ध होने पर कृषक अधिकाधिक जल उपयोग में लाते है। फलस्वरूप भूजल स्तर बढ़ने की आशंका बनती है। सामान्यतया भूजल स्तर जमीन सतह से 2.5 मीटर से अधिक गहराई पर होना चाहिये, तभी मुख्य फसलों की लाभकारी खेती संभव होती है। इससे विपरीत परिस्थितियों में भविष्य में कहीं-कहीं दलदलीकरण और कृषि भूमि ऊसर होने की समस्या आ सकती है। इस समस्या के निराकरण के लिये भारतीय विज्ञान संस्थान, बेंगलौर से भूजल प्रतिरूपण अध्ययन कर लिया गया है। सैंच्य क्षेत्र विकास कार्यक्रम में इस अध्ययन की अनुशंसाओं के अनुसार भूजल एवं सतही जल उपयोग का प्रावधान किया गया है।

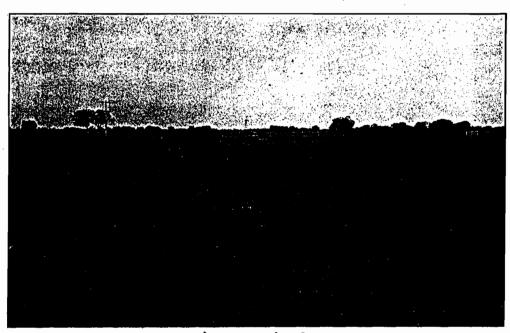
चूंकि सिंचित क्षेत्र होने के कारण अधिक पैदावार/लाभ की गुंजाइश होती है, अतः इसके लिये सिंचित फसलों के बीजों के अलावा रासायनिक खाद, कीट एवं खरपतवार नाशक दवाओं के उपयोग में वृद्धि होती है। इस तरह खेतों में प्रयुक्त रसायनों के सतही एवं भूजल में पहुंचने की आशंका बनती है जिससे भूजल और सतही जल प्रदूषित हो सकता है। ऐसे प्रदूषण के लिये इस परियोजना का क्षेत्र कितना संवेदनशील है, यह ज्ञात करने के लिये जवाहरलाल नेहरू कृषि विश्वविद्यालय, जबलपुर के वैज्ञानिकों से अध्ययन कराया जा रहा है। अध्ययन निष्कर्षों के अनुसार कार्यवाही की जावेगी तािक पर्यावरण प्रदूषित न हो।

राज्य शासन ने सैंच्य क्षेत्र विकास की एक योजना भारत सरकार को प्रस्तुत की है, जिसमें अधिक पैदावार के कारण अनाज एवं अन्य उत्पादनों के संसाधन और विक्रय इत्यादि की व्यवस्थाएं रखी गई हैं। इस योजना में उपर्युक्त सभी बातों के लिये निम्नानुसार प्रावधान किये गये हैं -

1. प्रक्षेत्र विकास कार्य - इसमें आवश्यकतानुसार भूमि समतलीकरण, भूमि समरूपण, जलनिकास सुविधाओं का विकास, खेतों तक सिंचाई नालियों का निर्माण, खेतों तक पहुंच मार्गों का विकास आदि सम्मिलित हैं।



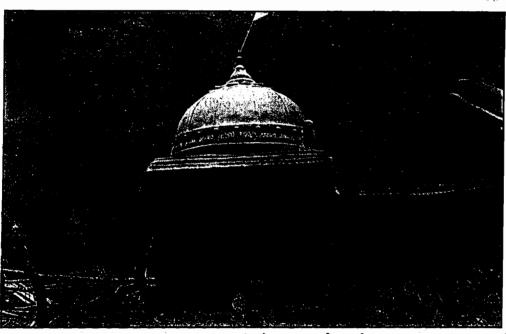
--जलग्रहण क्षेत्र उपचार कार्य-रन आफ मेनेजमेंट स्ट्रक्चर्स



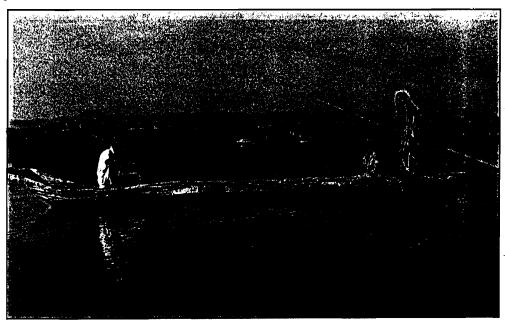
जलग्रहण क्षेत्र उपचार कार्य - फील्ड बंधान



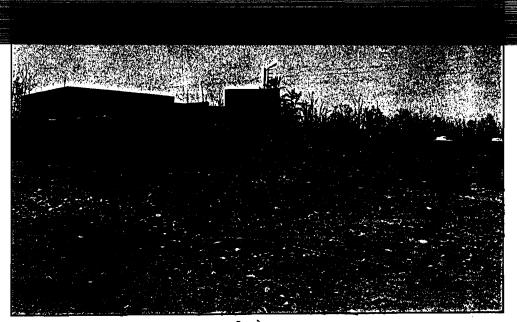
जलग्रहण क्षेत्र उपचार कार्य - नाला बंधान



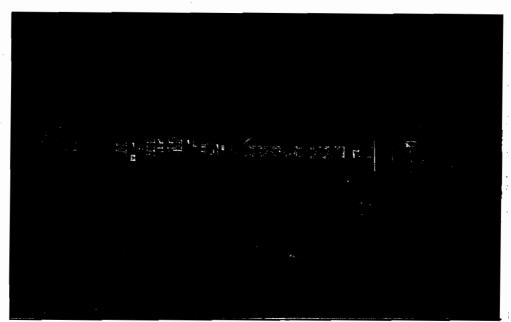
डूब स्थित शिव मंदिर धारी कोटला (पुनर्स्थापन पूर्व)



मतस्य आखेट



भूंकपीय वेषशाला



छनेरा पुनर्बसाहट स्थल (नया हरसूद)



आयुर्वेदिक औषद्यालय

- सतही जल एवं भूजल का उपयोग भूजल स्तर का बढ़नी रोकने के लिये नहरों से सिंचाई के साथ-साथ कुओं का विकास भी कराया जावेगा तथा सिंचाई आवश्यकता की पूर्ति कुओं के जल से भी की जावेगी।
- 3. कृषि उद्योगों का विकास सैंच्य क्षेत्र में बढ़ी पैदावार को सैंच्य क्षेत्र में संसाधित किये जाने के लिये आवश्यक उद्योग जैसे शक्कर मिल, कपास, जिनिंग फैक्टरी, पुठ्ठामिल, तेल मिल इत्यादि के विकास को भी शामिल किया गया है।
- 4. नियंत्रित मंडियों का विकास सैंच्य क्षेत्र की पैदावार का विपणन सुगम बनाने तथा कृषकों को उनकी पैदावार की सही कीमत दिलवाने के लिये नियंत्रित मंडियाँ विकसित की जाना भी प्रस्तावित है।
- 5. अनाज भंडार गृहों की सुविधा -अनाज की बढ़ी पैदावार के सुरक्षित भंडारण के लिये और भंडार गृह निर्मित किये जावेंगे ताकि कृषक आसानी से फसल का भंडारण कर सकें और विभिन्न नुकसानों से बच सकें।
- 6. सिंचित वनीकरण परियोजना क्षेत्रों में नहरों, सड़कों के किनारे वृक्षारोपण के साथ-साथ कृषकों की अकृषि भूमि पर वृक्षों के रोपण को सिंचित खेती के रूप में प्रोत्साहित किया जावेगा।
- 7. सड़कों का विकास खेतों से खिलहानों एवं गांवों को तथा गांवों को अनाज मंडी तथा मुख्य सड़कों से जोड़ने की आवश्यकता को ध्यान में रखा गया है।
- 4. <u>वन्य प्राणी/जीव जन्तु एवं वनस्पति तथा</u>
 परियोजना के प्रभाव क्षेत्र की संवाहन क्षमता
 अ- वन्य प्राणी/जीवजन्तु एवं वनस्पति संबंधी
 सुरक्षात्मक उपाय -

इंदिरा सागर परियोजना की डूब में आने वाले जल क्षेत्रों में कई प्रकार के पेड़-पौधे, जड़ी-बूटियां, जलीय जन्तु एवं वन्य प्राणी पाये जाते हैं। वनों के डूबने से पूर्व दुर्लभ एवं संकटाधीन प्रजातियां यदि कोई हों तो उनका विशेष ध्यान रखा जाना आवश्यक होगा ताकि भविष्य में ये लुप्त न हो जावें। वन्य प्राणियों की डूब क्षेत्र से लगे हुए एवं नजदीकी वन क्षेत्रों में सुरक्षित बसाहट भी अत्यंत महत्वपूर्ण है। इतना ही नहीं वरन् प्रामीण एवं स्थानीय लोगों के जीवन भी वनों पर निर्भर हैं। अतः इनकी जरूरतों का आंकलन तथा इनकी पूर्ति सुगम बनाने के उपायों को जानना आवश्यक है। उपर्युक्त सभी पहलुओं पर जानकारी/आंकड़े एकत्रित करने और कारगर उपाय ज्ञात करने के लिये निम्नलिखित अध्ययन कराये गये हैं -

- वन्य जीवों का सुरक्षित पुनर्स्थापन तथा संरक्षण योजना, द्वारा प्रकृति के मित्र संस्थान, भोपाल
- नर्मदा सागर और ओंकारेश्वर पिरयोजनाओं के प्रभाव क्षेत्र में वन्य प्राणी/ जीव-जन्तुओं एवं वनस्पित तथा मानवीय पहलुओं का अध्ययन, द्वारा भारतीय वन्य प्राणी संस्थान, देहरादून।

उपर्युक्त अध्ययनों से प्राप्त विवरणों के आधार पर एक कार्य योजना तैयार की जा रही है, जो परियोजना व्यय पर क्रियान्वित की जावेगी। अध्ययनों में की गई अनुशंसाओं के अनुसार निम्नलिखित एक राष्ट्रीय उद्यान एवं दो वन्य प्राणी अभ्यारण्यों के प्रस्ताव राज्य शासन के विचाराधीन हैं।

	संरक्षित क्षेत्र	जिला					
1.	ओंकारेश्वर राष्ट्रीय उद्यान,	ेदेवास एवं खण्डवा					
2.	सुरमान्या अभ्यारण	देवास एवं खण्डवा					
3.	मान्धाता अभ्यारण	देवास एवं खण्डवा					
	इनका गठन शीघ्र होने की संभावना है।						

ब- नदी जल गुणवत्ता एवं मत्स्य विकास -

आमतौर पर बड़े बांधों के निर्माण से पर्यावरणीय पारिस्थितिकीय एवं सरोवर विज्ञान से संबंधित परिवर्तन होते हैं जिनसे नदी जल की गुणवत्ता, जलीय वनस्पति एवं जीव जन्तु और स्थानीय मानव आबादी कई तरह से प्रभावित होती है। इस परिप्रेक्ष्य में यह आवश्यक समझा गया कि जलाशय निर्माण से पूर्व एवं बाद के चरणों में सरोवर विज्ञान संबंधी अध्ययन कराये जावें तािक बांध के कारण नदी जल की गुणवत्ता में विभिन्न अंतरालों में आने वाले अच्छे एवं बुरे बदलाव का अनुमान लग सके।

अतः मध्यप्रदेश के तीन विश्वविद्यालयों यथा उंचले नर्मदा कछार में बरगी जलाशय का अध्ययन रानी दुर्गावती विश्वविद्यालय, जबलपुर, मध्य नर्मदा कछार में तवा, बारना एवं कोलार जलाशय का अध्ययन बरकतउल्ला विश्वविद्यालय, भोपाल तथा निचले नर्मदा कछार का अध्ययन विक्रम विश्वविद्यालय, उज्जैन से कराया।

इन अध्ययनों के अनुसार इस बात का संकेत मिला है कि बहते हुए नदी जल को रोके जाने के कारण उसकी गुणवत्ता तथा जलीय वनस्पित इत्यादि में बदलाव आयेगा। प्रतिवेदन में उल्लेख है कि अध्ययन को आगे जारी रखा जाना चाहिये ताकि विभिन्न अंतरालों में जल गुणवत्ता तथा जलीय वनस्पित एवं जीव जन्तुओं में आये परिवर्तनों की पहचान हो सके और पर्यावरण पर पड़ने वाले कुप्रभावों से बचाव के उपाय समय रहते अपनाये जा सकें।

इंदिरा सागर जलाशय में मत्स्य विकास हेतु एक योजना वर्ष 1984 में उपलब्ध विवरणों के आधार पर तैयार की गई थी। इसके बाद उपर्युक्त सरोवर विज्ञानी अध्ययन के अलावा सेन्ट्रल इनलेंड केप्चर फिशरीज रिसर्च इंस्टीट्यूट बैरकपुर, कलकत्ता ने वर्ष 1993 में नर्मदा सागर, सरदार सरोवर और उसके निचले अंचल से संबंधित जानकारी का डेस्क पुनरीक्षण किया है। प्रकृति के मित्र संस्था, भोपाल द्वारा किये गये अध्ययन में मत्स्य की काफी जानकारी उपलब्ध हुई है। उपरोक्त अध्ययनों के आधार पर इस परियोजना में मत्स्य विकास के लिये पूर्व में बनाई गयी योजना पुनरीक्षित की जा रही है।

महासीर मछली नर्मदा नदी में पाई जाने वाली प्रमुख मछली है जिसका संरक्षण एवं विकास बाबत् अध्ययन आवश्यक है। इसके लिये इंदिरा सागर परियोजना में महासीर हैचरी योजना तैयार की गई है। इसके तहत महासीर मछली की विस्तृत जानकारी प्राप्त करने हेतु नर्मदा नदी के विभिन्न क्षेत्रों के गहरे दहों से एवं नदी के आस-पास लगने वाले प्रमुख बाजारों एवं मत्स्य अवतरण के केन्द्रों से महासीर मछली की सांख्यकीय एकत्र की जा रही है। महासीर मछली के बीज उत्पादन हेतु हेचरी निर्माण के लिये उपयुक्त भूमि स्थल चयन बाबत् सर्वेक्षण किया जा रहा है।

नर्मदा नियंत्रण प्राधिकरण द्वारा मत्स्य विकास संरक्षण हेतु मार्गदर्शिकाएं सुझाने के लिये एक निपुण दल गठित किया गया था। इससे प्राप्त मार्गदर्शिकाएं राज्य शासन के विचाराधीन हैं।

5. भूकंपीयता तथा जलाशय संपन्नता सक्षमता एवं

तट स्थायित्वता आदि -

भूकंपीयता -

नर्मदा सागर संकुल परियोजनाओं इंदिरा सागर, ओंकारेश्वर एवं महेश्वर बैराज के अंतर्गत देश का विशालतम जलाशय इंदिरा सागर में बनेगा। इन बांधों में भूकंपीयता संबंधी पहलू विचार में लिया गया है। नर्मदा सागर बांध के पुनरीक्षण दल, केन्द्रीय जल आयोग, नई दिल्ली, केन्द्रीय जल एवं ऊर्जा अनुसंधान केन्द्र, पूना और भारतीय मौसम विभाग, नई दिल्ली द्वारा की गई अनुशंसाओं के अनुसार नर्मदा घाटी विकास प्राधिकरण के नर्मदा सागर संकुल परियोजनाओं के चहुं ओर फैले क्षेत्र में भूकंपीयता संबंधी अध्ययन हेतु निम्नानुसार 10 वेधशालाओं का जाल बिछाने का निर्णय लिया है।

- 1. नर्मदा सागर (केन्द्रीय स्टेशन)
- 2. ओंकारेश्वर (कोठी)
- 3. महेश्वर
- इंदौर
- 5. खंडवा
- 6. बड़वानी
- 7. हीरापुर (हरदा)
- 8. कन्नौद
- 9. बागली (चापड़ा)
- 10. छनेरा।

उक्त वेधशालाओं में से 9 का निर्माण हो चुका है एवं शेष एक में कार्यवाही प्रगति पर है।

प्रारंभ में नर्मदा घाटी विकास प्राधिकरण द्वारा जलाशय निर्माण से पूर्व की स्थिति में भूकंपीयता संबंधी अध्ययन केन्द्रीय जल एवं ऊर्जा अनुसंधान केन्द्र, पूना को तब तक के लिये सौंपे गये जब तक कि प्राधिकरण स्वयं के यंत्र स्थापित नहीं कर लेता। तद्नुसार इस संस्थान द्वारा अपने यंत्र स्थापित कर नर्मदा नगर तथा ओंकारेश्वर में वर्ष 1987 में एवं महेश्वर में वर्ष 1991 में अध्ययन प्रारंभ किये गये और संकलित आंकड़ों का विश्लेषण किया गया।

तत्पश्चात् भारतीय मौसम विभाग की अनुशंसा पर उपर्युक्त

10 वेधशालाओं हेत् 10 माईक्रो भूकंप मापी यंत्र प्राप्त किये गये। इन्हें वर्ष 1991 में नर्मदा नगर, ओंकारेश्वर एवं महेश्वर में तथा हाल ही में खंडवा में स्थापित कर लिया गया है। शेष स्थानों पर यंत्र स्थापना कार्य प्रगति पर है। इसके अतिरिक्त भारतीय मौसम विभाग के सुझाये अनुसार वुड एंडरसन सिस्मोग्राफ के छह सेट प्राप्त किये जा रहे हैं। अभी तक चार सेट प्राप्त हो चुके हैं जिनकी स्थापना निकट भविष्य में किये जाने की संभावना है। इन यंत्रों से आंकड़े एकत्र करने का कार्य प्राधिकरण के कर्मचारियों/अधिकारियों द्वारा किया जा रहा है। इन आंकड़ों के विश्लेषण हेतु भारतीय मौसम विभाग से अनुरोध किया गया है। इस बीच प्राधिकरण आंकड़े एकत्र करने तथा विश्लेषण कार्यों में रत/लगाये जाने वाले अमले को यंत्र निर्माण कर्ताओं एवं भारतीय मौसम विभाग के पास प्रशिक्षित भी करा रहा है ताकि यंत्रों का रख रखाव एवं आंकड़ों का विश्लेषण सुचारू रूप से संभव रहे। इतना ही नहीं प्राधिकरण भूकंपीयता संबंधी अध्ययन हेतु आंकड़ों की प्राप्ति के लिये कम्प्यूटर पर आधारित आधुनिक/उन्नत भूकंपमापी यंत्र भी विदेशों से मंगा रहा है। इनकी पहली खेप आ चुकी है।

जलाशय संपन्नता -

जलाशय में एकत्रित जल की भूगर्भीय बहाव से हानि एवं जलाशय तट के टूट कर गिरने से उत्पन्न भारी जल तरंगें बांध के ऊपर से जल बहाव तो पैदा नहीं करेगी, इन बातों के अध्ययन भारतीय भू-वैज्ञानिक सर्वेक्षण दल से करा लिये गये हैं। इन अध्ययनों में सुझाई गई सावधानियां बरती जा रही हैं।

6. स्वास्थ्य पहलू -

बांध निर्माण के कारण जन स्वास्थ्य सुविधाओं पर कई प्रकार से प्रभाव पड़ सकते हैं, जैसे स्वास्थ्य केन्द्र डूब में आने के कारण स्वास्थ्य सुविधाओं में कमी आ सकती है, डूब क्षेत्र के विस्थापितों को जिन इलाकों में बसाया जाना है वहां जनसंख्या बढ़ जाने के कारण जारी स्वास्थ्य सुविधाओं का अपर्याप्त हो जाना इत्यादि। साथ ही बांध स्थल पर निर्माण कार्यों के लिये हजारों व्यक्ति कार्यरत रहते हैं एवं परियोजना प्रभावित क्षेत्रों में कई अन्य स्थानों पर भी सड़क, पुल एवं भवन निर्माण कार्यों में भी श्रमिक इत्यादि कार्यरत रहते हैं जिनके स्वास्थ्य का भी ध्यान रखा जाना आवश्यक होता है। उपर्युक्त सभी बातों को ध्यान में रखते हुए नर्मदा घाटी विकास प्राधिकरण द्वारा रुपये 748.73 लाख की स्वास्थ्य योजना तैयार की गई है। इसमें इंदिरा सागर परियोजना के लिये रुपये 303.92

लाख का प्रावधान है। इस योजना के अंतर्गत पुनासा में एक चिकित्सालय स्थापित किया गया है जो बांध निर्माण में रत व्यक्तियों को चिकित्सा सुविधा उपलब्ध करा रहा है।

जलाशय उत्पन्न करने वाली परियोजनाओं से हमेशा पारिस्थितिकीय परिवर्तन होते हैं और वातावरण में नमी एवं रसायनों के बहाव इत्यादि से जल गुणवत्ता का ह्रास तथा सैंच्य क्षेत्र में रुके जल के स्थान या कई डबरे उत्पन्न होने के कारण कीड़े-मकोड़ों या कीटाणु संवाहक जीव-जन्तुओं जैसे मक्खी, मच्छरों इत्यादि में वृद्धि होती है। इनके कारण मलेरिया, फाईलेरिया, हैजा, पीलिया, अस्थमा इत्यादि बीमारियां फैल सकती हैं। स्थानीय लोग इनसे पीड़ित हो सकते हैं।

बांध निर्माण से पूर्व परियोजना प्रभावित क्षेत्रों में जन स्वास्थ्य संबंधी क्या स्थिति है और बाद में क्या स्थिति हो सकती है, तथा संभावी बीमारियों की रोकथाम एवं चिकित्सा के उपाय जानने के लिये ये अध्ययन गांधी चिकित्सा महाविद्यालय, भोपाल को सौंपा गया है जो अंतिम चरण में है।

7. पुरातत्वीय एवं मानव विज्ञानकीय पहलू -

संपूर्ण विश्व में पुरातन संस्कृति नदी घाटी संस्कृति पर आधारित है। नर्मदा घाटी भी पुरातत्व धरोहरों से भरी पड़ी है। नर्मदा नदी के समस्त तटवर्ती क्षेत्रों में प्रागैतिहासिक, आद्योतिहासिक एवं मध्ययुगीन संस्कृति एवं पुरा स्मारक विद्यमान हैं। इन तथ्यों को ध्यान में रखते हुए इंदिरा सागर परियोजनांतर्गत डूब में आने वाले कुल 249 ग्रामों के पुरासंपदा के पुनर्स्थापन एवं संरक्षण हेतु वर्ष 1993 में कार्य योजना तैयार की गई। डूब क्षेत्र से प्रतिमाओं का संकलन निम्नानुसार कराया गया है।

- जिला होशंगाबाद
 ग्राम उवाँ, बिछौला, खेड़ी नेमा तथा हंडिया
- 25 प्रतिमाएं
- जिला देवास -ग्राम- राजोर, नेमावर, खातेगांव, नवाड़ा, निमनपुर, दैय्यत
- 49 प्रतिमाएं
- जिला खंडवा-ग्राम- धारी कोटला, जमोरी, 60 प्रतिमाएं नवगांव, बड़केश्वर, आशापुर, नवगांव, चांदेल

कुल प्रतिमाएं - 134 प्रतिमाएं

इस प्रकार संग्रहित प्रतिमाएं जिला संग्रहालय होशंगाबाद, देवास तथा जिला पुरातत्व संग्रहालय, खंडवा में संग्रहित हैं। इसी पिरयोजना में डूब से प्रभावित क्षेत्र के ग्राम खेड़ीनुमा जिला होशंगाबाद में राज्य शासन के पुरातत्व एवं संग्रहालय विभाग के द्वारा उत्खनन का कार्य किया गया। इस कार्य के दौरान नर्मदा घाटी के प्राचीन सम्पदा के पुरावशेष सामग्रियों तथा मुगल काल के पक्की मिट्टी के स्टायर, लोहे की कील, छल्ले, कांच के मनके, चूड़ियों के दुकड़े, तांबे के सिक्के, मानव मस्तक, मानव, आकृति, चाकू, पीतल के पुरावशेष कान के आभूषण, लोहे तथा पीतल के बर्तन, औजार इत्यादि प्राप्त हुआ है। इसके अलावा शक कुषाण शुंगकाल तथा मौर्यकालीन सभ्यता की उपर्युक्त वर्णित वस्तुएं भी प्राप्त हुई हैं।

वर्ष 1993 की कार्य योजना को सन् 1997 में पुनरीक्षित किया गया है जिसके अनुसार पुनर्स्थापन हेतु 10 स्मारक एवं पांच पुरातत्वीय टीले उत्खनन हेतु प्रस्तावित हैं। इन उत्खननों से प्राप्त सामग्री के संग्रहण हेतु खंडवा संग्रहालय एवं भोपाल में नर्मदा दीर्घा की व्यवस्था भी की जा रही है।-

हरदा जिले में हंडिया के समीप नर्मदा तट पर जोगा नाम का एक किला स्थित है जिसका संरक्षण केन्द्र सरकार के द्वारा किया जाता है। कहा जाता है कि इस किले को मुगल समाट औरंगजेब द्वारा एक पुराने किले की नींव पर बनवाया गया था। यह किला डूब में नहीं है किन्तु इसका उत्तरी बुर्ज काफी नीचे स्थित है और नदी जल के निघर्षण से प्रभावित है। इसकी सुरक्षा हेतु अध्ययन किया जा रहा है।

मानव विज्ञानिकीय पहलू -

इंदिरा सागर परियोजना के डूब क्षेत्र की मानव विज्ञानकीय जानकारी पर्याप्त मात्रा में उपलब्ध है। नर्मदा घाटी विकास प्राधिकरण द्वारा आदिवासी कला और हस्त कलाओं के सर्वेक्षणों का कार्य मध्यप्रदेश आदिवासी कला परिषद को सौंपा गया था जो पूर्ण हो चुका है एवं इसका प्रतिवेदन भी प्राप्त हो चुका है।

राष्ट्रीय मानव संग्रहालय ने जैव सांस्कृतिक सामग्री को संग्रहित करने के लिये एक कार्य समूह बनाया है। इसके अतिरिक्त भारतीय मानव वैज्ञानिकीय सर्वेक्षण के अंतर्गत भी इन पहलुओं को 'भारत के लोग' नामक अध्ययन में शामिल किया है। इन्होंने 'नर्मदा साल्वेज योजना' भी प्रारंभ की है।

ये समस्त विवरण एवं जैव सांस्कृतिक सामग्री परियोजना डूब से विस्थापित आदिवासी परिवारों की संस्कृति समझने में सहायक होगी और इनके आधार पर उनका कारगर पुनर्वास किया जा सकेगा।

8. परियोजना के विस्थापितों का पुनर्वास -

इंदिरा सागर परियोजना के निर्माण के फलस्वरूप खंडवा होशंगाबाद एवं देवास जिलों के कुल 249 ग्रामों (69 आंशिक तथा 180 पूर्ण) की 44,363 हेक्टेयर निजी भूमि तथा 80,572 जनसंख्या प्रभावित होगी। राज्य शासन ने एक दीर्घकालीन पुनर्वास नीति निर्धारित की है। तदनुसार पुनर्वास का कार्य प्रगति पर है।

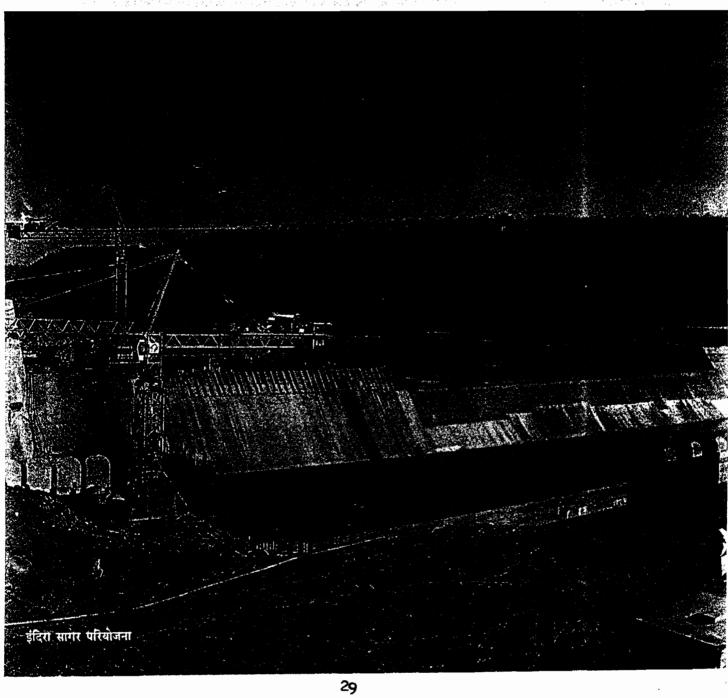
खंडवा जिले का हरसूद तहसील मुख्यालय डूब से प्रभावित शहरी क्षेत्र है। इस नगर की पुनर्बसाहट के लिये अत्याधुनिक सुविधाओं से सम्पन्न एक आदर्श नगर न्यू हरसूद ग्राम छनेरा के पास निर्माणाधीन है।

इंदिरा सागर परियोजना के निर्माण एवं डूब से प्रभावित ग्राम धारी कोटला के 32 परिवारों को ग्राम सरल्या में सम्पूर्ण आवश्यक सुविधाओं के साथ बसाया गया है।



वन्य प्राणियों का संरक्षण





Annex-XXXIII-Min-VII

SUYOGIDENSITY.PM5

30

(MAHARASHTRA)

YEARWISE WORK DONE AND EXPENDITURE INCURRED IN DIRECTLY DRAINING SUBMITTED IN NANDURBAR DIVISION

(Rs. in Lakhs)

		~-				•					4. 1	X			7 - 1,11	
		WC	PRK DO	NE - 19	94-95				. W(ORK DON	IE - 195-	93	W	ORK DON	E - 1996-	
Sr. No.	Name of Sub Division	Included Villages in Sub. W.	Code Nos.	includ- ed Bl. Nos.	Area in Ha.	Loose Boulder (Nos.)	Contour St. Bund (R.V.V.)	Sanct. Amt.	IMP. Area (HA.)	Loose Boulder (Nos.)	Corcur St. End (R.M.)		IMP. Area (HA.)	Loose Boulder (Nos.)	Contour St. Bund (R.V.V.)	Expdt.
1	Akkalkuwa-2	Chimakha	NA.						•	• .			17.			
		Dhankhadi	3 a	2	24.32	45	2355	1.13	0	0	0	0	43.00	45	2355	1.13
		Jagthi	3 b	7	131.02	220	7659	5.59	0	0	. 0	0	131.02	220	7659	5.59
		Kotar	3 c	5	161.18	250	2600	7.78	0	. 0	0	0	168.18	250	2600	7.78
		Tinsmali	5 b	4	121.16	179	3716	5.21	0	0	0	.10	121.16	179	3716	5.31
		Naygvaon	5 a	10	59.42	96	0	2.81	95.00	130	5	.89	241.39	226	745	6.70
		Bhapane	'5 d	4	66.89	83	2200	2.78	50.00	96	100	.27	131.25	179	3700	- 6.05
	Total A. Kuwa		6	32	563.99	873	18530	25.30	145.00	226	2,5	.26	836.00	1099	20775	32.56
															<u> </u>	
2.	Shahada	Sisa sel	Na-4a	20	193.64	244	25208	7.25	0	0	0	0	343.64	394	45363	12.50
		Goda														
		Pimple	3	5	62.08	112	1000	2.82	. 0	/ 0	0	0	62.08	112	1000	2.82
		Zapi	3 k	6	143.29	209	8260	6.20	15.00	5	130	1,75	143.29	214	9710	6.95
	Total		3	31	409.01	, 565	34428	16.27	15.00	5	110	1,75	549.01	720	56073	22.27
			1. 0		105.00	404	10015	F 47	0	0	0	0	277.19	437	25860	10.76
3.	Akkalkuwa - 1	Gaman sin	Na-3c		195.33	194	10015	4			-					5.75
	•	Bamin	3 d	9	196.95	317	8925	5.75	0				137.22	317	0323	
		Mandavi	 	 	<u></u>		- 4400	1.19	0	0	0	0	129.70	205	3935	4.6
	• •	Debramai	3 9		87.54		1190		0							
		Mukhadi	31		16.54	+	19530	·	0	<u>- </u>	1					
	TOTAL	ļ	4	30	496.26	605	19530	13.20	1 0	1			3/3/14	301	- 55720	1
4.	Dhadgaon	Bhadabhu	Na-8	25	391.21	529	19890	18.29	125.00	215	970	3.35	498.00	744	28960	24.6
4.	Diaugaon	Udadhaya	3 9	_	151.38	J			0							6.8
	 -	Bon	71		210.00				16.00							
		Savryad	31		94.55				97.00			1.95				
_	·	- Curryau		+	-37.00	+		1	1			-	-			
	TOTAL	·		4 63	848.14	1248	25952	38.17	238.00	380	3 10!	5 2 10	1047.7	7 1618	8 45079	50:3
	CDANDTOTAL		·				- +			61	1 222	0.14	3011	9 42	4 161047	127-1

YEARWISE WORK DONE AND EXPENDITURE INCURRED IN DIRECTLY DRAINING SUBWATER SHED IN NANDURBAR DIVISION

(Rs. in Lakh

·		TOTA	PPOE	OCEDI	NORKS				1010	JBK DUV	/E - 1992-9	3	WC	RK DON	E - 1993-94	1 '
Sr. No.	Name of Sub Division	Included Villages in Sub. W.	Code Nos.	Includ- ed Bi. Nos.	Area in Ha.		Contour St. Bund (R.V.V.)	Sanct. Amt.	IMP. Area (HA.)	Loose	Contour St. Bund (R.V.V.)	Expt.	IMP. Area (HA.)	Loose Boulder	Contour	Expdt
1	Akkalkuwa-2	Chimakha	NA.													
		Dhankhadi	3а	2	43.00	80	3100	1.83	. 0	0	0	0	. 0	0	0	
		Jagthi	3 b	7	131.02	241	7665	5.76	0	0	0	0	Ð	0	0	
		Kotar	3 с	5	168.18	250	2600	7.80	0	0	. 0	0	0~	- 0	0	
		Tinsmali	5 b	4	121.16	179	3705	5.16	0	0	0	0	0	0	0	
		Naygvaon	5 a	10	241.39	372	3920	11.56	0	0	. 0	0	0	0	0	
		Bhapane	. 5 d	4	131.25	179	3700	5.91	0	0	0	0	0	0	0	
	Total A. Kuwa		6	32.	836.00	1301	24690	38.02	0	0	0	0	0	0	0.	
		-						1					·	ļ		
2.	Shahada	Sisa sel	Na-4a	20	343.64	382	50430	13.27	0	0	0	0	150	150	20155	5.
		Goda		1			1							ļ	ļ	
		Pimple	3 j	5	62.08	112	1000	2.98	0	0		0	0	-}	0	
		Zapi	3 k	6	157.29	214	9710	7.24	0	C	-	0	0		0	ļ
1	Jotal		3	31	563.01	708	61140	23.49	0	0	0	0	150	,150	20155	5
				1			T					1	<u> </u>			 _ _
3.	Akkalkuwa - 1	Gaman sin	Na-3c	13	300.34	438	29700	10.82	0) 0		150.51			5
	1	Bamin	3 d	9	196.95	323	12375	10.85	0	() 0	0	C	0	0	-
		Mandavi														+-,
		Debramal	3 g	7	158.74	205	4135	4.64	C		0	0	69.20			1-
		Mukhadi	·3 h	1	16.58	. 28	400	0.74			0 0	0			_1	
						1	1									-
	TOTAL		1	30	673.14	994	46610	27.05	()	0 (
4.	Dhadgaon	Bhadabhu	Na-8	f 25	542.68	744	28950	25.87)	0 (0 0	
		Udadhaya	3 9	11	151.38	237	3490	7.34)	0) 0			0 0	
		Bon	7 5		235.21	365	660	5 11.60		0		0 0				2
		Savryad	3 1	(12	174.08	263	667	8.40		0	0	0 , 0)	0	0	2
		1	1		1465 =				-				1	0	0	0
	TOTAL	+		63					- I	0	0	0	3 3347	~ 1		
1	GRANDTOTA	4	17	7. 156	3175,50	0 4610	7 17840	2 141 77		<u>.</u>		V (: • • % /			

17/09/1999 15:21

Annex-XXXIII-Min-VIII

Physical and Financial progress of works of NMC.(As on 31.08.1999)

Package	Earthwork	Linning	Structure Concr.
0.00 to 58.00 Km.	100%	100%	100%
58.00 to 82.00 Km.	100%	100%	100%
82.00 to 108.00 Km.	100%	100%	100%
108.00 to 144.50 Km.	98.89%	98.63%	99.93%
144.50 to 155.03 Km.	91.82%	92.01%	96.79%
155.03 to 168.43 Km.	99.78%	99.58%	100%
168.43 to 177.14 Km.	90.67%	53.33%	69.80%
177.14 to 188.78 Km.	92.82%	80.59%	92.50%
188.78 to 200.24 Km.	95.33%	90.68%	74.71%
200.24 to 211.00 Km.	98%	90.13%	59.24%
211.00 to 223.79 km.	99.73%	99.41%	96.28%
223.79 to 236.58 Km.	97.62%	98.10%	97.91%
236.58 to 249.95 Km.	100%	94.88%	98.06%
249.95 to 263.16 Km.	100%	-	-

Annex-XXXIII-Min-IX

TX.

Statement showing the activities carried out for improvement of habitat in Shoolpaneshwar Sanctuary, during the year 1998-99.

Sr. No.		Work component	Physical Progress	Financial Progress (in rupees)
I	Protect	ion to the sanctuary.		
	i.	Fencing	Proposed	
	ii.	Watch Tower (Maintenance)	3 No.	39,035/-
	iii.	Fire Lines	100 Km.	14,970/-
	iv.	Vaccination to the cattle.	Proposed	
	v.	Stone wall fencing	10262 Rmt.	4,61,834/-
	vi.	Fire chowki	15 No.	51,610/-
	vii.	Fire watchers	35 No.	1,55,368/-
П .	Habitat	improvement & facilities for wildlife.		
	i.	Supply of water for wildlife	L.S.	1,09,812/-
	ii.	Supply of fodder	Proposed	-
	iii.	Bird observation hut	Proposed	-
	iv.	SMC works (Barricades)	2 No.	99,991/-
	v.	Creation of habitat(Check Dam)	1 No.	3,36,390/-
	vi.	Construction of small ponds	2 No.	2,17,505/-
	vii.	Removal of unwanted species	Proposed	-
	viii.	Advance work of plantations	35 Ha.	1,00,941/-
	ix.	Fodder plantation for wildlife.	22 Ha.	1,31,615/-
	x.	Nala bunding	2113 Cu.mt.	1,09,908/-
Ш	Eco dev	elopment		
	i.	Trench works	•	2,77,886/-
	ii.	To provide non conventional energy (Solar light)	6 Villages	-
	iii.	Digging of tube well and Providing hand pump(3 Nos.)	1 No.	1,60,256/-
	iv.	Installation of hand pump	1 No.	35,000/-
IV		education camp for the population in & the Sanctuary.	Proposed	
v	Wildlife	training for the Sanctuary staff	Proposed	. -
VI	Comper	sation for the injuries caused by wildlife	4 No.	20,000/-
VII	Wildlife	week celebration		6,377/-
		Tot	al Rs.	23,55,887/-

Annex-XXXIII-Min-X

SUMMARY OF DISCUSSIONS BETWEEN NCA AND DR. ROMILA THAPAR HELD ON 16TH SEPTEMBER 1999 AT NEW DELHI

A brief note describing the steps taken by State Govt. along with the latest plan prepared by the Department of Archaeology & Museum, Govt. of M.P. was sent to Dr. Romila Thapar by us in advance. To discuss the issues raised by her regarding archaeological investigations of the Indira Sagar Project, a meeting on 16th September at her residence at New Delhi was arranged between her and NCA officials. The plan prepared by Department of Archaeology & Museum, Govt. of M.P. was discussed in detail and it emerged from the discussions that

- The plan has taken sufficient care of preserving monuments especially temples, it will be desirable to document the archaeological findings in the Narmada Basin for proper records and future reference.
- She laid emphasis on complete documentation of pre-historical sites along with location etc.
- She was of the opinion that not only the archaeological findings but anthropological findings buried in the Narmada Basin may also be excavated at selected locations namely :Bijalpur Khurd Chhalpakala, Gajanpur, Navalpura Gannaur identified by the experts.

Member (E&R), NCA invited her to visit Narmada Basin to which she agreed. He also invited her to participate in the forthcoming 33rd meeting of Environment Sub-group as a special invitee.

Annex-XXXIII-Min-XI

STUDY OF HEALTH ASPECTS IN PROJECT IMPACT AREA ON NARMADA SAGAR THROUGH EPIDEMIOLOGICAL SURVEILLANCE

ABSTRACT OF 6TH AND FINAL PHASE REPORT

INTRODUCTION

The present study entitiled "study on health aspects in project impact area of Narmada Sagar Dam through epidemiclogical Surveillance system" was started in July 1992 with following objectives:

- 1. The study morbidity and mortality pattern in Narmada Project area.
- 2. To compare it with health situations in a similar area of which project was completed earlier.
- 3. To elucidate any change in health situation in due course of time.
- 4. To suggest health promotion and disease prevention measuresfor the project area.

METHODLOGY

As decided in the MOU survey will be conducted twice in year i.e. during two main seasons of summer and winter and will be carried out for three consecutive years. The sample will consist of 1000

families at two pre-impoundment sistes and two post-impoundment sites each.

Pre-impoundment areas where dams are to be constructed in future, Punasa, Maheshwar Post-impoundment areas of tawa and Bargi projects where dams have already been constructed.

There was mention of area of S.S.P.(Sardar Sarover) in the introduction, but in actual plan of study it was not included for data collection on morbidity since area was in the GUJRAT state.

Up till now the study have been completed in five phases and report of the same have been submitted to NVDA authorities.

The sixth and final phase of study in under completion with slight change in methodology. The control group of preimpoundment area have been shifted to post-impoundment areas prior to the construction of dam Tawa and Bargi.

The present report is on abstract of 6th and final phase of study, the data on morbidity of Bargi civil dispansary and PHC Barela prior to dam construction from year 1983 to 1988 have been taken as a control group.

RESULTS AND DISCUSSION

The following table is a comparision of morbidity in the postimpoundment area of Bargi dam and data of Bargi as pre-impondment (Prior to dam construction).

Name of Disease	Morbidity Rate (percentage)					
	Postimponment	Pre-Impoundment				
	area	area (control)				
1. Malaria	3.49	0.22				
2. WAter Borne Gastrointeritis	1.10	0.49				
3. Respiratory Infections	2.21	1.10				
4. Skin Infections	1.62	0.58				
5. Diseases of Genitournary	0.30	0.29				
6. Sexually Transmitted Diseases	0.16	0.15				
7. E.N.T. Problem	0.20	0.81				
8. Eye problems	0.18	1.56				
9. Diseases of Musculoskelatal sy	stem 0.16	1.30.				
10. Others	0.74	1.80				
	10.16	8.30				

The Morbidity pattern during the last survey done in january 96 to june 96 it was revealed that illness are mostly contributed by arthropod and water horn diseases. Respiratory diseases also contribute to the illness which may be attributed due to dampness in the environment.

When this data is comapred with the preimpoundment area of Bargi Dam for last five year prior to construction of DAM It is very clear that incidence of Malaria has increased from •22% i.e. highest in one year has increased to twenty folds to 4.7% during survey period.

Total morbidity in the post-impoundment area has been found to 10.16% while in the pre-impoundment area. It was 8.30%.

Similar findings were obtained in the 5th phase of study where morbidity in the post-impoundment area was 15.88% as compared to 12.57% in the pre-impoundment area

Increase in morbidity has significantly been contributed by disease like malaria, dysentry etc which are either arthropod born water born and respiratory infection may be due to increase in moisture.

M

Nutritional status of children has been found to be better in the post-impoundment area which might be due to on going supplimentry feeding programme through Anganwadis workers and female health workers.

RECOMMONDATIONS

- I. The existing health agencies needs to be strentgthen specially for activities like malana surveillance. Filaria survey and periodical check up and councelling of vuluavable goup i.e. mother and children.
- 2. One female health worker 2000 population for fegistering women and childrenfor comprehensive health care.
- 3. It can be suggested that for malaria and Flaria survellience a lab technician may be available for a population of 10,000 to work malaria clinic like worker so that cradicable treatment is started immediately.

- 5. Epidemiological survellince is a continous process where information from the community reaches to epidemiologist and in turn a feed back is sent to the community for reducing the incidence of diseases. Thus it can be suggested that one epideological cell should be created to monifourth health conduction in the rehabilitated areas.
- 6. Periodical meeting between epidemiologist health manager and Medical Officer working in the fields will improve the health situations which will help to raise the physical quality of life of the rehabilitated population.



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पर्यावरणउपदल ENVIRONMENT SUB - GROUP

चौतीसवींबैठककीकार्यसूची Agenda for the 34th meting

स्थान : पर्यावरण भवन, नई दिल्ली ।

Venue: Paryavaran Bhawan, New Delhi.

दिनांक : 14 नवम्बर, 2000, 3 बजे

Date : 144 November, 2000, 3.00 P.M.

नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

इन्दौर अक्टूबर, 2000

Indore October, 2000

Agenda for 34th Meeting of the Environmental Sub-group of NCA INDEX

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ANNEXURES

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Annex- 2	Status Report on Environment Management of the SSP & ISP – March, 2000.	34
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Annex- 4	A note by SSNNL on the progress of works on Shoolpaneshwar Sanctuary in Gujarat.	132
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Agenda for the 34th Meeting of the Environment Sub-Group of NCA

Item No. XXXIV-1(157) : Confirmation of minutes of the 33rd Meeting.

Minutes of 33rd Meeting of Environment Sub-Group of Narmada Control Authority were circulated to all members and invitees vide letter No. Env-3(33)/98/2142-74/ dated 9.11.99.

No comments were received. The minutes are put up for confirmation.

Item No. XXXIV-2(158): Review of action taken on the decision of the previous meetings.

1. Pari-passu context & compliance (xx1-4 14P)

As per the suggestions in 32nd meeting of the environment sub-group the Committee of ESG for an independent assessment through field visit was formed.

The second field visit of the Committee was undertaken in the month of July 2000 for the area of Gujarat. During the Visit the Committee reviewed the progress on selected parameters of Environment pertaining to SSP. Report of the Committee with observations and recommendations is placed at Annex-XXXIV-(1)

Members may like to discuss and review.

2. Environmental Management Plan for SSP and ISP.

MOEF desired that a comprehensive document covering findings of various studies and management plan drawn for mitigating the environmental aspects be prepared by the NCA. It was suggested that this should cover the following:

- > Studies undertaken including duration and agency.
- > Findings of the study report and it's analysis.
- > Mitigation measures proposed based on study report.
- > Status of implementation of these measures.
- > Additional studies/surveys required, if any.
- > Expenditure incurred on implementation of safeguard measures.
- > Index Maps indicating area coverage of proposed mitigation measures and actual implementation.
- > Conclusion/Recommendations.

Status of implementation of the Action Plan prepared by the State Govts. was reviewed by NCA from-time-to-time. State Govts. were requested to submit the updated and revised Action Plans, covering the above aspects to the NCA at the earliest to enable compilation of a comprehensive document as desired by the MOEF. State Govts. may please present the latest position on submission of these plans for a review by the Sub-group. However, all the plans available with NCA have been collated to generate an integrated Environmental Action Plan 2000 by the NCA's Environment Wing. This was circulated to all concerned for their observation.

Members may like to review and discuss for according approval to this plan.

3. Submission of catchment area treatment plans for freely draining critically degraded sub-watersheds (Item No.-xxii-2(1122)

As per the decision of GOI of June, 1992 The project authorities were required to submit of Action Plan for treatment of balance of the critically degraded sub-watersheds and the current status summarised in the Status Report.

Govt. of Gujarat

There was 29157 ha. of catchment in Gujarat. Govt. of Gujarat has fully completed the treatment of freely draining critically degraded catchment within the Narmada Basin.

Govt. of M.P.

50

Govt. of M.P. was required to submit schemes for treatment of subwatersheds covering both forest and non-forest areas spread to 475617 ha.

Project authorities prepared the plans for treating the 349842 ha of catchment in 139 sub-watersheds of Phase-II areas by the end of year 2011. Micro-watersheds plans were promised by GOMP on year-to-year basis. So far project authorities have submitted 32 nos. of schemes covering an area of 60000 ha. Out this, 22 schemes covering an area of 36373 ha were related to the SSP and balance schemes to ISP. All these schemes have been approved under RVP schemes. About 9973 ha area from these schemes for the SSP and 7102 ha area under ISP have been treated by the end of March 1999.

Govt. of Maharashtra

Govt. of Maharashtra were required to submit the schemes for treatment of sub-watersheds spread to 80881 ha area covering both forest and non-forestland.

Project authorities have submitted macro-watersheds plans for critically degraded freely draining net area for about 77568 ha during 1994. The net area proposed to be treated includes 40619 ha of forestland and 36949 ha of non-forestland.

GOM have submitted schemes for 22 watershed for approval to GOI. Out of total 35 sub-watersheds so far only 3 schemes have been sanctioned.

Members may like to discuss and review.

Minish Funds

3

Necessary _ Maintenance of records. _

4. Duration of treatment in catchment areas

Pusuation

Regarding increasing the duration of treatment from the present three years to five years, GOMP was pursuing the issue with concerned Central Govt. It was also agreed that MOEF would keep pursuing with the Ministry of Agriculture and Cooperation. Present position may please be indicated by all concerned.

Members may like to discuss and review.

5. Silt Monitoring

Govt. of Gujarat

Silt

Regarding preparing the plan for evaluation & monitoring of silt-outflow from the catchment the CCF, SSPA during 33rd meeting proposed to take up the work with the help of Chief Engineer (Design) and forest field staff. Details may please be presented.

Progress may please be reviewed by the members.

Govt. of Madhya Pradesh

NVDA proposed to establish four silt monitoring stations (SMS). However during 33rd meeting it was informed that Due to non-availability of imported equipment (Indo-German technique), it is still pending. Possibility of using Indigenous equipment was to be explored. Details may please be presented by the NVDA for a review by the Members.

6. COST ESTIMATES FOR PREPARATION OF ACTION PLANS AND IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD MEASURES.

GOMP and GOG furnished this information. Updated picture of the estimate and actual expenditure upto March 2000 may please be presented at the current price level.

It was also agreed that GOM will send the request for fund to SSNNL for various parameters of ESM so that the same could be provided in the budget of the project and made available to GOM.

Progress may please be presented by GOM / SSNNL.

Members may like to discuss and review.

7. ESTABLISHING A SEPARATE AUTHORITY FOR COORDINATING ENVIRONMENTAL WORKS IN MAHARASHTRA.

During the earlier meetings, Environment Sub-group while reviewing the progress in Maharashtra desired the formulation of an authority to monitor implementation of environmental action plans for the SSP. Draft terms of references for the same were framed by the NCA and were forwarded to GOM for their consideration. The issue was discussed during the 33rd meeting where it was requested that GOM should take up steps for creation of Environmental Cell with Director along with supporting staff in the office and field exclusively for the SSP.

Progress may please be presented by GOM.

8. PUBLICATION ON ENVIRONMENT

Earlier a copy of draft publication on ISP prepared by Environment Unit of NCA was circulated to all Members vide this office letter No.Env-3(33)/99, dtd. 22.9.99. The publication is under printing.

Govt. of M.P.

Brok.

In the last meeting, a pamphlet was circulated by NVDA (GOMP) on "Indira Sagar Pariyojana Evam Parvavaran Sanrakshan". Progress on other publications may please be presented.

Govt, of Gujarat

The publication on environment namely "Check list of Birds" was prepared earlier and was presented by GOG. Publications on other thrust areas of the environment pertaining to SSP were to be prepared by GOG. Progress may please be presented.

Govt. of Maharashtra

GOM is yet to prepare any publication on achievements in Maharashtra.

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Item No. XXXIV-3(159): PRESENT STATUS OF STUDIES, SURVEYS AND ENVIRONMENTAL ACTION PLANS.

Current status of the progress on various items as on 30th June 2000 is placed at Annex-XXXIV-(2).

Latest available progress of works vis-à-vis status of compliance is presented below for a review by the members:

1) PHASED CATCHMENT AREA TREATMENT

Government of Madhya Pradesh

Sardar Sarovar Project

By the end of July 2000, an area of 76,044 ha has been treated against the final target area of 1,25,725 ha. $\frac{60,044}{50,0}$

Indira Sagar Project

Against a target of 73,456 ha, an area of 41,219 ha has been completed upto July 2000.

Govt. of Maharashtra

Sardar Sarovar Project

In Maharashtra, against a target of 24,298 ha, an area of 23,295 ha has been treated.

Gort of Gujrat: Les already completed 29,157.00.

2) COMPENSATORY AFFORESTATION

Govt. of M.P.

Sardar Sarovar Project

By the end of July 2000, Govt. of M.P. have completed plantation works over an area of 8,736 ha against a final target of 8,737 ha.

Indira Sagar Project

By the end of July 2000, Govt. of M.R. has completed plantation work over an area of 67,188 ha against a target of 80,945 ha.

The Sale of Especial

Govt. of Maharashtra - Sardar Sarovar Project

For the submergence, progress achieved was 19,281 ha against a target of 19,468 ha. Whereas for the land released for R&R works, progress achieved was 3,584 ha against a target of 4,200 ha.

Govt. of Gujarat - Sardar Sarovar Project

By the end of September 1994, Govt. of Gujarat had completed plantation works in the entire planned area of 13,950 ha. (including both non forest and degraded forest areas).

3) COMMAND AREA DEVELOPMENT

Govt. of Madhya Pradesh - Indira Sagar Project

During the last meeting, NVDA assured the sub-group regarding formation of an inter-departmental committee to look into the issues of environmental impacts within the command of SSP. Progress may please be presented.

Action Plan

In the last meeting, it was informed by the GOMP that the study pertaining to the effect of agro-chemical run-off from agricultural fields on surface and ground water was assigned to J.N. Krishi Vishwa Vidyalaya, Jabalpur and that the study was making progress. Further progress may please be presented.

Govt. of Gujarat - Sardar Sarovar Project

Ag. Rediporch

Progress of works on construction of canal and it's network as per office record was annexed with the agenda of 32nd meeting of the sub-group.

Updated progress of works on construction of canal and its networks may please be presented.

Govt. of Rajasthan - Sardar Sarovar Project

During the last meeting, it was informed that Environmental Impact Assessment of the Narmada Canal in Rajasthan had been completed by WAPCOS and that report was accepted by the GOR. GOR had undertaken an exercise of floating the international competitive biddings for consultancy to decide the further course of action in this regard. Further progress may please be presented for a review by the sub-group.

4) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

To review the progress on this aspect, a meeting was organised on 23rd June 2000 at NCA office, New Delhi under the chairmanship of Member(E&R), NCA. Minutes of the meeting are enclosed at **Annex-XXXIV-(3)**.

Govt. of Madhya Pradesh

Indira Sagar Project

In accordance with the recommendations of the study conducted by the Wildlife Institute of India, it was informed by the GOMP during the 33rd meeting of ESG that the issue regarding declaration of National parks/sanctuary was being examined by the Finance Department for further submission to Cabinet of GOMP.

Further progress may please be presented for a review by the sub-group.

Sardar Sarovar Project

Regarding preparation of Action Plan on the basis of the recommendation of SFRI, Jabalpur, it was informed that the draft Action Plan was presented to State Wildlife Committee for their consideration. Progress thereon may please be presented.

Government of Gujarat

Sardar Sarovar Project

The information on development works carried out in Shoolpaneshwar sanctuary is annexed at **Annex-XXXIV-(4)**.

GOG may present the status of Action Plan as per recommendatons of the study group of the M.S. University, Vadodara. In the last meeting of Flora and Fauna, GOG agreed to prepare a tabular statement to show clearly the actions proposed or taken by the State Govt. vis-a-vis the recommendations of the study. This may please be presented for a review by the sub-group.

Govt. of Maharashtra

Sardar Sarovar Project

Regarding preparation of the Action Plan based on the recommendations of the study group at Pune University, GOM was to prepare a plan

covering flora, fauna and carrying capacity aspects. Progress may please be presented.

In the last meeting of Flora and Fauna, it was contemplated that creation of wildlife sanctuary may not be possible in Maharashtra and the State Forest Department has undertaken social forestry component in the areas on a larger scale. GOM was requested to expedite it's response regarding actions by the State Govts. on the recommendations of the study in a tabular form. This may please be presented.

In addition to above aspects, the status of studies entrusted to CICFRI and status of felling from submergence area may also please be presented.

5) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Sardar Sarovar Project

To review the progress on archaeological and anthropological aspects in relation to SSP, a meeting was organised at Bhopal on dtd. 23.6.1999 under the chairmanship of Member (E&R), NCA. The minutes of the meeting are enclosed at Annex-XXXIV-(5).

The State Department of Archaeology & Museum have revised their earlier Action Plan during January 1999. This Action Plan referred to as Action Plan of 1997.

An updated progress may please be presented by GOG & NVDA.

Indira Sagar Project

Government of Madhya Pradesh

Regarding needed protection measure for the Joga Fort, ASI, Nagpur branch prepared an estimate of Rs.1.5 crores. This was to be finalized by the Director General, ASI. Director Exploration, ASI agreed to take initiatives for arranging a visit of the Director General, ASI to the Joga Fort. This is awaited.

As per communication received, copy placed at Annex-XXXIV-(6), ASI has expressed its inability due to administrative reasons to takeup the work and have suggested that NVDA may like to takeup the work as per details prepared by ASI.

Members may like to discuss and review.

6) SEISMICITY & RIM STABILITY OF RESERVOIR

Government of Gujarat - Sardar Sarovar Project

The GOG has identified a locations for the installation of seismic monitoring stations, 4 each on either side and one at the downstream of the Sardar Sarovar reservoir, out of a total 9 stations, 3 are in M.P., 1 in Maharashtra and 5 are in Gujarat. Construction and instrument installation work is completed at all the 9 seismic monitoring stations.

Regarding analysis of data collected by these observatories and its application, it was suggested that SSNNL or NVDA may get in touch with Earthquake Research Institute, Roorkee or Indian Metereological Department or GSI for analysis of the data.

Progress may please be presented for a review by the sub-group.

Govt. of Madhya Pradesh - Indira Sagar Project

GOMP informed that for seismic monitoring, 10 sites were identified.

An updated progress on each and every monitoring station may please be presented.

7) HEALTH ASPECTS

To review the progress on different aspects of health, a meeting was held under the chairmanship of Member (E&R), NCA on dtd. 28.8.1999 at New Delhi. A note on the important issues discussed during the meeting is placed at **Annex-XXXIV-(7)**.

- To identify the potential breeding areas of the mosquito, the State Govt.
 would get in touch with Director, MRC and invite him to visit the project
 areas for on-the-spot-assessment and suggestions on the need for a
 geographical reconnaissance survey and efficacy of lining etc. Director,
 MRC agreed to provide needed technical inputs in the State.
- GOG was requested to furnish the information on the status of Malaria in the peripheral Gujarat villages surrounding Sardar Sarovar reservoir.
- GOM informed that the detailed health plan has been drawn up by the Deputy Director of State Health Services. The details in this regard are yet awaited.
- Final report of Gandhi Medical College, Bhopal was to be presented. It is yet awaited and status may please be presented.

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- For the disease surveillance programme, 10 districts were identified by NICD in M.P. and in this regard, NICD was requested to include two districts namely: Mandla and Mandleshwar in their programme.
- A separate cell in Maharashtra on health aspects on the lines of GOG.

Members may like to discuss and review.

8) FISHERIES DEVELOPMENT OF SARDAR SAROVAR PROJECT & INDIRA SAGAR PROJECT RESERVOIR

A meeting on Fisheries aspects was held on 4.11.1999 at New Delhi under the chairmanship of Member (E&R), NCA. The minutes of the meeting are enclosed at **Annex-XXXIV-(8)** for information of the members.

On the recommendations of the desk review studies the Govt. of Maharashtra assigned studies on Hydro-biological aspects to Vadodara centre of Central Inland Capture Fisheries Research Institute, Barrackpore.

In the last meeting of ESG, it was informed by GOM that regarding submission of report of CICFRI, Vadodara, another 8-10 months would be required to submit a detailed report. It is yet awaited. Progress may please be informed.

Item No. XXXIII-4(160): Any other item.

Date and venue of the next meeting.

Wevadian

Ramau

ANNEXURES

ANNEX - XXXIV - (1)



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

रां० पर्या-3(34)/2000/1609 - 30

दिनॉक : 24 अगस्त 2000

सेवा में.

सभी सदस्य एवं आमंत्रितगण, संलग्न सूची के अनुसार ।

विषय : सरदार सरोवर एवं नर्मदा सागर परियोजनाओं पर पर्यावरण ठप-दल की कमेटी के दौरे (द्वितीय क्षेत्र भ्रमण : गुजरात राज्य) की रिपोर्ट।

महोदय,

उपरोक्त विषय के सम्बन्ध में पर्यावरण उप-दल की कमेटी के दिनोंक 27 जुलाई, 2000 से 29 जुलाई, 2000 सम्पन्न द्वितीय क्षेत्र भ्रमण की रिपोर्ट इस पत्र के साथ संलग्न कर भेजी जा रही है । यदि इस पर आपकी कोई राय अथवा टिप्पणी हो तो कृपया अधोहस्ताक्षरी को 15 दिनों के अन्दर सूचित करें ।

कृपया इसकी प्राप्ति की सूचना दें।

संलञ्नकः उपरोवत

भवदीय,

रिकार के कियार)
(डा० पर्वन कुमार)
विशेषज्ञ (पर्यावरण)

प्रतिलिपि : -

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- 5- सचिव, पर्यावरण, पर्यावरण विभाग, महाराष्ट्र सरकार, मंत्रालय, मुम्बई 400 032 को उक्त रिपोर्ट की एक प्रति सादर सूचनार्थ प्रेषित ।

(डा० पवन कुमार) विशेषज्ञ (पर्यावरण)

of Market Market States

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REPORT ON SECOND FIELD VISIT TO THE SARDAR SAROVAR PROJECT AREAS IN GUJARAT

JULY 2000

COMMITTEE OF THE ENVIRONMENT SUB-GROUP Narmada Control Authority Indore

August 2000

FIELD VISIT REPORT OF THE COMMITTEE ON THE SARDAR SAROVAR PROJECT AREAS IN THE STATE OF GUJARAT

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FIELD VISIT REPORT OF THE COMMITTEE ON THE SARDAR SAROVAR PROJECT AREAS IN THE STATE OF GUJARAT DURING JULY 2000

According to the decision taken in the 32nd meeting of Environment Subgroup of NCA held on 14.10.98 at New Delhi, a Committee for assessing the *pan-passu* compliance of the implementation of the environment safeguard measures through undertaking field visit's to the areas in the States of Maharashtra, Madhya Pradesh, Gujarat and Rajasthan was constituted vide letter No. Env-3(33)/99/475, dated 16th March 1999. The Committee comprised representatives of the Ministry of Environment & Forests, Narmada Control Authority, Botanical Survey of India, Wildlife Institute of India, Non-official Members and concerned officers of the States of Madhya Pradesh, Maharashtra, Gujarat and Rajasthan. The terms of reference for the Committee were as under:

- a) The officers from State Departments related to environmental safeguard parameters will be associated with the field visit.
- b) Field visit's would be coordinated by the Narmada Control Authority. Necessary inputs for data, information, maps etc. required by the Committee during the field visit would be made available by the officers of the concerned States.
- The Committee would assess the progress of works for ascertaining the panpassu compliance of the environmental stipulations for the Sardar Sarovar and Indira Sagar Projects by undertaking field visit's to the project areas and would place the report of the findings to the Sub-group.

In pursuance to the above the second visit of the team to the areas in Gujarat was programmed during 26th July to 29th July 2000. A list of members and invitees along with a list of the officers interacted during the review in the field is given at **Annexure-1**.

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The Committee visited the areas in Gujarat as per the following programme : 27^{th} July 2000

- Preliminary meeting of the Committee members for a general review.
- ≤ Visit to the canal site plantations.
- Visit to the Sardar Sarovar dam site.
- Visit to the catchment area treatment sites and vicinity plantations.
- Visit to the Shoolpaneshwar temple and downstream areas.

28th July 2000

- ✓ Visit to the construction site of Saurashtra branch canal at Malavan in the Sardar Sarovar command area in Gujarat.
- Visit to the Wild Ass Sanctuary at Koparni and discussions with the Sanctuary Superintendent and experts at Dharangadhra.

29th July 2000

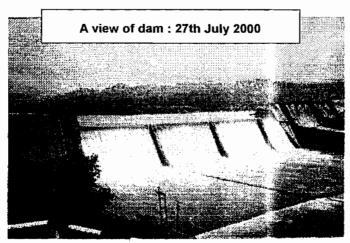
- ✓ Visit to the Office of the Narmada Planning Group at Gandhinagar and discussions with the concerned officials regarding studies, activities and development of the command area of the Sardar Sarovar dam.
- Presentations by the concerned officers of the Narmada Planning Group, Sardar Sarovar Narmada Nigam Ltd. and wrap up meeting.

The Committee reviewed the progress of planning and implementation of the environment safeguard measures taken by the State Governments and decided to visit the areas of catchment treatment, vicinity plantations, archaeological monuments besides construction site of the Sardar Sarovar dam, Saurashtra branch canal, the areas of the Wild Ass Sanctuary and to hold discussions with the experts and officials of the Narmada Planning Group, Sardar Sarovar Narmada Nigam Ltd. The following decisions and discussions of the Sub-group were informed to the Committee:

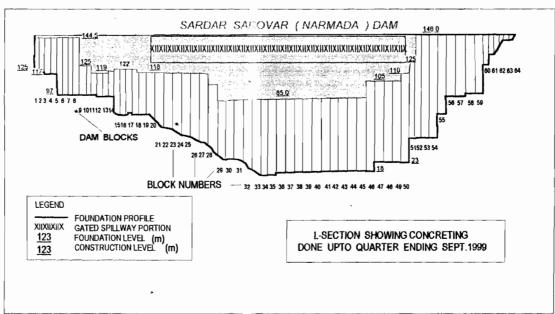
• Environment Sub-group during it's 18th meeting held on 28.5.93 discussed the issue of *pari-passu* compliance. Chairman while reviewing the preparedness of the environmental studies in relation to construction works on project, reiterated that the pari-passu clause is to be so operated as to complete all the works on

the areas commensurate with submergence which is an indicator of the project of the construction works.

During the 22nd meeting of the Sub-group Chairman stated that all the works
which adversely affects the environment steps for their mitigation have to
proceed on pari-passu basis whereas certain other works can be done on a
different scheduling for which a view has to be taken by the MOEF.



Profile of the Sardar Sarovar dam is placed below.



The Committee visited the areas in Gujarat for assessing the quality of works by visiting selected and accessible areas and verified the progress of works on the issues which were verifiable in the field through interaction with the local officers. The sites inspected and the information gathered about them is given below:

CATCHMENT AREA TREATMENT

PLANNING

Committee was informed that project authorities were required to prepare the plans, as Phase-I programme, for treating those critically degraded sub-watersheds which were identified as directly draining into the reservoir. The balance sub-watersheds were to be treated as Phase-II programme. Current status of Phase-I programme is given below.

PHASE-I: DIRECTLY DRAINING SUB-WATERSHEDS

As per the data furnished by AIS&LUSO an area of 1,76,517 ha was to be treated in Phase-I. Project authorities have, however, prepared the plan for treating additional area of 2663 ha. Thus an area of 1,79,180 ha is to be treated at the cost of the project and *pari-passu* with the project works. Project authorities have prepared the plans for treating 1,79,180 ha area in about 10 years' time. Government of Gujarat started the treatment works w.e.f. monsoon of 1990 whereas Government of Maharashtra and Government of Madhya Pradesh could start the work in the year 1992.

Government of Gujarat

The entire catchment area was classified based on stock mapping survey by Forest Department and also by interpretation of satellite imageries obtained from ISRO with LISS-II censors. Accordingly, afforestation and SMC works were taken up by the Forest Department in the forest area and in non-forest area by Gujarat State Land Development Corporation.

Progress of Implementation

The Government of Gujarat has completed the treatment works in the entire 27204 ha of forest areas and 1953 ha of non-forest areas. The entire treatment programme was carried out ahead of the reservoir filling. Progress of works are summarised in the following tables:

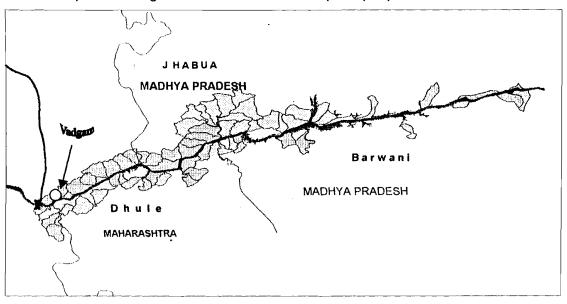
PHASE-I

Table: Progress of Phase-I CAT Works (Area in ha)

YFAR	Forest area	Non-forest area	Total
1990-91	428	898	5426
1991-92	4770	230	5000
1992-93	6014	336	6350
1993-94	6000	286	6286
1994-95	5730	168	5898
1995-96	0	35	35
1999-00	162	0	162
Total	27204	1953	162 29157
Į.			

CATCHMENT AREA TREATMENT (CAT)		
At FRL 138.68 m target (ha)	29157	
Overall progress (ha)	29157	
Overall progress (%)	100	
Progress in the vicinity area (%)	100	

A map showing location of the sub-watersheds vis-à-vis the impoundment created at present height of the dam at EL 88 m (90 m) is placed below.



Directly draining sub-watersheds.

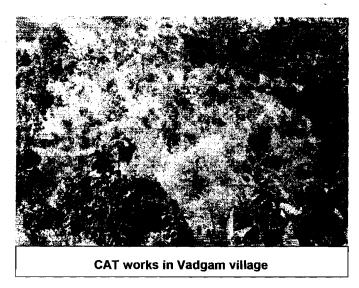
Site(s) Visited

Village Vadgam

Sub-watershed Nb1a (AISLUSO)/R1-R4 (IRS GOG) of Vadgam village was visited. This sub-watershed encloses an area of 4778 ha out of which 4400 ha area was treatable and treatment works were taken up during the year 1989.

GOG officials informed that the forest areas in the catchment of SSP fall in Bharuch and Vadodara districts. The total catchment area for treatment is 27204 ha. This area has been classified into 3 categories depending on the canopy density of the crop in the area for the purpose of treatment. The three density classes and the treatment afforded to these areas are as follows:

Category	Density	Treatment Measures
`A'	Less than 4	Planting 2000 seedlings per ha and soil and moisture conservation works (Nala bunding, fully plugs, check dams, brush wood plugs, gradonies, staggering trenches and percolation ponds). Total area in this category is 13240 ha.
`B'	4-5	400 seedlings per ha and soil and moisture conservation works. Total area is 7003 ha.
,C,	6 and above	Fencing the area for protection and Nala bunding. Total area is 6799 ha.



The emphasis is laid on planting of as many indigenous species of trees as possible to create biodiversity. People's participation is being sought in plantation works. Protection works have been phased out over a period of five years from 1995-96 to 1999-2000. The total expenditure on has the works come Rs.2204.13 lakh. Following components are included:

- Soil & Moisture conservation works.
- Development of multistory forests.
- Plantation in revenue/corporation wastelands.
- 4. Development of agroforestry/horticulture in private lands in catchment area.
- Protection of forests from fire.
- 6. Plantation and SMC works in left out in 162 ha.
- Maintenance of past plantations.

The tree planting activity carried out in the catchment areas were augmented by planting of suitable indigenous tree species, which form the middle and lower canopy of trees in the forest areas of the catchment. Government of Gujarat informed that an analysis of the Remote sensing data of 1985-86 and 1994 revealed that there was trend for improvement in the status of density due to implementation of Catchment Area Treatment Plan. It was further informed that the closed forest and open forest area have been increased by 13% and 11% respectively whereas degraded forest area was decreased by 22% in 1994 as compared to 1985-86. Committee members were informed that the works carried out under catchment treatment programme have minimised/controlled sediment transportation and are expected to increase the life of the Dam besides contributing to the improved soil and moisture conditions, encouraged nesting and breeding of birds with abundant browse and water availability for animals.

Observations and Recommendations

Only sample areas of catchment area treatment sites were visited as indicated above. The site visited was near the shore line. These areas were ideally covered with plantations and structures to control the erosion like boulder check dams constructed in the year 1994 were in place. These structures were filled up with silts and were stabilized by thick growth of the grasses. Even steep slopes were planted up. Staggered contour trenches to conserve moisture were discernable. Mixed miscellaneous tree species were planted all over.

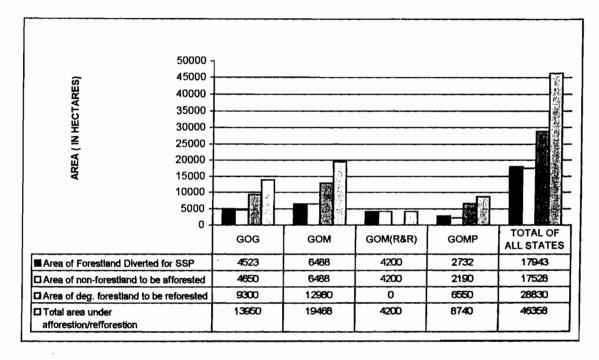
Committee was of the view that it could serve as model project and recommended replication of such efforts elsewhere under different programmes of the catchment treatment/soil moisture conservation.

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PLANTATION SITES

Planning

Committee was informed that an area of 13386 ha was diverted by MOEF vide it's order of 1987 (in addition to the area diverted by the MOEF in 1987 an area of 357 ha was diverted by GOG earlier). It was stipulated in this order that plantations shall be carried-out in equal non-forest land in addition to the plantations on degraded forest land double in extent of the area diverted. Thus for every ha of the area diverted, three ha of plantations were to be carried out by the project authorities. Statewise details of the total area taken for SSP and the planning in lieu thereof are given in the chart below:



Implementation

GOG has undertaken compensatory plantation in 4650 ha of non-forest areas and 9300 ha in degraded forest areas against the submergence of 4523 ha forestland in Gujarat.

Area afforested (i.e. non-forest area) has already been declared as forest under (Section-4) of Forest Conservation Act, 1980. The villagewise area transferred for compensatory plantation work is given in following table:

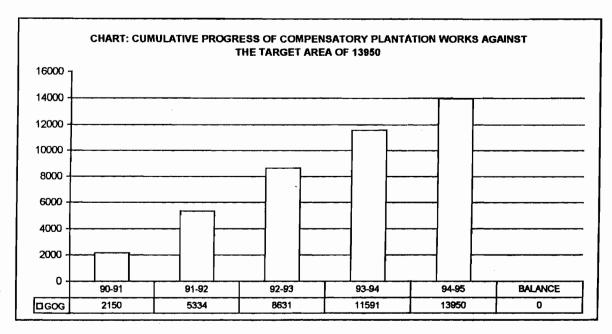
SI.No.	Name of Village	Taluka	Area in ha
1.	Chandrani	Anjar	150
2.	Dhamadka		270
3.	Godhra	Mandvi	301
4.	Jakhau	Abdasa	251
5.	Bhachau		800
6.	Shikarpur	Bhachau	978
7.	Shivlakha		750
8.	Vandhia		600
9.	Manaba	Rapar	550
		Total	4650

Tree species are planted keeping in view the agro-climate conditions along with ensuring utility from the point of view of forage, fuel wood, food, medicines, minor forest products like gum and honey and also shade. The following species have been planted; this has been done to enlarge the biological diversity of the plantations.

- ≤ Prosopis julifora
- ≤ Acacia tortolis
- ≤ Azadirachta indica
- ≤ Acacia nilotica
- ≤ Salvadora oleoides
- ≤ Pithecelobium dulce
- ≤ Salvadora persica
- ≤ Acacia Senegal

- ≤ Ziziphus mauritiana
- ≤ Tamariindus indica
- ≤ Commiphora mukul
- ≤ Albizia lebbeck
- ≤ Cordia dichotoma
- ≤ Jatrophas curcus
- ≤ Phoenix dactylifera
- ≤ Coradia rothii
- ≤ Thespesia populnea

Progress of tree planting in the State of Gujarat is shown in bar Chart below:



The progress of works for the SSP in Gujarat vis-à-vis requirement of the felling of the forest area diverted is shown in the table below:

	Present status	Remarks
Final targets (ha)		Entire forest area (4523 ha)
Present status of progress (ha)	13950	in the submergence is clear
Overall progress (%)		felled. Plantation works are
		also completed.

Site(s) visited

In addition to the compensatory plantations project authorities have also raised the plantations as per the details given below

Vicinity Plantations

The area was planted by Forest Development, Government of Gujarat. The area planted was 550 ha. 1.2 million trees of *A.catchu*, Castor, Cerus, *Khamir, Neem* and Bamboo were planted.

Canal Bank Plantations

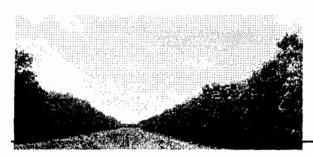
- Approx. 5300 ha area may be available along the Narmada Canal for plantation.
- ≤ 1870 ha has already been planted.
- Further plantation to be taken up in the completed reaches of the canal/branch canal.

Narmada Main Canal Chainage 19 km.



Kolamba village of Naswadi Taluk where plantations were taken up in 100 ha area in 1996-97, mainly four species namely *Tectona grandis, Dandrocalamus strictus, Azadirecta indica, Emblica officinalis* were planted, was visited. The teak was planted up in an area of 100 ha in 15 to 20 rows at a spacing of 2.5 m, it's

crop height was about 12 ft. and the crop dia was about 8 cm. with over 90% survival rate. Miscellaneous species were planted up in an area of about 50 ha. The growth of bamboo was poor whereas *amla* and *neem* were putting on average growth.



Branch Canal Chainage 23 km.

Bilodia Branch Canal was visited where Acacia catchu, Ficus glomurata, Albizia lebbeck,

Pithocelobium dulce, plantations were taken up in an area of 20 ha in blocks of about 500 m each along the banks in 8 to 10 rows, 2.5 m apart. The plantation visited were of the year 1995-96. Plants were putting on good growth.

Recommendations



Committee suggested that in future, plantations of thorny species may be avoided on the avenue plantations / canal bank plantations for obvious reasons. Field officers stated that due to harsh conditions prevailing in the area and also due to heavy biotic

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pressure non palatable species have been planted up. They also showed the members plantations of trees yielding minor forest produce like bamboo (*Dandrocalamus strictus*), *Khair (Acacia catchu)* etc.

It was informed that some of the revenue areas where the plantations have been carried out already been transferred to the regular forest division & work on this account is under progress in other areas.

It was also suggested that the species selected for the avenue plantations should be able to survive about hundred years and as such quick growing species may not be encouraged on the avenue plantations. Field officers, however, informed that keeping in view the harsh environment and pressure on the resources objective of taking up plantations along the larger areas of the canal bank is also to get the revenue. Committee suggested that keeping in view the needs of the local tribal population, in future, only indigenous species growing around the forest areas successfully may be considered for plantations and that plantations of *Prosopis juliflora, Acacia nilotica Inga dulcis etc.* may be avoided multifarious economic tree species like *Madhuca latifolia, M indica*, may be undertaken. Plantations of *Terminalia belerica, Emblica officinalis, Azadirachta indica* etc. and *Ailanthus exclsa Spindous laurifolius, Pongamia pinnata of economic importance may also be tried.*

As at some places waterlogging silt was reported, it was suggested that *Termilia* arjuna may be attempted on the canal banks and in the depressions, as this species is most suited for waterlogging areas.

Committee observing that almost all works on compensatory afforestation have already been completed, efforts should be made to transfer these areas for regular upkeep and maintenance, to the regular forest department in the meantime some funds should be provided for maintenance of the structures and protection of the plantations. Necessary action should be taken to declare these areas as Protected Forests or Reserve Forests as per the procedure under Indian Forest Act.

ARCHAEOLOGICAL SITES

Committee was informed that in Gujarat it is planned to relocate two temples viz. Shoolpaneshwar temple which was on the border of Gujarat and Maharashtra and for which *Government* of Gujarat accepted the responsibility for relocation. This temple was relocated 15 km downstream of the SSP at village Gora. All works are completed. Regarding another temple viz. Hampheshwar, the plinth of this temple is at 105 m. Works have been taken up departmentally. More than 50% works were completed.

FLORA, FAUNA & CARRYING CAPACITY

Planning and Implementation

Committee was informed that all studies for survey of flora and fauna and assessment of carrying capacity have been completed in the State of Gujarat. Action Plans have been drawn up by Government of Gujarat for development of Shoolpaneshwar sanctuary. It was informed that as a consequence to the felling in the submergence area, wildlife from the submergence area have already moved to the adjoining upper catchments rich in forests.

The project authorities have formulated an Environmental Management Plan on Development of Shoolpaneshwar sanctuary for implementation.

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600 Ha 4 times

Project authorities have already taken up various measures/activities for improvement of habitat in Shoolpaneshwar Sanctuary. It includes protection to the Sanctuary, Habitat improvement and facilities for Wildlife eco-development programmes, organization of nature education camps for the population in and around Sanctuary, Wildlife training for sanctuary staff etc. A statement showing the activities carried out for improvement of habitat in Shoolpaneshwar Sanctuary during 1998-99 is placed below.

Statement showing the activities carried out for improvement of habitat in Shoolpaneshwar Sanctuary, during the year 1998-99.

SI.No.	Work component	Physical
	·	progress
I.	Protection to the sanctuary	
	Fencing	Proposed
	Watch Tower (Maintenance	3 No.
	Fire Lines	100 Km.
	Vaccination to the cattle	Proposed
	Stone wall fencing	10262 Rmt.
	Fire chowki	15 No.
	Fire watchers	35 No.
11.	Habitat Improvement & facilities for wildlife.	
	Supply of water for wildlife	L.S.
	Supply of fodder	Proposed
	Bird observation hut	Proposed
	SMC works (Barricades)	2 No.
	Creation of habitat (Check Dam)	1 No.
	Construction of small ponds	2 No.
	Removal of unwanted species	Proposed
	Advance work of plantations	35 Ha.
	Fodder plantation for wildlife	22 Ha.
	Nala Bunding	2113 Cu. Mt.
III.	Eco development	
	Trench works	
	To provide no conventional energy (Solar light)	6 Villages
	Digging of tube well and Providing hand pums (3 nos.)	1 N o.
	Installation of hand pump	1 No.
IV.	Nature education camp for the population in & around	Proposed
	the Sanctuary	
V.	Wildlife training for the Sanctuary staff	Proposed
VI.	Compensation for the Injuries caused by wildlife	04
VII.	Widlife week celebration	

Field visit Report: July 2000

COMMAND AREA

NARMADA MAIN CANAL

For the construction purpose, the main canal has been considered in four segments on the basis of major off-take branch canals.

Phase I. Ch. 0.0 km to 144.5 km (Mahi crossing).

Phase II (A). Ch. 144.5 km to 263.165 km (off-take of Saurashtra branch)

Phase II (B). Ch. 263.165 km to 388.164 km (near off-take of Kachchh br.canal)

Phase II (C). Ch. 388.164 km to 458.412 km (up to Gujarat-Rajasthan Border)

NMC PHASE - I: Km. 0 to Km 144.5

Phase-I of the NMC was earlier programmed to be completed by June, 1995 and the irrigation was proposed to commence with the construction of Dam up-to RL 110 m by the end of July / August, 1995. Under phase-I, an irrigation potential of about 4.3 lac ha. is envisaged. The Government of Gujarat have proposed to complete the works of main canal in phase-I in all respects soon. There are total 23 branch canals under Phase-I upto Mahi river crossing of Narmada Main canal, out of which 13 canals off-take directly from NMC and the remaining 10 canals off-take from branch canals. Total length of these 23 branch canals is about 656 kms. Out of 23 branch canals, civil works of 21 branch canals are almost completed. The remaining 2 Branch Canals viz. Jambusar and Kundhela Branch Canals off-taking from Vadodara Branch Canal are likely to be completed soon.

NMC PHASE - II: Km 144.5 to Km 458.412

For Phase-II, from 144.5 km to 458.412 km i.e. up-to Gujarat - Rajasthan border, the works in the initial reaches have been started. The detailed construction programme for the balance reach are under finalisation. There are 27 branch canals including two major branch canals, off-taking at 263 km and at 386 km to convey water for irrigation, domestic and municipal water supply and for industrial uses.

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The Saurashtra Branch Canal (SBC) off-taking at 263.20 km of NMC, is 104 km long. The special features of this branch canal is that in a length 104 km, there will be a fall of about 32.73 m and water will be required to be lifted for about 71.23 m to cover the command area and to cover the entire Saurashtra region for supply of drinking water. At 3 canal fall sites, hydro-power will be generated and will be utilised to lift water at 5 pumping sites in the same branch.

Command Area Development

Government of Gujarat informed that with a view to derive best benefit's from the irrigation water, when canal would start flowing, the project report of SSP submitted to the Planning Commission envisaged following steps:

- 1) Construction of canals.
- 2) Construction of watercourses and field canals.
- Land leveling.
- 4) Land drainage.
- 5) Ground water studies and investigation of ground water resources.
- 6) Network of roads in the command area.
- 7) Marketing and warehousing facilities.
- 8) Establishment of research-cum-demonstration farms.
- Co-operative and Establishment of credit societies for credit facilities to agriculturists.
- 10) Arrangements for timely procurement of inputs like fertilizers, pesticides, improvised seeds etc.

Various studies were conducted during the period from 1982 to 1987, prior to environmental clearance and thereafter.

The key studies undertaken on various aspects in command area of SSP after environmental clearance can be categorised as follows:

1) Command Area Studies with reference to drainage, waterlogging and salinity: The list includes the various drainage studies suggesting various mitigative measures for waterlogging and salinity and formulation of master plan

- suggesting remedial measures for the surface drainage and sub-surface drainage in the command area. The list is annexed as **Annex-II**.
- Command area studies with reference to flora and fauna :
 List of various studies conducted with reference to flora and fauna in command area of SSP is annexed herewith as *Annex-III*.
- 3) Command area studies with reference to agro-forestry:
 The list of various studies carried out with special reference to cropping pattern, development of agro-forestry is annexed herewith as Annex-IV.
- 4) Command area studies with reference to technical study: Several technical studies were carried out to provide technical feedback for engineering structures to be built in the command areas for transmitting it into integrated Command Area Development Plan. The list of studies is annexed herewith as **Annex-V**.
- 5) The Sardar Sarovar Project will also provide an opportunity to enhance nature conservation outside the immediate catchment area of the Narmada. In particular the wildlife sanctuary located in the command area of the project will benefit from the increased fresh water availability resulting from the Project and there are plans by the GOG to further develop these. They comprise of:
 - Velavadar Black Buck National Park.
 - ≤ Nal Sarovar Bird Sanctuary.
 - ≤ Wild Ass Sanctuary in the Rann of Kutch.

FIELD VISIT TO THE MALVAN - MALIYA BRANCH CANAL

The Saurashtra Branch Canal (SBC) is the largest branch of Narmada Project canal system which off-take from Narmada Main Canal at Ch. 263.20 km. near Kadi District — Mehsana and has a length of 104.46 km. and it tails at Bhogavo—II Irrigation Scheme (Dholi Dhaja dam) near Surendranagar. The Saurashtra Branch Canal is quite a large system but in addition the system is complex and unique in nature that involves the passages of canal through a constantly falling ground in more than half of it's initial reach and in the subsequent reach, it has a rising ground to traverse through to reach Bhogavo-II Irrigation Scheme where it tails. While doing

so, it falls down through 53.22 m upto Ch. 59.49 km. and rises by 66.43 m before tailing into Dholi Dhaja dam. Three falls of 10.91 m magnitude are to be provided in the reach to 0 to 59.49 km. of falling limb. Approximate 45 MW electricity is planned to be generated from above 3 falls. For lifting the water in the rising limb of SBC between Ch 59 to 104.46 km. approximate 117 MW of electricity will be consumed.

The command area of the Saurashtra Branch Canal is 543320 ha out of which 456997 ha is proposed to be irrigated in Saurashtra region. The area in Saurashtra region is highly drought prone because of the scanty and erratic rainfall. In addition to irrigation, it is proposed to provide drinking water for all the villages and town in Saurashtra besides providing water for industrial purpose. It was informed that Gujarat Water Supply and Sewerage Board will make arrangement to supply the water from Narmada Canal System.

Three sanctuaries will be benefited by the availability of the sweet water in the command, they include Black buck sanctuary at Velavadar, Birds sanctuary at Nal Sarovar and Wild ass sanctuary in the Kutch. It is also proposed to develop plantations along the available space on the sides of canal.

Present Status of Works

To supply drinking water to Saurashtra and Kutch region, the works of Narmada Canal System in Saurashtra region was taken up on priority. Accordingly the works of SBC upto 88 km. Maliya Branch Canal and Vallabhipur Branch Canal have been taken up. By June 2000 about 90% of the earth works, 88% of the structure concrete works were completed. On these works about 84% of the expenditure was already incurred.

Further works of Saurashtra Branch Canal beyond 88 to 104 km. and remaining works of other 4 sub-branch canals namely Dhrangadhra, Morbi, Limbdi, Botad Branch Canal are also planned to be taken up during 2000 and 2001. The works are expected to be completed during 2005.

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FIELD VISIT TO THE KOPARNI - WILD ASS SANCTUARY

The vegetation of the runn is reported to be dominated by 6/E3 saline thorn forests, 6E/4 salavadora scrup, 5E/8 saline alkaline scrub, 6DS1 cassia auriculata scrub, euphorbia scrub, sueda cover besides grasses and herbaceous cover. A few species fall under the category of rare / endangered / threatened species. Urochondra setulosa occuring is a species endemic to India. Commiphora wightii is listed in the IUCN Red Data Book. The major grasses found were Aristida adscensionis, Eragrostis ciliaris, Sporobolus, Chloris, Seteria species. However, it was informed that the salt work activity has been in practice in the LRK since 1873 which has increased day-by-day. About 31% of the salt production of the Gujarat State is from LRK for which brine of the major part of the LRK is used.

The Sanctuary area was visited at Koparni helmet 25 km. from Dhrangadhra. and was found to be flooded with rain waters as river Banas, Rupen and Saraswati are the major river that empty in the runn. The rain water get mixed up with sea ingress from the Gulf of Cambay. The entire runn was looking like a seasonal brackish water shallow lake. Fishing activity was also seen. It was informed that the sanctuary area is a good breeding ground for the prawns. Migratory birds like Caspian Tern and White Ibis besides Cattle Egret could be seen even at this season and natural grasses found in the sanctuaries were sprouting. It was also reported that the sanctuary area is quite rich in other forms of wildlife like Chinkara, Black Buck, Blue Bull, Wild Boar, Wolf, Jackal, Hynea, Purcupine etc. besides reptiles, birds and fishes which also need to be conserved and protected. Members were of the opinion that there is a need for propagating endemic indigenous grasses in the area on an experimental basis.

The canal will pass through the fringe areas of the sanctuary and shall impact the sanctuary directly or indirectly. Therefore, the Committee members felt that there was a need for better interaction between the planners, engineers on one hand and the experts on wildlife particularly the wild ass on the other to avoid any

negative impacts on the precious biological resource. In view of the concern raised regarding movement of wild ass between the two ranns, i.e., Little Rann of Kutch (LRK) and Greater Rann of Kutch (GRK) and likely impacts which may emanates from the Kutch Branch Canal. In addition, the impacts generated by the irrigation in the command near Sanctuary areas, discussions were held with the Sanctuary Superintendent and concerned officers of the Forest Department.

FIELD VISIT TO THE DHRANGADHRA - DISCUSSIONS WITH EXPERTS ON WILD ASS SANCTUARY

Experts on wild ass belonging to Gujarat Ecological Education and Research (GEER) Foundation, Gandhinagar informed that detailed studies have been conducted, more particularly, with reference to Wild Ass Sanctuary in Little Rann of Kutch, a detailed study was undertaken by Gujarat Ecological Education and Research (GEER) Foundation, Gandhinagar. As per the report of the said study, none of the branch canals or even distribution network encroached upon the sanctuary limit of LRK comprising in area of 4953 sq. kilometer and that they remain far away from the sanctuary. The report further suggested that the movement of Wildlife is largely from the Rann to the fringes and vice versa. **Keeping in mind** this recommendation, the Kutch branch canal will have a siphon at the junction between LRK and GRK so that there is no restriction on the movement of Wild Ass. As per the report of said study, Wild Ass do not use the fringe areas of vast Rann but use the islands or bets located well within the desert area.

- The canal will pass through the fringe areas of the sanctuary and shall impact the sanctuary directly or indirectly. Therefore, the Committee members felt that there was a need for better interaction between the planners, engineers on one hand and the experts on wildlife particularly the wild ass on the other, to avoid any possible negative impact on the precious biological resource.
- It was also observed that the sanctuary area is quite rich in other forms of wildlife that also need to be conserved and protected.

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- Members were of the opinion that there is a need for propagating endemic indigenous grasses in the area on an experimental basis.
- It was suggested that following aspects may be kept in view after introduction of canal water for irrigation on the fringe areas of the sanctuary or in the areas on the neck of the LRK and GRK:
 - Agro-pollution aspects should be kept in mind while making recommendations for on-farm and off-farm development works.
 - Safe passage to the wild ass during it's movement on the fringe area should be considered by providing bridges/siphons across the canals and distributaries.
 - Spread of the Prosopris juliflora should be stopped and steps should be taken for it's removal.
 - Salt pan industries should not be allowed to expand within the sanctuary.

Field visit Report: July 2000

DISCUSSIONS AND RECOMMENDATIONS

Discussions were held with the officers of Narmada Planning Group, Sardar Sarovar Narmada Nigam Ltd. and officers of the Environment Cell and those in charge of the civil constructions on the dam and canal network. Detailed presentations were made by the concerned officers of the State Government on various facets of the command area development. Detailed presentation were made on the following:

- Construction of canal system; command area, measures for reduction of water logging & salinity surfacing,
- Ground water studies and investigations, mathematical modeling of ground water, conjunctive use,
- Water delivery & associated issues, distribution system planning, field channels, land leveling, land drainage,
- Problems, potential, terrain, soils, ground water & irrigation strategy including crop planning, drainage needs, form development technique, seepage losses and water logging etc. for Bara Tract area in region 4 of the command.

Regarding drainage the following points were brought out:

- Surface drainage would be an integral part of irrigation net work and is being provided for to cover 40 ha. chak unit in all the areas needing surface drainage.
- The vertical drainage as required will be through Tube Wells and Open Wells.
 The drainage system would consist of surface network of open channels and ground water control wells.
- 3. The natural drainage shall be suitably modified and additional drainage will be provided where ever necessary to take care of excess water during monsoon to ensure that the flood water gets drained out in a reasonable period and there is no spill over and choking of drainage.

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- The sub-surface water drainage control will be through judicial ground water exploitation and with adequate planning so that there is no water logging in the areas.
- 5. The drainage system shall be constructed and maintained up to 40 ha. block synchronising in general with a chak distribution unit.
- 6. The maintenance of drainage within the chak will be left to the farmers.
- 7. The construction of the drainage network will be completed simultaneously with the construction of major distribution network and completed on block to block basis so that it is ready for use by the farmers by which time the surface water becomes available for irrigation.

The Vice-Chairman, SSNNL informed the members that considering the water scarcity in the command and uncertainty on the commencement of irrigation people would not like to drain out what ever little rain fall they are getting through installation of network of drainage and land themselves in the problems. Therefore Government have a plan to installed drainage network after commencement of the irrigation. He was of the view that considering the low water tables and that irrigation to the delta of only 53 cm or less as against 75 cm in existing projects is proposed to be provided. Volumetric and rotational water supply by warabandhi and other measures in place, it is expected that problem of water logging would not present a problem during initial irrigation. However detailed plans for drainage are included in the command area development plan under preparation. Special measures to contain water logging have been planned for Bara and Bhal tract.

Prof. Ramasheshan, suggested that the some of the areas where studies have pointed out water table at about 5 metre depth / basalt with overlying clay, advance actions on drainage would be required. He further suggested that water quality at the outlet of the drainage may have to assessed for ascertaining it's impacts on the users on the fringe of the command area.

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ANNEXURES

NCA Environment Sub-group: Committee

Annexure-I

Field visit Report: July 2000

List of Participants

Government of India

- 1. Shri N.D. Tiwari, IFS, Member (E&R), NCA, Indore. Chairman
- 2. Dr. Nalini Bhat, Addl. Director, Ministry of Environment & Forests, New Delhi.
- 3. Dr. R.D. Dixit, Joint Director, Botanical Survey of India, Allahabad.
- 4. Dr. Pawan Kumar, Specialist (Environment), NCA, Indore. Convenor
- 5. Shri R G. Pandey, Deputy Director (Environment), NCA, Indore.
- 6. Shri R. Gaurana, Asstt. Director (Environment), NCA, Indore.

Non-official Member

1. Prof. S. Ramaseshan, Non-official Member, Perumbudurai.

Government of Gujarat

- 1. Shri V.B. Buch, IAS, Vice-Chairman, SSNNL, Gandhinagar.
- 2. Shri C.K. Koshy, IAS, Managing-Director, SSNNL, Gandhinagar

Government of Madhya Pradesh

1. Shri Silekar, IFS, CF, NVDA, Government of M.P.

Key officers interacted / associated during the visit

- 1. Dr. S.A. Chavan, IFS, CCF, SSPA, Gandhinagar.
- 2. Dr. H.S. Singh, IFS, Director, GEER Foundation, Gandhinagar.
- 3. Shri V.C. Trivedi, IAS, Addl. Commissioner, Gandhinagar.
- 4. Shri Negi, IFS, CF, Kevadia, Distt. Narmada.
- 5. Shri Ashwani Parmar, DCF, SSPA, Gandhinagar.
- 6. Smt. Namita Priyadarshi, IFS, SSNNL, Gandhinagar.
- 7. Shri V.J. Rana, Sanctuary Superintendent, Wild Ass Sanctuary, Dhrangadhra.
- 8. Shri Vikram Patel, SSPA, Gandhinagar.
- 9. Shri Joshi, Deputy Engineer, Environment Cell, SSPA, Gandhinagar.
- 10. Shri L.V. Asra, Chief Engineer, CAD, SSNNL, Gandhinagar,
- 11. Shri J.B.Patel, Chief Engineer, Saurashtra Branch Canal, Rajkot.
- 12. Dr. C.L. Patel, Research Scientists, Gujarat Agriculture University.
- 13. Shri K.N.Rawal, Suptd. Engr., Saurashtra Branch Canal, Circle-I, Surendranagar.
- 14. Shri Ashok Gajjar, Executive Engineer, Sardar Sarovar Dam, Kevadia.
- 15. Shri R.H. Vaghela, Ex.Eng, Surashtra Branch Canal, Division-1/4, Dhrangadhra.
- 16. Shri A.V.Durkal, Executive Erigineer, NPG, Gandhinagar.
- 17. Shri P.M. Shah, Technical Advisor to M.D., SSNNL., Gandhinagar.
- Shri R.J.Shah OSD, NPG, Gandhinagar.
- 19. Shri M.K.Kantheria, Executive Engineer, NPG, Gandhinagar.
- 20. Shri B.J.Shah, Director, Canals, SSNNL, Gandhi Nagar
- 21. Shri Munshi, Soil Survey Officer, SSNNL, Vadodara.

Annexure - IT

List of the studies with respect to drainage, water logging and salinity in the command area.

No.	Name of the study	Name of agency	Year of completion
1	Survey and investigation work of ground water Resources in Narmada-Mahi Doab.	Gujarat Water Resources Development Corporation Ltd ,Gandhinagar.	1987
2	Inter-Regional Water Allocation and Determination of Branch Canal Capacity.	Operation Research group, Vadodara	1989
3	Extended Study on Inter Regional water Allocation and Determination of Branch Canal Capacity.	Operation Research group, Vadodara	1989
4	Mathematical Modeling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati.	Consultancy Engineering Service, New Delhi.	1993
5	Mathematical Modeling of Ground Water System for SSP Command Between Rivers Sabarmati and Banas.	Operation Research group, Vadodára	1993
6	Mathematical Modeling of Groundwater System for Command Beyond Banas up to Rajasthan Border.	Dalal Consultants, Ahmedabad.	1993
7	Pre-feasibility Level Drainage Study for SSP Command Beyond Mahl.	Consultancy Engineering Service, New Delhl.	1993
8	Review of Ground Water Drainage, Study.	H.R.Willingford.	1996
9	Mathematical Modeling of Ground Water for System Single Layer Model-Narmada-Mahi Doab.	Operation Research Group, Vadodara	1982

Annexure - III
List of studies with respect to flora and fauna in the command area of SSP

No.	Name of the study	Name of agency	Year of completion.
1	Environmental Impact Assessment Studies on Inland and Marine Fisheries relevant to the Command Area of Sardar Sarovar (Narmada) Project.	M.S.University, Baroda	1994.
2	Environmental Impact Assessment (EIA) Studies on Water Related Disease in Sardar Sarovar Project (SSP) Command Area including the Down Stream of the SSP.	Commissionerate of Health, Medical Services & Medical Education, Govt. of Gujarat, Gandhinagar.	1995.
3	Study of Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project: Lying between the Narmada and Sabarmati River (EIA Studies)	Sardar Patel University, Vallabh Vidyanagar.	1995.
4	EIA on Downstream of Sardar Sarovar Dam up to Gulf of Cambay.	H.R.Willingford	1995
5	Study on Flora and Fauna of the Command Area of the Sardar Sarovar (Narmada) Project.	Saurashtra University Rajkot.	1996
; 6 	Environmental Impact Assessment of Black Buck National Park located at Velavadar in the command area of SSP.	GEER Foundation	1993
7	Study on Flora and Fauna of the Command Area of SS(N) Project Lying Between Sabarmati River and Rajasthan Border, EIA Studies.	Gujarat University, Ahmedabad.	1998
8	Ecological Study of Wild Ass Sanctuary and surrounding Area Using Remote Sensing Technology for EIA.	Gujarat Ecological Education & Research Foundation (GEER Foundation), Gandhinagar.	1998
9	Environmental Impact Assessment of Nal Sarovar Bird Sanctuary.	GEER Foundation.	1998

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Annexure-117

List of the studies with respect to Auro-forestry in the command area of SSP

Sr. No.	Name of study	Name of Agency	Year of Completion
1	Cropping Pattern and Water Demand Study in Narmada Command Area	Operation Research Group, Vadodara	1987
2	Growth of Agro-Processing industries in phase-I of the SSP	Gujarat Industrial & Technical consultancy Organisation Ltd. Gandhanagar.	1990 \
3	Study on Preparation of a Detailed Integrated Command Area Development Plan for SSP	M/s. Wamana Consultants Pvt Ltd, Hyderabad	1994
4	Agro-Pollution Aspect of Command Area.	H.R. Wallingford	1996

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Annexure- V

List of studies with respect to technical study in the command area of SSP

Sr. No,	Name of Study	Name of Agency	Year of completion
1	Consultancy Work for Control, Telemetry and Communication Network on Narmada Canal System for SSP	Gujarat Communication & Electrical Ltd.	1991
2	Techno-Economic study for utilising Village Tanks as Borrow Area for Construction of Canal Network.	Operations Research Group, Vadodara.	1992 \
3	Studies in Water Rates Policy, in 3 parts		
	i) Pricing of a Public Utility survey of literature.	Department of Economics, South Gujarat University, Surat	1992
(ii) Financial working of Imigation Project- A Case of four Projects in Gujarat.	Department of Economics, Sardar Patel University, Vallabh Vidyanagar.	1992
	iii) Some Policy Issue for Canal Water Rates in Gujarat.	Department of Economics, Sardar Patel University, Vallabh Vidyanagar.	1992



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

संख्या-पर्या: 2(1) 2000/ 7520-28

<u> दिनांक: 18-8-2०००</u>

पंजीकत डाक द्वारा

सेवा में.

श्री विश्वनाथ आनन्द. भारत सरकार के सचिव, पर्यावरण एवं वन मंत्रालय, सी.जी.ओ. काम्पलेक्स. पर्यावरण भवन, लोदी रोड नई दिल्ली - 110 003

विषय:-सरदार सरोवर एवं नर्मदा सागर परियोजनाओं के पर्यावरण प्रबन्धन से सम्बन्धित स्थिति विवरण - मार्च, 2000.

महोदय.

इस पत्र के साथ उक्त रिपोर्ट की एक प्रति सादर अवलोकनार्थ एवम् आवश्यक कार्यवाही हेतु भेजी जा रही है।

भवदीय

संलग्नक: उपरोक्तानुगार ।

(डा. पवन कुमार) विशेषज्ञ पर्यावरण

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BG-79, Scheme No. 74-C, Vijay Nagar, Indore - 452 010 (M.P.) बी.जी. - 79, रकीम नं. 74-सी, विजय नगर, इन्दौर 452 010 (म.प्र.) Phone No.: Mem (E&R)- 554333, SPL(Env)- 571587, IAO-558603, APRO-557691 Gram: NARCONTROL Fax: 91-731-554333

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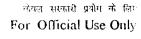
प्रतिलिपि : ~

- 1- सचिव, जल संसाधन मंत्रालय एवं अध्यक्ष, नर्मदा नियंत्रण प्राधिकरण, श्रम शक्ति भवन, रफी मार्ग, नई दिल्ली को उक्त रिपोर्ट की एक प्रति सूचनार्थ प्रेषित ।
- 2- कार्यकारी सदस्य, नर्मदा नियंत्रण प्राधिकरण, इन्दौर को उक्त रिपोर्ट की एक प्रति सूचनार्थ प्रेषित ।
- 3- सदस्य पर्यावरण एवं पुनर्वास नर्मदा नियंत्रण प्राधिकरण, इन्दौर को उक्त रिपोर्ट की एक प्रति सूचनार्थ प्रेषित ।
- 4- प्रबन्ध निदेशक, सरदार सरोवर नर्मदा निगम लि0, नया सचिवालय परिसर, ब्लाक न. 10, गाँधीनगर-10 गुजरात को उक्त रिपोर्ट की एक प्रति सूचनार्थ प्रेषित ।
- 5- सचिव, पर्यावरण, महाराष्ट्र सरकार, नया प्रशासनिक भवन, मंत्रालय, मुम्बई-४०० ०३२ को उक्त रिपोर्ट की पाँच प्रतियाँ सूचनार्थ प्रेषित ।
- 6- सदस्य, पर्यावरण एव वन, नर्मदा घाटी विकास प्राधिकरण, नर्मदा भवन,तुलसी नगर, भोपाल-562003 को उक्त रिपोर्ट की पाँच प्रतियां सूचनार्थ प्रेपित ।
- 7- (सचिव, पर्यावरण, पर्यावरण विभाग, राजस्थान सरकार, सचिवालय, जयपुर 302 005 को उक्त रिपोर्ट की एक प्रति सूचनार्थ प्रेषित ।
- 8- उप निदेशक सम्पर्क, नर्मदा नियंत्रण प्राधिकरण, 1001 भिकाजी कामा प्लेस, 10वीं मंजिल भिकाजी कामा भवन, नई दिल्ली–110066.

(*डा. पवन कुमार*) विशेषज्ञ पर्यावरण

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स्थिति विवरण Status Report





पर्यावरण प्रबन्धन सरदार सरोवर एवं इंदिरा सागर परियोजनाएँ

Environment Management Sardar Sarovar & Indira Sagar Projects

> मार्च, 2000 March, 2000

नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

इन्दीर जुलाई, 2000

> Indore July, 2000

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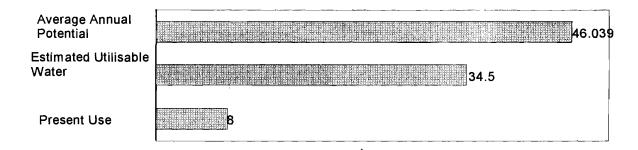
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STATUS REPORT

March, 2000

Environment ManagementSardar Sarovar and Indira Sagar Project

Narmada is the fifth largest river of India. It is also the largest west flowing, least polluted river. Its length from Amarkantak to Arabian Sea is - 1312 Km. The mean Annual Rainfall in the basin is 1,180 mm (46.45 inches) and Average Annual Run-Off is 41,000 M.Cu.M (33.21 MAF). Its catchment area is about 98,000 Sq.Km, which is spread to the State of Madhya Pradesh, Maharashtra and Gujarat. The current utilization of the Narmada water is as follows (Units in MAF.):



Master Plan For The Development Of Narmada River Basin: NWDTA

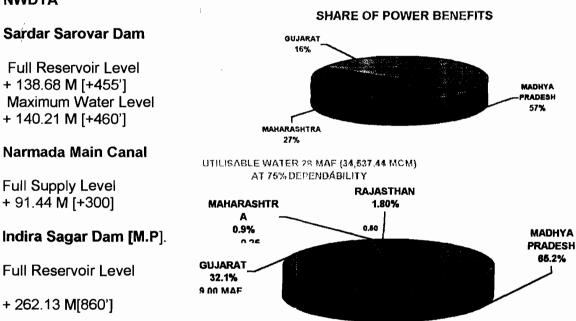
In 1965, India appointed a committee to develop a master plan for the Narmada Basin. The committee's recommendations were not accepted by the riparian states. This impasse led to the constitution of the Narmada Water Disputes Tribunal in 1969 by Government of India under Inter State Water Dispute Act of 1956, for adjudication of water disputes of Narmada among riparian States. Its deliberations continued until 1979. The Tribunal considered the Sardar Sarovar Projects and the Narmada Sagar Projects together using the best hydrological, engineering, and other evidence available and passed the order which was notified in Gazette on December 16th, 1979.

NWDTA

In its 1979 award, the Narmada Water Disputes Tribunal made many of the most fundamental decisions about the Projects. These included the dam location, regulation of flows, reservoir levels etc. There are points in the Tribunal award that bear on the environmental aspects of Sardar Sarovar Project which are summarised below:

- the utilizable quantum of Narmada waters at the Sardar Sarovar dam site is specified at 28 million acre feet (MAF) on the basis of 75 per cent dependability.
- apportionment is to be 18.25 MAF for Madhya Pradesh, Gujarat 9,00 MAF, Rajasthan 0.50 MAF, and Maharashtra 0.25 or in that ratio.
- the apportionment/sharing of water are subject to review after 45 years.
- + the canal and dam water levels are fixed.
- the multi-purpose character of the project, including hydroelectric power, is affirmed.
- Madhya Pradesh is to provide regulated releases of water from the Narmada Sagar Projects to the Sardar Sarovar Projects and.
- terms of the award are subject to change if there is agreement between all the states concerned.

Principal Levels and apportioning of the irrigation and power benefits by the NWDTA



Estimates of Govt. of Madhya Pradesh anticipate that over the next half century there will be 29 major, 135 medium, and about 3,000 minor projects in the Narmada River valley. The Sardar Sarovar, one of the first to be built on the main river, is the terminal project on the river system and its benefits and impacts, are linked to developments of Indira Sagar Project upstream.

Key Directives By The NWDT On Environment & Rehabilitation

Fisheries development (NWDTA clause XI, sub-clause V (6) & (7): The NWDT direction regarding this is in para- 5 &7 of Sub-clause V of final order and decision of NWDT in Chapter XX of the Report of Volume II. The decision is reproduced below:

- V(6) "Notwithstanding vesting in Gujarat of the lands coming under submergence, Madhya Pradesh and Maharashtra shall continue to enjoy all rights of sovereignty intact over the submerged area in the respective States".
- V(7)"Madhya Pradesh and Maharashtra respectively shall be exclusively
 entitled to all rights of fishing, boating and water transportation over the part of
 lake over the submerged land within Madhya Pradesh and Maharashtra
 respectively provided, however, that such right is not exercised to the
 prejudice of any utilities of the legitimate performance of their duties by the
 project personnel".
- Monitoring of the protection shifting/relocation of the monuments of archaeological significance being affected by the submergence of Sardar Sarovar, Narmada Sagar, (NWDT clause XI-sub-clause III (4) & XIV-7,8(3)(iv).
- Studies related to Downstream scenario for estimating impacts of project activities (NWDT clause IX (Vii) related to indenting of water for downstream by Gujarat.
- Clause XI{sub clause I to VI, page 110-115}deals with the provision for rehabilitation of oustees (PAFs) from submergence area of Madhya Pradesh and Maharashtra who are likely to be resettled in Gujarat or in their home states.

Environmental Clearance by Govt. of India

It is recognised that the creation of reservoir will bring in environmental, social and economic impacts and that there will be changes in environmental regime in the upstream, downstream and in the command basically due to submergence and displacement of people and wildlife and irrigation in the command. Such changes are required to be assessed and evaluated for taking decision before proceeding with the project.

Ministry of Water Resources the then Ministry of Irrigation & Power had developed detailed guidelines framed during October, 1980 for project formulations which included a detailed check-list by the Ministry of Environment & Forests, the then department of Environment of the department of Science & Technology of the Govt. of India, for assessment of environmental impact of the projects and planning for Environmental Safeguard Measures.

In accordance with the requirement of the Department of Environment, project authorities submitted the detailed project report (DPR) along with the needed information on environmental issues during February to October, 1980. Environmental Appraisal Committee of the Ministry of Environment & Forests approved the project in

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principle during its 12th meeting held in 1983. More information & data on certain parameters of Environmental impact & management were subsequently provided through additional documentations over a period of time in various stages of completeness by three states i.e. Maharashtra, Gujarat and Madhya Pradesh. The information provided was also updated from-time-to-time. The studies action and data were considered at levels and the projects namely Sardar Sarovar in Gujarat and Indira Sagar in Madhya Pradesh were formally cleared from environmental angle on 24th June, 1987 by the Ministry of Environment & Forests, Govt. of India. Permission for diversion of the forestland was also subsequently accorded for both the projects separately by the MOEF during September, 1987 and October, 1987. The Investment Clearance for the Sardar Sarovar and Indira Sagar Project was received from the Planning Commission during October, 1988 and November, 1988 respectively, thus paving the way for implementation of these projects.

Before a formal clearance by the Ministry of Environment & Forests, Narmada Control Authority was expanded and was entrusted with the increased responsibilities in the areas of environment and rehabilitation. The clearances issued subsequent to the expansion of the NCA by the Central Government departments, contained certain conditions to be complied with during the course of project implementation.

The Parameters

- + rehabilitation master plan;
- + phased catchment area treatment scheme;
- compensatory afforestation plan;
- + command area development.
- survey of flora and fauna; carrying capacity of surrounding area;
- + seismicity and
- + health aspects.

The Narmada Control Authority was given the responsibilities to ensure that the environmental safeguard measures would be planned and implemented in depth and the pace of its implementation would be pari passu with the progress of the work on the Projects. The four conditions of the clearance were:

- ➤ the Narmada Control Authority would ensure that the environmental measures are planned and implemented pari passu with the progress of the work on the project;
- > the detailed surveys/studies would be done
- catchment area treatment and rehabilitation programs would be completed ahead of reservoir filling.
- > The Department of Environment would be kept informed of progress.

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Forest Clearance

In September 1987, under the Forest (Conservation) Act, 1980 the Central government gave approval for the diversion of over 13,386 hectares of forest land for the Sardar Sarovar Projects. This approval was subject to eleven conditions in all three states, of which the following are especially relevant.

- detailed compensatory afforestation plans would be submitted.
- > a proposal for non-forest areas for rehabilitation of oustees would be submitted.
- compensatory afforestation would be in double the area of degraded forest lands in addition to the afforestation of equivalent non-forest land, and a scheme for this would be submitted.
- a catchment area treatment plan will be prepared by November 30, 1987, failing which a central government team would be appointed at a cost to the project.

Investment Clearance

The Planning Commission, Govt. of India approved investment for an estimate cost of Rs. 6,406 crores for SSP in Gujarat vide their letter dated 15.10.88. The Planning Commission of the Government of India granted the State of Gujarat approval for the Sardar Sarovar Projects subject to seven conditions that bear on the environment (as well as resettlement and rehabilitation).

- > compliance with the 1987 environmental and forestry clearances;
- adequate funding to meet the construction schedule;
- > submission of a detailed program for drainage and ground water balance studies beyond the Mahi River;
- adoption of measures to ensure project revenue from water rates to pay for annual operation and maintenance charges;
- > setting up an expert group to study siltation in the main canal.
- drawing up a detailed schedule and plans for the micro-level irrigation network system; and an implementation schedule for completion of the canal network so that irrigation benefits do, in fact, start accruing from the financial investment.

Monitoring by the NCA.

Following the recommendations of the Ministry of Environment & Forest, the scope of the Narmada Control Authority was enlarged on 4th June, 1987 through amendment brought out by MOWR under clause 9(i)4 9(2)a, through gazette notification. The functions of NCA were modified to include major functions of coordination & direction of the implementation of all the projects including the environmental protection measures to ensure the faithful compliance of the conditions attached by GOI while granting clearance to these projects.

Environment and Rehabilitation Wing Of The NCA

The Environment & Rehabilitation (E&R) wing of NCA is headed by Member (E&R), NCA, Indore. Member (E&R), NCA draws support from two officers of the rank of Directors, namely 1) Specialist Environment Environment and 2) IAO with additional charge of Director Rehabilitation.

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Organisation Chart of E&R wing



Environment and Rehabilitation Sub-Groups Of NCA

NCA had constituted among others, two sub-groups namely Environment sub-group under the Chairmanship of Secretary, Ministry of Env.& Forests, GOI. And Rehabilitation Sub-group under the Chairmanship of Secretary, Ministry of Social Justice & Empowrement, GOI. Member (E&R), NCA is Member Secretary to both of these sub-groups.

Functions Of The Environment Sub-Group.

- i) To work out the environmental safeguard measures to be planned and implemented for the entire Narmada Basin so that environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar and Sardar Sarovar Projects.
- ii) To determine the terms of reference of required surveys and studies necessary for implementation of environmental safeguard measures inclusive of data base required, the methods by which the data base is to be prepared and also to identify the institutions/individuals to undertake the preparation of such documents.
- iii) To get prepared for clearance by the Ministries and NCA the action plans with regard to all environmental safeguard measures and the assessment criteria thereof.

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- iv) To devise a suitable monitoring and evaluation mechanism so that the action plans are effectively implemented in consonance with stipulations at the time of clearance of the projects.
- v) To assess the necessary organisation with management capability being set up for adequate implementation of environmental safeguard measures.
- vi) To undertake all measures necessary to assist Narmada Control Authority in the planning and implementation of environmental safeguard measures.

Important Sub-Groups and Sub-Committees On Environment & Rehabilitation

- There is a Environment Committee headed by the Member (E&R), NCA The Committee visits the impacted areas in all the three states by rotation for assessing compliance and submits its reports to the sub-group and necessary recommendations are forwarded to concerned State Governments for compliance.
- 2. High level expert group on fisheries development and conservation in Sardar Sarovar reservoir. This is chaired by the Joint Secretary, MOE&F. Member (E&R), NCA is the Member Secretary for this committee.
- Committee on flora and fauna aspect of Sardar Sarovar and Narmada Sagar Project. This committee is chaired by Member (E&R), NCA
- 4. Committee on archaeological and anthropological aspects. This committee is chaired by Member (E&R), NCA
- 5. Committee on Health aspects. This committee is chaired by Member (E&R), NCA
- 6. There are four high level expert multi disciplinary groups directing, coordinating and monitoring various studies commissioned by Govt. of Gujarat for the vast command area of SSP formed in pursuance of the directives of the Environment Sub-group for initiating such studies. Member (E&R) is included as regular member. Meeting of the expert group are convened by NPG from time to time to discuss the progress/interim reports of the studies commissioned by the Govt. of Gujarat.
- 7. Govt. of Maharashtra had formed Focus Group consisting of Secretaries of the various departments of the Govt. of Maharashtra to review issues related to SSP.
- 8. The Govt. of M.P. had constituted Wild Life Committee to review the environmental issues related with the SSP and ISP including studies, action plans and implementations.

SARDAR SAROVAR PROJECT

Salient Features of the Project

Locations
Height
Length
Gross storage
Live storage
Annual irrigation
Installed capacity

Cost of Project Rs.6,406.00 crore (at 1986-87 price level)

Annual irrigation Per ha submergence of cultivable land

Near village Navagam, distt. Narmada

163.00 m 1,210.00 m

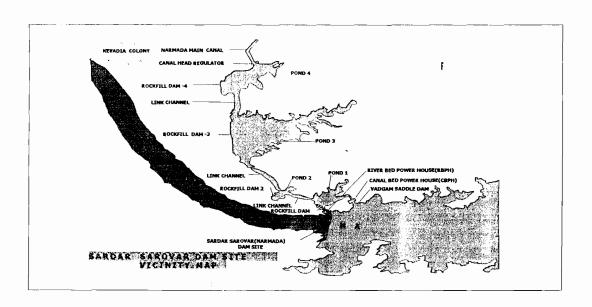
9.5 (7.70) b cum (MAF) 5.8 (4.73) b cum (MAF)

18.65 lakh ha.

1,450 mw (1200 mw + 250 mw)

Rs.13,180.62 crore (at 1991-92 price level)

of About 165 ha



Key benefits from the proposed project.

Irrigation	Hydropower	Flood control
Gujarat 18.65 lakh ha Rajasthan 17.92 lakh ha Maharashtra 0.73 lakh ha	1450 MW	210 villages and Bharuch city 750,000 population

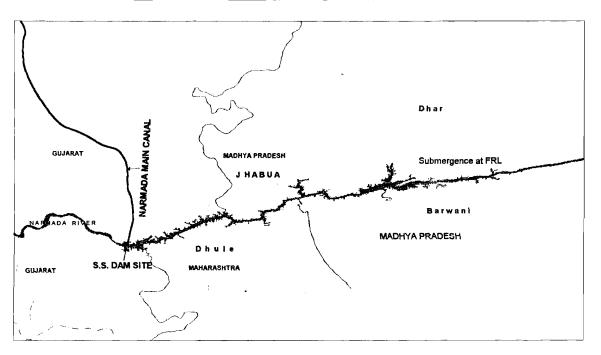
Additional benefits

- Drinking water supply to 135 urban centres and 8215 villages
- + Water supply for industries
- + Fisheries development
- + Wild life sanctuaries development

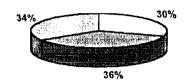
The submergence

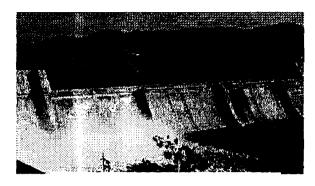
The submergence zone of the project lies within the State of Maharashtra , Madhya Pradesh & Gujarat as depicted in the table & map below.

State	Culturable land (ha)	Forest land (ha)	Land under other uses (ha)	Total land (ha)	Affected number of villages	Affected number of PAFs
Madhya Pradesh	7,883	2,731	10,208	20,822	193	33,014
Maharashtra	1,519	6,489	1,592	9,599	33	3,213
Gujarat	1,877	4,166	1,069	7,112	19	4,600
Total	11,279	13,386	12,869	37,533	245	40,827



LAND USE PATTERN OF LAND UNDER SUBMERGENCE





Sardar Sarovar Dam

□Culturable Land □Forest Land □Other Uses

Development and current status of the management of SSP environment

The environmental clearance had suggested the following parameters for Environmental Management.

- 1. Resettlement & Rehabilitation.
- 2. Catchment Area Treatment
- 3. Compensatory Afforestation
- 4. Command Area Development.
- 5. Flora Fauna& Carrying Capacity of Surrounding area
- 6. Seismicity
- 7. Health

In addition during the course of the project implementation and review of the environmental planning, at the instance of the environment sub-group of the NCA several more issues like archaeology, anthropology, downstream impacts, fisheries etc. were also identified. The State Government have taken steps for preparation / updating of the action plans, covering the suggested parameters.

The present status report delineates the steps taken by the project authorities right from planning stage up till the quarter ending March, 2000, for the implementation of the identified mitigative measures as hereunder.



CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

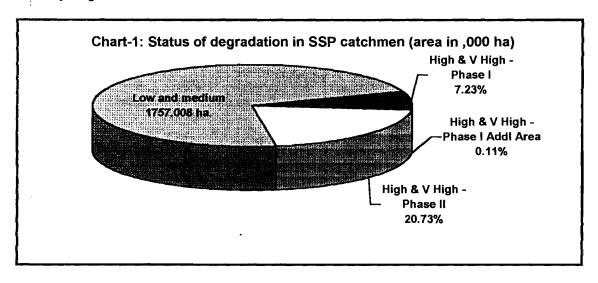
- more detailed surveys for prioritisation of the sub-catchments in the SSP area should be undertaken;
- A phased CAT programme should be prepared and implemented ahead of reservoir filling.

Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the SSP catchment. They include: -

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), 1985.
- Report on Prioritisation of Sub-watersheds in Sub-catchments of Narmada Catchment, 1991 by AIS&LUSO, New Delhi.

According to the above studies, the total catchment area of Sardar Sarovar Project below Narmada Sagar Dam is 24,42,440 ha. Out of this, 6,82,769 ha area spread to 500 sub-watersheds having silt yield index 1,200 and above was identified as critically degraded.



GOI issued a directive in July 1992 that, for the SSP, the project would bear the costs of the treatment of all critically degraded sub-watersheds draining directly into the reservoir. These watersheds were identified amongst those classified as either very high or high-priority categories by the All India Soil & Land Use Survey Organisation

(AISLUSO). The project would also be responsible for the treatment of those areas of the catchment, which are directly damaged by the project activities.

In addition, plans are required to be prepared for the treatment of the balance of the critically degraded sub-watersheds but the cost of this will be met from other ongoing schemes and in a timeframe to be determined.

PLANNING:

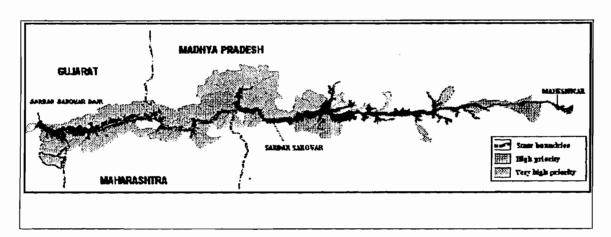
Project authorities were required to prepare the plans, as phase-I programme, for treating those critically degraded sub-watersheds which were identified as *directly draining* into the reservoir. The balance sub-watersheds were to be treated as Phase-II programme.

	Particulars		Madhya Pradesh	Gujarat	Maharashtra	Total
Very High & High	Planned to Treat	Phase I	125725	29157	24298	179180
Q Tilgit	Heat	Phase- II	349892		77568	427460

Table 1: Area Statistics of Very High & High Priority Sub-watersheds in the Catchment of Sardar Sarovar Project

I. PHASE-I: DIRECTLY DRAINING SUB-WATERSHEDS

Project authorities have prepared the plans for treating total area of 1,79,180 ha as shown in the *table* –1 above. This area is required to be treated pari-passu with the project works



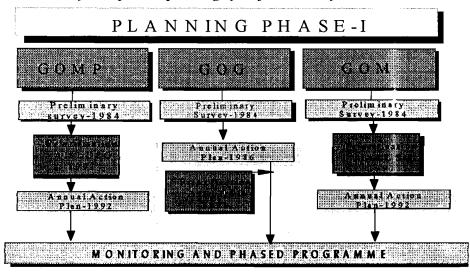
Map: Showing critically degraded directly draining sub watersheds of SSP

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ACTION PLANS:

The project authorities have submitted the Action Plans in varying stages of completeness. These plans contained information related to survey work, management options, monitoring & phased programme of treatment besides provisions for annual budget. The various stages in planning for each item of the plan are given in the *Fig.-1 below*.

1823. Flow chart of CAT phase-I planning by Gujarat, Madhya Pradesh and Maharashtra



Elements of Action Plan

Key elements of the Action Plan which includes time-table, menu, budget etc. received from GOG, GOMP & GOM are depicted in *Fig.-2*

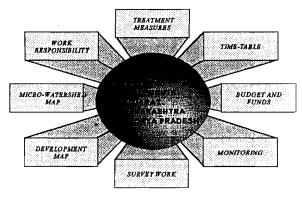


Figure 1: Action Plan components.

IMPLEMENTATION:

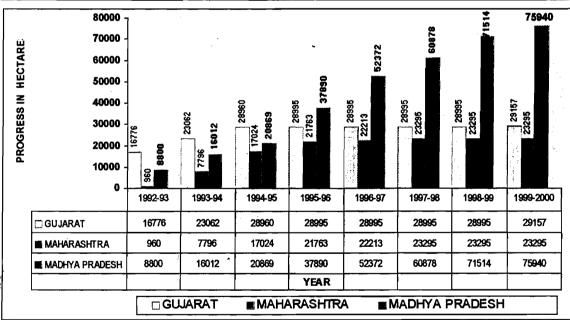
Project authorities have prepared the plans for treating 1,79,180 ha area in about 10 years time. Govt. of Gujarat started the treatment works w.e.f. monsoon of 1990 whereas Govt. of Maharashtra and Govt. of Madhya Pradesh could start the work in the year 1992. The progress of treatment work.

is detailed in the table - 2 and the bar chart-I drawn below.

Area under 1,79,180 ha Progress 1,28,230 ha Balance 50,950 ha treatment

Table -2: Year wise progress of CAT Works

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YEAR	AR GOG		, , , , , , , , , , , , , , , , , , , ,	GOM			GOMP		
TARGETS	F A 27204	N FA 1953	TOTAL 29157	FA 21122	N FA 3176	TOTAL 24298	F A 51930	N FA 73795	TOTAL 125725
1990-91	4,528	898	5,426	0	0	0	0	0	00
1991-92	4,770	230	5,000	0	0	0	0	0	0
1992-93	6,014	336	6,350	960	0	960	0	8,800	8,800
1993-94	6,000	286	6,286	6,514	322	6,836	966	6,246	7,212
1994-95	5,730	168	5,898	6,542	2,686	9,228	4,263	594	4,857
1995-96	0	35	35	4,735	4	4,739	N/A	N/A	17,021
1996-97	0	0	0	450	0	450	N/A	N/A	14,482
1997-98	0	0	0	1082	0	1082	N/A	N/A	8,506
1998-99	0	0	0	0	0	0	N/A	N/A	10,636
99-2000	162	0	162	0	0	0	N/A	N/A	4426
Total	27,204	1,953	29,157	20,283	3,012	23,295	N/A	N/A	75940



Bar Chart-1: Cumulative progress of the CAT works in the States of Madhya Pradesh, Gujarat and Maharashtra

Govt. of Gujarat

As the Catchment area of Sardar Sarovar was little in Gujarat, GOG accepted the recommendations of Diwan Committee and commenced the work of treating entire catchment area in the year 1990. By the end of 1994 forest area of 27,042 ha & nonforest area of 1953 ha were treated. Treatment work is almost completed except for 162 ha of non-forest area. Graphic presentation of the progress is given in the *chart-4*.

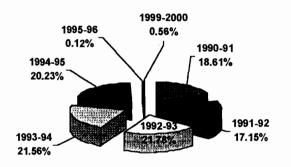


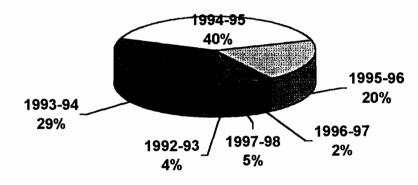
CHART-4 Progress of CAT Phase I IN Gujarat (Area in Ha.)



Govt. of Maharashtra:

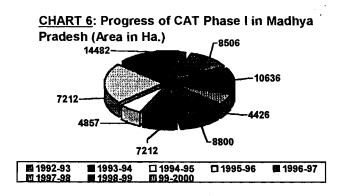
Treatment works in Maharashtra could commence in the year 1992. By the end of March, 1998 forest area of 20,283.47 ha and non-forest area 3,011.86 ha were treated. Graphic profile of the progress is given in *chart-5*.

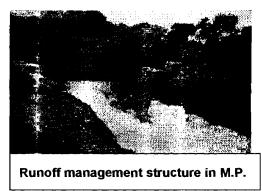
CHART 5 : Progress of CAT Phase I in Maharashtra (Area in Ha.)



Govt. of Madhya Pradesh

Treatment works in Madhya Pradesh could commence after submission of the revised work plan in 1992. By the end of March, 2000 a total of 75,940 ha area including both, forest & non-forest areas was treated-up. Progress is depicted in *chart-6*





Balance Targets:

Against the planned target of 179,180 ha of CAT works for the SSP as a whole, an area of 1,28,230ha was treated up by the end of March, 2000. It is proposed to treat the balance area as shown in chart-7 and detailed in the table-3

■ Progress upto March, 2000 ■ Unachieved target 99-2000

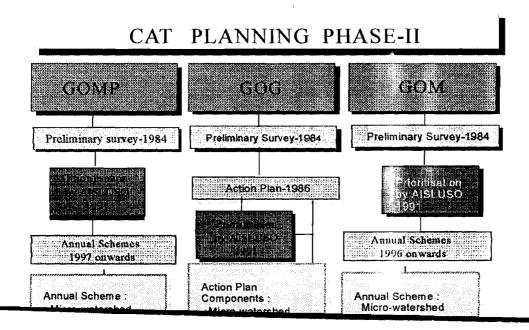


『 able 3: CAT Works remaining

ACARCIA QC.									
PARTICULARS	GUJARAT			MAHARASHTRA			MADHYA PRADESH		
	F.A.	N.F.A	TOTAL	F.A.	N.F.A.	TOTAL	F.A.	N.F.A.	TOTAL
TARGET	27204	1953	29157	21122	3176	24298	51930	73795	125725
WORK DONE	27204	1953	29157	20283	3012	23295	N/A	N/A	75940
Balance	0	0	0	839	164	1003	N/A	N/A	49785

PHASE-II: INDIRECTLY DRAINING SUBWATERSHEDS:

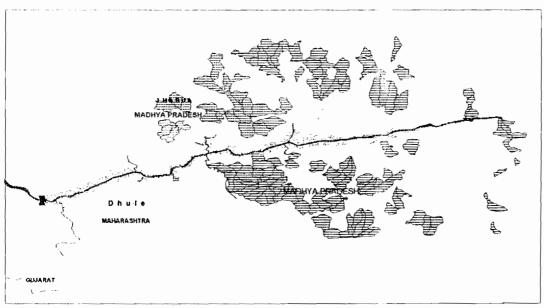
Project authorities were required to prepare plans for treating balance of the critically degraded sub-watersheds. The planning process is summarised in the figure below:



PROPOSAL FOR MONITORING AND PHASED PROGRAMME

Figure 2: Summary of status of CAT planning.

State Govts. of Maharashtra and Madhya Pradesh have submitted the plans. The funds for treating these areas have been promised by the RVP Scheme of Planning Commission, National Afforestation and Eco-development Board etc. The plans are being revised in a phased manner in accordance with the guidelines of the funding agencies. The RVP and NAEB have approved some of these plans. Works have commenced. Planning Commission has agreed for inclusion of Narmada River catchment for treatment under its programme of River Valley Project Scheme. MOE&F also promise funds from National Afforestation & Eco-Development Board. Work commenced on 6 schemes in Maharashtra & a few others in Madhya Pradesh. Further 7 more schemes were approved during 1997-98.



SSP CAT Phase-II sub-watersheds in M.P.

Madhya Pradesh:

Catchment area of Sardar Sarovar Project below Narmada Sagar in Madhya Pradesh to 5.44.505 ba. This area includes the freely draining area attributable to Jobat, Man,

Total Area of Freely Draining Critically Degraded Sub-watersheds	5,46,702 ha
Catchment below NSP	3,52,089 ha
Net Treatable area	3,18,118 ha

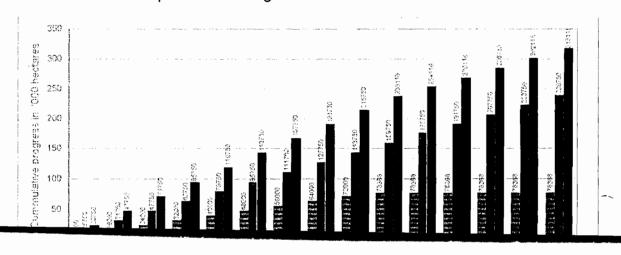
Project	Phase-I	Phase-II (Balance area)	Total Area
	(Directly Draining)		
Jobat			28,211
Man			12,720
Maheshwar			13,209
Omkareshwar			14,748
SSP	1,25,725	3,49,892	4,75,617
		Total:	5,44,505

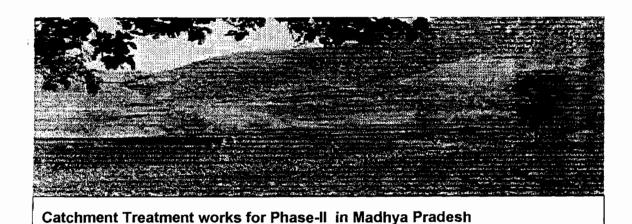
Schedule of Treatment

Project authorities have prepared the plans for treating the 3,49,892 ha of catchment in 139 sub-watersheds of Phase-II areas by the end of year 2011. The schedule of treatment planned is given in Bar Chart-8 on next page. However, annual micro-watershed plans are under implementation as presented below.

Progress of Implementation:

Project authorities have submitted schemes covering 30,881 ha of the catchment to RVP schemes, of which 23,210.78 ha area is proposed to be treated at a cost of Rs.1062.67 lacs during current year. By the end of March, 2000, an area of 9973 ha was treated. Schedule of implementation is given in the Bar Chart-8.





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Maharashtra

Foot. of Maharashtra have prepared a macro-watershed plan for 77,568 hectare in Phase-II of CAT works, out of total 80,881 hectare in 35 subwatersheds. Apart from this separate micro-watersheds plans are prepared for forestland and non-forestland. Micro-watershed plans for forestland in all 35 watersheds have been submitted, which covers 42,867 hectare area. Progress on such schemes is 7,050 hectare. In case of non-forestland, the schemes are not available with NCA but the progress of 7,854 hectare. is reported on 13 micro-watershed schemes covering an area of 15,656 hectare.



COMPENSATORY AFFORESTATION

Approval for the diversion of forestland for the SSP was granted by the MOEF in 1987, 1990 & in 1993 (including for R&R works) but several conditions were attached relating to the planning and implementation of CAF. Principals amongst these are the following stipulations.



SSP area near Vill. Manibeli before submergence

- For every hectare of forestland submerged or diverted for construction of the project there should be Compensatory Afforestation on one hectare of nonforest land plus reforestation on two hectares of degraded forest.
- For the 4,200.00 hectares of forestland in Maharashtra, which is to be used for R&R, an equal area of non-forest land or double the area of degraded forest should be planted.
- The governments of the three states involved should prepare plans detailing their proposals for Compensatory Afforestation and submit these to the MOEF before work in the forest area is due to commence.
- The project should supply firewood to its construction workers, at its own cost, the boying to meet their fuel needs from the surrounding

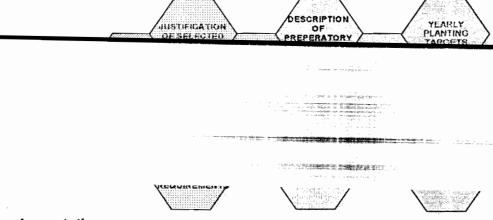
- **Let Studies on Eco and Environment by M.S. University of Baroda (MSU) in 1983.**
- Sardar Sarovar Project: Preparation of Environmental Work Plan by the Forest Department of Maharashtra in 1988.
- **Lesson** Eco-Environment and Wildlife Management Studies in Sardar Sarovar Submergence Area in Gujarat by MSU, in 1992.
- Impact Assessment of Madhya Pradesh Land to be submerged Under Sardar Sarovar Project and Adjoining Ecosystems by State Forest Research Institute, Jabalpur (1989-92).
- Report on Flora and Fauna In and Around Sardar Sarovar Project, Maharashtra by the University of Pune, Aug.1997.

⊈ ACTION PLANS

In compliance with the conditions set by the MOEF, each state has prepared an action plan for the CAF of areas within its boundaries. The relevant documents are:

- Government of Gujarat Work Plan for Management of Environmental Effects, Section on Forests and Wildlife: The Compensatory Afforestation Plan for the Rann of Kachchh, 1986.
- Project for Afforestation in Sardar Sarovar Project Impact Areas due to Diversion of forestlands for Sardar Sarovar Project (GOG), 1991.
- Compensatory Afforestation Scheme in Lieu of Sardar Sarovar Project in Dhule District, Maharashtra State (1989).
- Government of Madhya Pradesh Forest Department Action Plan of Compensatory Afforestation for Sardar Sarovar Multipurpose River Valley Project (1989).

These plans were submitted in varying stages of completeness but each has now been revised and updated. Action plans of three State Govt. contained following components:



Implementation

The Action Plans spell out a programme of tree planting in the three states on both non-forest and degraded forest areas as shown in bar *Chart-12* and *Table-6 & 7*.

Planning

An area of 13386 ha was diverted by MOEF vide its order of 1987. It was stipulated in this order that plantations shall be carried out in equal non forest land in addition to the plantations on degraded forest land double in extent of the area diverted. Thus for every ha of the area diverted three ha of plantations were to be carried out by the project authorities. In addition to the area diverted by the MOEF in 1987 an area of 357 ha was diverted by GOG earlier. State Govts. have

prepared the plans for plantations of 46,358 ha besides reforestation of 28,830 ha area including plantations over 4,200 ha of non-forest land in lieu of the land released for R&R works in Maharashtra. Statewise details of the total area taken for SSP and the planning in lieu thereof are given in the chart-11.

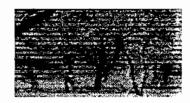
In Maharashtra State 4200 ha forest land was released for R&R works in two phases. In 1990 an area of 2700 ha was released in Taloda taluka. Further 1500 ha was released during 1993 in the same taluka. State Govt. was required to carry out plantations on equal non-forestland. Detailed programme and progress of plantations is given in the table 6 below

Table-6. Compensatory Afforestation against 4200 ha forest land released for R&R works in Maharashtra vide MOEF order dated 1990 (2700ha) and 1993 (1500 ha.

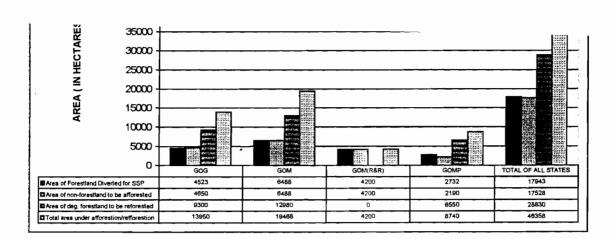
Year	Land	Progress	Progress	Progress	Progress	Progress	Cumulative	Target
	released	1993=94	1994-95	1995-96	1996-97	1997-98	Progress	1997-98
1990	2,700.00	2,192.37	311.00	184.50	0.00	0,00	2,687.87	12.13
1993	1,500.00	0.00	0.00	896.00	0.00	0.00	896.00	604.00
TOTAL	4,200.00	2,192.37	311.00	1,080.50	0.00	0.00	3,583.87	616.13

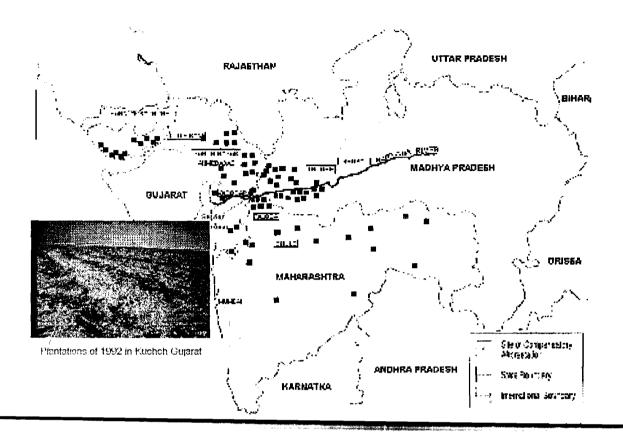
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93-94	2,500.00	460.00	20.00	1,156.00	2,215.00	_	
94-95	1,516.00	843.00	-	2,894.00	1189 *		
95-96	Completed	Completed	Completed	NIL	NIL	NIL	
96-97		-	-	NIL	NIL	NIL	
97-98	_	-	_	NIL	208 *		
98-99					277 *		
99-2000					26		
Sub-total	9,300.00	4,650.00	12,955.00	6,326.00			
Total	13,95	0.00	19,28	31.00	8,73	6.00	

^{*} Area classification, not reported.

In addition to the above following additional plantations have been takenup by the Govt. of Gujarat.

Additional Plantation Activities

(a) Plantation along Canal Banks

The total potential of canal bank plantations is estimated to be 5,300 ha. A project report prepared for this purpose by Gujarat Forest Deptt. is under scrutiny by SSNNL. The plantation programme was launched from the year 1990-91. Plantations on 1,870 ha have already been established till monsoon of 1999.

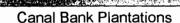
(b) Dam Vicinity Plantation (240ha)

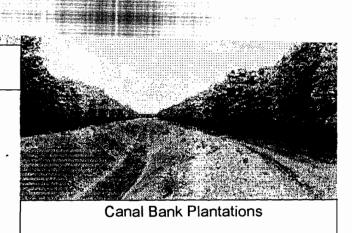
The plantation in total area 551 ha. In the vicinity of dam have been completed by the forest department as well as project authorities. This is being maintained by project authorities.

(c) Ravine Land Afforestation (200 ha)

On the left bank of river Sabarmati an area of 200ha in two villages i.e. Ratanpur (120ha.) and Phirojpur (80 ha) was taken up for model plantation. Entire work has now been completed

An area of 311 ha. had been planted in the project area and the work is completed.







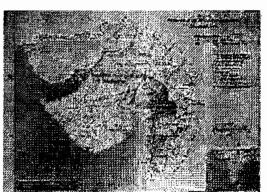
COMMAND AREA DEVELOPMENT

The SSP will provide irrigation water for a Cultivable Command Area of 1.9 million hectares in Gujarat. The introduction of fresh water to the drought-prone areas of Gujarat will create obvious benefits for the farming communities. In order to safeguard these benefits, control and monitoring will be required in the following areas:

- soil drainage, waterlogging and salinity;
- water quality;
- forest loss;
- potential impact on flora and fauna;
- effects on public health:
- socio-economic impacts.

A large number of studies have been

undertaken by the project authorities most of these studies are now complete. The result of the studies available by the end of 1993 were used to prepare and assessment report of the development of the Command Area simultaneously by the H.R.



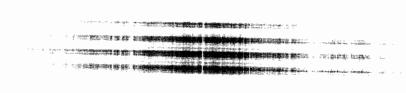


Table-8. STUDIES COMPLETED

	Studies	Name of Agency	Year of completion
1.	Pre-Feasibility Study for Low Level Canal	Jyoti Consultants Ltd., Vadodara.	1981
2.	Mathematical Modeling of Ground Water for System Single Layer Model- Narmada-Mahi Doab.	Operation Research Group Vadodara.	1982
3.	Pre-Feasibility Level Drainage Study of Narmada Mahi Doab of SSP Command.	Core Consultants Ltd. Ahmedabad	1982
4.	Some Aspects of Role of Panchyats and Institutional Arrangements for Canal Irrigation in Two Talukas of Ahmedabad District.	Institute of Cultural and Urban Anthropology, Ahmedabad.	1982

5.	A Study of Settlement Pattern (6 Talukas in the Narmada Command Area of Mahesana Distt. of Gujarat).	Department of Geography, Gujarat University, Ahmedabad.	1982
6.	Regionalisation of Narmada Command.	Operations Research Group, Vadodara.	1982
7.	Marginal Cost Study of Two Typical Distributeries and Two Typical Branches.	Dr. C.R. Shah, Vadodara	1983
8.	Socio-Economic Bench Mark Survey of 62 Talukas (Sub-districts) of Narmada Command Area.	Fourteen Different Agencies including Universities Research Institutions etc.	Between 1982 & 1983
9.	Population Projection and Migration Study for Narmada Command Area.	Operations Research Group, Vadodara.	1983
10.	Study on Water Demand for Non-Agricultural Use from Narmada Project.	Gujarat Water Supply and Sewerage Board, Gandhinagar	1983
11.	Consumer Expenditure, Assets and Indebtedness of Rural Households of the Command Area of Sardar Sarovar (Narmada) Project	Directorate of Economics & Statistics, Gandhinagar	1983
12.	Wasteland Development Project for Command Area of Narmada Canal (Region 11 and 12).	Gujarat State Rural Development Corporation Ltd., Gandhinagar.	1984
13.	Mathematical Modeling of Ground Water System Narmada Mahi Doab.	Operations Research Group, Vadodara	1985
14.	Additional Work on Mathematical Modeling of Ground Water System-Single Layer Model Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
15.	State of Adoption of Improved Technology in Narmada Command and Rest of Gujarat State	Operations Research Group, Vadodara	1985

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	Narmada Command Area.		l I
20.	Inter-Regional Water Allocation and	Operations Research Group, Vadodara.	1989
	Determination of Branch Canal Capacity.		
21.	Extended Study on Inter Regional Water	Operations Research Group, Vadodara.	1989
	Allocation and Determination of Branch Canal		
	Capacity.		
`22.	Growth of Agro-Processing Industries in	Gujarat Industrial & Technical Consultancy	1990
	Phase-I of the SSP.	Organisation Ltd. Gandhinagar	
23.	Consultancy Work for Control, Telemetry and	Gujarat Communication & Electrical Ltd.	1991
ĺ	Communication Network on Narmada Canal	Vadodara	
	System for SSP.		
24.	Techno-Economic Study for Utilising Village	Operations Research Group, Vadodara.	1992
	Tanks as Borrow Area for Construction of		
	Canal Network.		

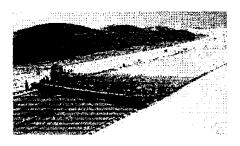
25. Studies in Water Rates Policy, in 3 parts:		
26. Pricing of a Public Utility Survey of Literature.	Department of Economics, South Gujarat University, Surat	1992
 Financial working of Irrigation Projects - A Case of Four Projects in Gujarat. 	Department of Economics, Sardar Patel University, Vallabh, Vidyanagar.	1992
28. Some Policy Issue for Canal Water Rates in Gujarat.	Department of Economics, Sardar Patel University, Vallabh, Vidyanagar.	1992
 Mathematical Modeling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati. 	Consultancy Engineering Service, New Delhi.	1993
 Mathematical Modeling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati. 	Operation Research Group, Vadodara	1993
31. Mathematical Modeling of Groundwater System for SSP Command Beyond Banas up to Rajasthan Border.	Dalal Consultants, Ahmedabad.	1993
32. Pre-feasibility Level Drainage Study for SSP Command Beyond Mahi.	Consultancy Engineering Services, New Delhi.	1993
33. Study on Preparation of a Detailed Integrated Command Area Development Plan for SSP.	M/s. Wamana Consultants Pvt. Ltd., Hyderabad.	May, 1994
 Environmental Impact Assessment Studies on Inland and Marine Fisheries relevant to the Command Area of Sardar Samovar (Narmada) Project. 	M.S. University, Vadodara.	Nov. 1994
35. Environmental Impact Assessment (EIA) Studies on Water Related Diseases in Sardar	Commissionerate of Health, Medical Services & Medical Education, Govt. of Gujarat, Gandhinapar	Oct. 1995

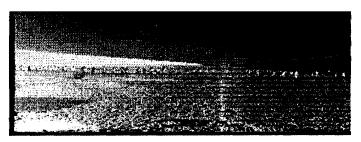
20.	Levilvine Danier-	· · · · · · · · · · · · · · · · · · ·	
	Project.	Ahmedabad.	
39.	Area of Sardar Sarovar (Narmada) Project Lying in Saurashtra and Kachchh Area (EIA	Saurashtra University, Rajkot.	Jan. 1996
40.	Review of Ground Water Drainage Study.	H.R. Wallingford	Feb. 1996
41.	Agro Pollution Aspect of Command Area.	H.R. Wallingford	
42.	Environmental Impact Assessment of Black Buck National Park located at Velavadar in the command area of SSP.	GEER Foundation	Dec. 1993
43.	Study on Flora and Fauna of the Command Area of SS(N) Project: Lying Between Sabarmati River and Rajasthan Border, EIA Studies.	Gujarat University, Ahmedabad.	Mar., 1998

44. Ecological Study of Wild Ass Sanctuary and Surrounding Area Using Remote Sensing Technology for EIA.	Gujarat. Ecological Education & Research Foundation (GEER Foundation), Gandhinagar.	March 1998
45. Environmental Impact Assessment of Nal Sarovar Bird Sanctuary.	GEER Foundation	March, 1998

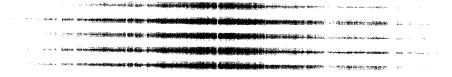
Table-9: ON GOING STUDIES

1.	Agricultural Research Studies.	Gujarat Agricultural Univ.	Study commenced in 1987
2.	Survey and Investigation Work of Ground Water Resources Beyond River Mahi in SSP Command.	Gujarat Water Resources Development Corporation Ltd. Gandhinagar.	1989
3.	Action Research on People' Participation in Water Management in SSP.	Gandhi Labour Institute, Ahmedabad.	1991





(B) Current Scenario: Government of Rajasthan





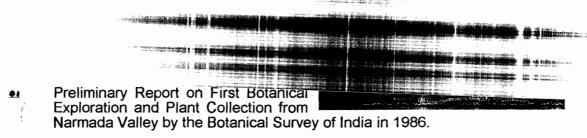
FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

The guidelines of the MOEF required that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present can be assessed, listed (rare and endangered) species can be detected, if present, and appropriate conservation measures devised.

MOEF issued clearance condition of this related specifically to the the Narmada Control in-depth studies on flora implementation of Safeguard

On the basis of relevant details supplied by the various states, for the SSP in 1987. A clearance, as far as it Flora & Fauna, was that Authority would ensure & fauna needed for Environmental

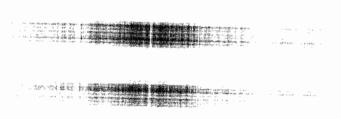
measures.



- Report on the Survey of the Narmada Sagar Area by Zoological Survey of India, 1988.
- Note on Sardar Sarovar Project Preparation of Environmental Work Plan for Forest and Wildlife by the State Forest Department, GOM, 1988.
- Status of Flora and Fauna in and Around Sardar Sarovar Project, Maharashtra is studied by the University of Pune (1992-94). Final report is received in NCA.
- Eco-Environmental and Wildlife Management Studies in the Sardar Sarovar Area in Gujarat, 1992, by MSU.

- Impact Assessment of Madhya Pradesh Land to be Submerged Under Sardar Sarovar Project and Adjoining Ecosystems. The study was conducted by the State Forest Research Institute (SFRI) in Jabalpur and financed by the NVDA. This study was completed & report was submitted in 1994.
- Workshop on Approaches to Integrated Wildlife Management in Gujarat: A Report by the SSNNL, October 1990.
- People's Involvement in Wildlife Management, by VIKSAT in 1991.
- Wildlife Management Studies in the Submergence and Catchment Area of Narmada Project: With Special Reference to Shoolpaneshwar Wildlife Sanctuary, by the SSNNL, 1992.
- Narmada Basin Water Development Plan: Development of Fisheries, 1987, was prepared by the Narmada Planning Agency, GOMP.
- Rapid Reconnaissance Survey of Limnological Aspects Part I, II and III, 1987, were undertaken by the Bhopal, Vikram and Rani Durgavati Universities for GOMP.
- The Central Pollution Control Board, Central Water Commission, the State Pollution Control Boards and the National Institute of Oceanography have collected water quality data.
- Narmada River Basin Development Project: Fisheries Component, 1991 by the German Consultants to the World Bank, GOPA.

wef the Fishing Families of the Narmada River by CICFRI,



- Studies on Fish Conservation in Narmada Sagar, Sardar Sarovar and its Downstream, is a desk review sponsored by the NCA and undertaken by CICFRI, 1993.
- Ecology and Fisheries of the Narmada Estuarine System with Special Reference to Proposed Impoundment (Sardar Sarovar Dam) is an ongoing study begun in 1988 by CICFRI.

ACTION PLANS

A) Wildlife (Terrestrial)

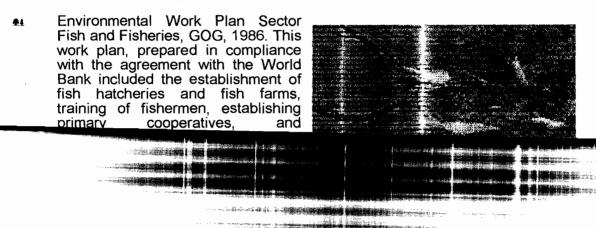
To ensure that the wildlife conservation measures are implemented effectively, action plans for the three states were prepared as follows:

- Felling plans for the forest area coming under submergence in Maharashtra and Madhya Pradesh will avoid the possibility of animals being trapped in the submergence area
- Plans for improvement works in the wildlife sanctuaries of Gujarat. Shoolpaneshwar sanctuary development action plan prepared by GOG in 1996 and submitted to Forest Deptt. GOG for implementation.

B) Fisheries (Aquatic):

Three State Govt.(s) submitted the fisheries development plans, which are as follows:

The Narmada Basin Water Development Plan: The Development of Fisheries, 1984. This comprehensive plan for GOMP addressed the development of fisheries in the Omkareshwar, Maheshwar and SSP areas. Phasing and programming with respect to pre and post-impoundment, clearance of the forests, training of fishermen, cooperative societies and post-impoundment management was proposed.



A Note on SSP: Preparation of Environmental Work Plan for Fisheries Development in Maharashtra, 1987.

This plan included proposals for the felling in the reservoir submergence zone, fish seed, hatcheries, stocking, fishing, manpower requirements, and training and management through the Inter-State Board. Some more studies have been proposed by GOM through CICFRI. Subsequently, the state governments have revised their plans with a view to address to issues as they arose. The revised plan for GOM included proposals for the fishing population to be resettled on the periphery of the reservoir or in R&R sites in Maharashtra. In addition, the establishment of low-cost hatcheries and irrigation tanks, the development of pen cage culture fisheries, and intensive fish farming were proposed. GOG also revised their plan by end 1994. The plan contained four volumes covering upstream, downstream & command areas. In view of the progressive impoundment which commenced in March 1994. NCA has constituted an expert group to lay down the guidelines for conservation &

The state of the s

development of fisheries & its ecosystem. The plans submitted by state governments are under scrutiny of this expert group. The summary of status of planning is given in table-10 and table-11.

Table-10: Summary of Status of Environmental Planning: Wildlife

	Gujarat	Maharashtra	Madhya Pradesh
 Preliminary Surveys 	Complete	Complete	Complete
in-depth Studies	Complete, Final reports available.	Completed, Draft Final report available	Complete Final reports available.
Development of Management Options	Complete for Shoolpaneshwar sanctuary.	Awaiting results of study report from SES, Pune.	Some work completed but awaiting deliberations of the expert group.
Action Plans : • Migratory corridors	Not needed	Not needed	Plan ready
Sanctuary development	Shoolpaneshwar sanctuary Management Plan prepared	Not needed.	Not needed.
Wildlife conservation measures in adjoining forest(s)	Massive afforestation in catchment of SSP.	Under formulations.	Awaits final outcome of the expert group.
Implementation	Shoolpaneshwar Sanctuary Plan under implementation. CAT work (increasing carrying capacity) nearing	CAF & CAT nearly completed. Plan under formulation.	Arrangements complete, awaiting final outcome of study. Substantial CAT works in the catchment

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- Nal Sarovar, Bird Sanctuary; Wild Ass Sanctuary in the Rann of Kuchch.
- Velavadar Black Buck National Park.



Table-11. Summary of Status of Environmental Planning: **Fisheries**

		Govt. of Gujarat	Govt. of Maharashtra	Govt. of M.P.
	Preliminary surveys work plan	Yes	Yes	Yes
•	Updating of detailed surveys/studies of fish fauna	Yes	-	Yes
•	Updated Action plans	Yes	Yes	Submitted in 1997
Im	plementation:			
1.	Plan for clear felling	Completed	Yes, to synchronise with submergence about 734.00 ha. felled.	Yes, to synchronise with submergence work commenced.
2.	Development of fish farms	Under implementation	Proposal under revision	Proposal under revision
3.	Establishment of IFDB for future R&D Management	Agreed	Agreed	Agreed.
4.	Expert group to lay down guidelines for Conservation & Development		As per col. No.2	As per col. No.2

the state executive agencies for follow-up action. Guidelines are on the anvii.

Creation of an Interstate Fisheries Development Board has been agreed to by party States, which is expected to be setup and fully functioning prior to reservoir filling. This Board would implement the guidelines for conservation of fisheries recommended by HLEG.

The Organisation is expected to be set up and fully functioning prior to reservoir filling.

On-going Fisheries Activities in the Sardar Sarovar

Some fisheries development activities are already going in the Sardar Sarovar from the year 1992 onwards. From 1993-94, these programmes received the financial support from the Sardar Sarovar projects. These activities are:

- · Seed Stocking in the Sardar Sarovar
- Development of Rearing space for Fish Seed Production
- Mangrove Plantation Programme.

Till the March, 2000 State Forest Department and other Fisheries Development Agencies have stocked 382.35 lacs fingerlings / yearlings in the main reservoir as well as dykes of the Sardar Sarovar.

There is a provision to create rearing space for seed rearing in the Sardar Sarovar and the funds have been provided by the SSP.

The total amount for the rearing ponds is at present Rs.64.36 lakh. The site selected for the rearing ponds initially in the reservoir premises was found to be unsuitable on account of higher water permeability of the soil. Hence, another site has been located in the village of Timbi (Nanded Taluk) of Bharuch district, in the Survey No.303. The soil samples have been sent for analysis to decide the suitability.

In Gujarat, reservoir bowl is already cleared of all vegetative growth. Execution of felling in M.P. & Maharastra, as per felling plans prepared, awaits the commencement of impounding.



JEIJMICITY

STUDIES

Studies of reservoir induced seismicity (RIS) and rim stability have been carried out by the Geological Survey of India (GSI), Central Water and Power Research Station (CWPRS), University of Roorkee and World Rank Consultants. The principal studies are described below:

- University of Roorkee. 1980. Geological and Sε smological Investigations of the Environs of Narmada Valley around Navagam I am site in Gujarat.
- GSI. 1981-82 and 1982-83. A Geotechnical Report on the Reservoir Competency Investigations in Parts of Sarcar Sarovar Area, Bharuch & Vadodara Districts. Volumes II&I.
- Shenoi et al. 1982. Shenoi et al presented at the New Delhi Conference on the significance of Seismotectonic Aspects on Reservoir Development.
- Balasundarum, M.S. 1982 Sardar Sarovar Froject: A Geotechnical Report compiled and edited for the Government of Guj rat.

IMPLEMENTATION

The various recommendations for modification of the dam design which have all been implemented are summarised as:

- Adoption of horizontal design coefficient of 0.125 g on the recommendation of the Dam Review Panel
- Installation of stress monitors in the main body of the dam
- Increase of the depth of the foundation to 18m below the lowest riverbed.

The Government of Gujarat has identified 9 locations for the installation of seismic monitoring stations, 4 each on either side and one at the downstream of

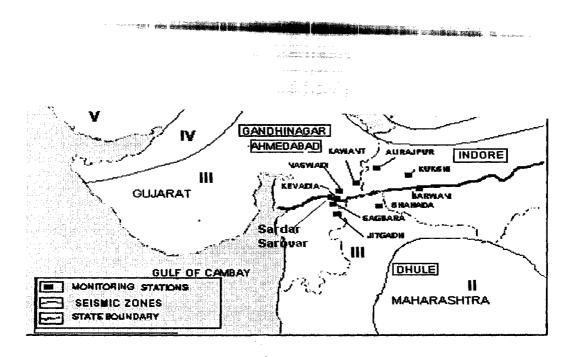
tion on periphery of the Sardar

the Sardar Sarovar reservoir, out of a total of 9 stations, 3 are in M.P., 1 in Maharashtra & 5 are in Gujarat. Construction and instrumentation installation work is completed at all the 9 seismic monitoring stations. The seismological observatory at Kevadia Colony is in operation since 1973. The data of Kevadia Colony seismograph station for the period from 1973 to 1984 was analysed by CWPRS, Pune and GEAR, Vadodara. Also, Micro-earthquake surveys around Navagam Dam were carried out in the year 1980 by Dept. of Earthquake Engineering, University of Roorkee. The Micro-earthquake activity was found to be of low level and was generally scattered in the Narmada basin.

The seismological network with latest instruments was established in the year 1989. After the installation of new seismic instruments at new sites, local micro-earthquakes as well as global earthquakes are being recorded. The events which are recorded at network are analysed and located using the computer program 'FASTHYPO' incorporated with seismic Data processing and Analysis Computer (DAC - 300). The progress of implementation is illustrated in Table below:

Table-12: Status of implementation of seismicity aspects

ACTION	STATUS
• / Dam design modifications	Completed
Monitoring stations	Construction and instrument installation work is completed at all 9 seismic monitoring stations.
GSI (Nagpur Division) Rim Stability studies	Completed
Tracer Studies by CWPRS	Reports submitted.





HEALTH ASPECTS

STUDIES

A large number of studies have been carried out on the health profile of villages in the three affected states. The key studies are summarised below:

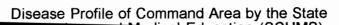
Narmada Programme - Schistosomiasis - Back-to-Office Report, 1986, assessment carried out by Goodland, consultant to the World Bank, the National Institute of Communicable Diseases (NICD) and the

World Organisation (WHO).

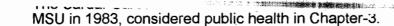
Proceedings Recommendations Meeting the

Schistosomiasis Research and Surveillance held at NICD on 22nd November 1985.





Land Marie La William War St. T. C. Carles

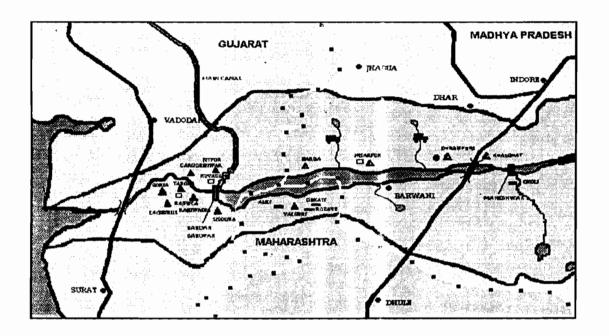


- Numerous studies have been conducted on the incidence of malaria in India, amongst others, by the Malaria Research Center (MRC).
- Revised Plan by GOM, 1995.
- Revised Health Plan by GOG, 1996.
- Draft Health Management Plan by GOG, 1997.
- Epidemiological Surveillance Studies by GOM, 1996.
- Epidemiological Surveillance Studies by Gandhi Medical College, Bhopal for GOMP 5th Interim Report (1997).

Status of Implementation of Actions for Public Health

	Action	Gujarat	Maharashtra	Madhya Pradesh
•	Baseline studies	Complete, 1986 updated '95	Complete, 1987 being updated.	Complete, 1994 being updated.
•	Preparation of state action plan	Submitted and modified in 1986; Urban Malaria Scheme proposed. Draft Health Management Plan submitted in 1997.	Original submitted in 1987 revised in 1991, 1992 & 1993.	Original submitted in 1986, revised in 1988 and final plan submitted in 1991. Cost details incorporated in 1996.
•	Survey of existing facilities	Complete	Complete	Complete
•	Establishme nt of new facilities	Hospital at Kevadia for workers; laboratory and mobile unit complete, drug dispensaries	Somawal village hospital; health centers and health units functioning.	Hospital, mobile unit and civil dispensaries for labour; detailed scheme for resettled population
•	Vector control	NMEP; SSNNL work -shop on	NMEP; adoption malaria control muidelines of	NMEP; state malaria control organizations strengthened

			laboratory facilities Provided.	
•	Disease monitoring and responsibilit y	EIA report submitted. Draft	Surveillance studies commenced. Phase-I	Gandhi Medical College, Bhopal. Five interim.



Showing status of implementation of health plan in SSP impact area.

molementation



- Providing specialized services at the door steps of PARS ≤
- Medical check-up ≤
- Pot chlorination through distribution of chlorine tablets. ≤
- Providing nutritional supplements to children's, pregnants and lactic mothers. ≤
- Other preventive and curative health measures

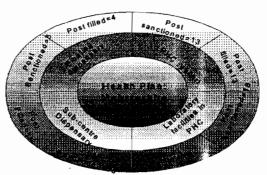
B) Govt. of Madhya Pradesh

GOMP have already submitted cost breakup of Health Plan pertinent to SSP. The work of locating a suitable site for the hospital at Nisarpur is under progress.

C) Govt. of Maharashtra:

The following Health Schemes have been sanctioned by Government of Maharashtra vide Govt. Resolution No.1 (PHC -1593 / 2038 / CR268 / 93/ PH4 dtd. 4.4.1994 and No. MISC 1095 / 5 / CRI / PH 4 dtd. 15^{th} November 1995. The position is depicted in the fig.-4

Fig-4: showing the current status of the implementation of the action plan in Maharashtra





ARCHAEOLOGICAL SURVEY

In the case of SSP, where some sites may be submerged the NWDT award stipulated that, the entire cost of relocation

and protection should be chargeable to GOG. Relocation work is to be supervised by the Department of Archaeology under the provisions of the 1958 Act.



STUDIES

- Survey was carried out by the State Department of Archaeology to cancers, sites in 24 villages of Akrani taluk and nine villages from Akkalkuwa taluk, Dhule district.
- Madhya Pradesh: Survey by State Department of Archaeology and Museum (1992), in sixteen volumes.
- Anthropological Survey of India: Narmada Salvage Plan.
- Anthropological Survey of India: People's of India.
- Adivasi Kala Parishad: Survey of Material Cultural in the Narmada Valley.

Rashtriya Manav Sanghralaya: Narmada Salvage Plan.

Summary of Current Situation and Progress

		Gujarat	Madhya Pradesh	Maharashtra *
•	Survey of villages in Submergence Zone		plete' for all item in all	
1	Identification of Cultural Sites.	"Com	iplete' for all item in all	the States.
•	Collection of Data and Documentation of Sites	Complete	In progress	Not required.
•	Selection of appropriate sites	Complete	In process	Not required
•	Action plan	Complete	Finalised	Not required

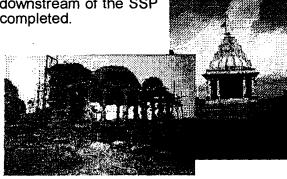
• Survey in Maharashtra identified one temple, which was on the border with Gujarat. GOG has already relocated this temple 15 km. downstream of earlier location.

Cultural heritage in SSP

Relocation	on of temple	Excavation		Sculptures	
Target	Complete	Targe	Progres	Target	Progres
	ď	t	S		S
2	1	_		-	
NIL	N.A.	NIL	N.A.	NIL	N.A.
	Target 2	2 d	Target Complete Targe d t 2 1 -	Target Complete Targe Progres d t s	Target Complete Targe Progres Target d t s 2 1

Shoolpaneshwar temple which was on the border with State of Maharashtra is relocated 15 km. downstream of the SSP in village Gora. Relocation works already completed.

Relocation of remaining temple, i.e., Hampheshwar Temple is under progress. The stone monument of 'Garbhgrah' is completed upto 5.0 m height and about 18 columns of Rangmandap have also been erected. Stone monument work for two small temples namely: Ramji and Angaji adjoining to the main temple is done upto 51 ft. level.



Day to Markey

B. Madhya Pradesh:

GOMP earlier prepared the Action Plan 1993. The details are as below:

			tion Plan	1993. The details are as below:
SI	Part	iculars		Status
N	Name of	Village	Distric	
0	monument		t	
1.	Shiv Mandir	Roligaon	Jhabu a	Handed over to ASI by State Deptt. of Archaeology, M.P. Progress is awaited.
2.	Kanjaleshwar Mandir	Semalda	Dhar	- do -
3.	Jalaleshwar Mandir	Khujawa	Dhar	- do -
4.	Bhawani Mata Mandir	Khujawa	Dhar	The monument is taken in Action Plan 1997. Relocation is remaining.
5.	3 nos. big statues	Khujawa	Dhar	- do -
6.	Shiv Mandir	Barda	Dhar	The monument is taken in Action Plan 1997 and relocated completely.
7.	Rock-cut sculptures	Pipaldagar hi	Dhar	- do -

Excavation

. 1	SI.		Particulars	Status
			1 al tivulai 3	Otatas
	N	Namo	of District	

			praotioos.
4.	Mound at village Krimohigaon	Khargone	- do -
5.	Mound at village Kheda	Dhar	Handed over to ASI. Progress is awaited.

After some years, GOMP prepared a comprehensive Action Plan 1997. According to this, some more monuments and excavation sites were included. The details are as under:

and the state of the second of

RELOCATION / PROTECTION

SI.		Pa	rticulars			Status
No	Name of monument		Tehsil	District	RL in	
1.	Shiv Mandir	Bada Barda	Manavar	Dhar	130.97 0	Relocated completely.
2.	Bhawani Mata Mandir	Khujawa	Dharampu ri	Dhar	147.82 5	Scrapping of lime plaster done for numbering purpose.
3.	Shomeshw ar Mandir	Khujawa	Dharampu ri	Dhar	129.53 0	Progress is nil.
4.	Shiv Mandir (S.No.1)	Khujawa	Dharampu ri	Dhar	135.46 0	Work of relocation started
5.	Shiv Mandir (S.No.2)	Khujawa	Dharampu ri	Dhar	135.47 5	but due to public resentment, it was stopped by
6.	Shiv Mandir (S.No.3)	Khujawa	Dharampu ri	Dhar	135.16 5	the collector.I
7.	Rock-cut caves	Khujawa	Dharampu ri	Dhar	135.07 5	Progress is nil.
8.	Big statues	Khujawa	Dharampu ri	Dhar	146.39 5	Progress is nil.
9.	Shiv Mandir (Mauni	Pipaldagarh i	Dharampu ri	Dhar	153.77 5	Relocated completely in village Nimbola.

13	Baneshwar	Navadatoli	Kasarawa	Knargon	137.70	rrogr o ss is mi.
1	Mandir		d	е	5	
	(Shiv Mandir)					

EXCAVATION

SI.	Partic	ulars	Status	
N	Name of mound	District	RL in m	
0				
1.	Mound at village	Khargo	151.635	Progress is nil.
	Maruchichli	ne		
2.	Mound at village	Dhar	146.875	Progress is nil.

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	Ekalwara				
3.	Mound at Katnera	village	Dhar	139.865	Progress is nil.
4.	Mound at Khalghat (Khalkhurd)	village	Dhar		Excavated. Records are with the o/o the Archaeologist, Archaeology & Museum, Rajwada, Indore.
5.	Mound at Kalyanpura	village	Dhar	148.035	Progress is nil.

Collection & display at Museum

Sculptures, 118 in nos. were collected from the regions coming under the submergence area of the Sardar Sarovar dam. This sculptures were obtained from Pipldagarhi, Khujawa, Dharamapuri and different other villages. These are displayed at Distt. Museum in Dhar Distt.

Since these sculptures were lying open for a very long time they bear traces of weathering effect on them like salt formation, red-oxide deposition, besides accumulating dust, dirt and fungus on them. They were cleaned by the chemists using necessary chemicals like Ammonia, Sodium hydroxide, Benzene P.V.A. etc. After cleaning the sculptures were coated with preservative for saving them from further deterioration.

Museum

 Narmada Park and Museum at Lalbagh at Indore, Besides Museum at Barwani and Kasarawad proposed. Land for museum at Barwani & Kasrawad

Government of Madhya Pradesh has informed that in view of the studies being carried out in connection with Narmada Sagar Project, no separate anthropological studies are required and that the Director General, Anthropological Survey of India has also expressed the same view. M.P. State Adivasi Kala Parishad has submitted its report on Tribal arts & culture. Besides Anthropological Survey of India has informed that Narmada basin is already covered extensively under the project "Peoples of India". Besides Rashtriya Manav Sanghralaya has conducted needed studies in the past as follows. Further studies are

covered under R&R plan of the state Governments. The work done by An.S.I is being used.

and the second s

Narmada Control Authority. <u>No:4</u>

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- a study of the palaeo-ecology of quaternary fossils in the central Narmada
- excavation of upper Paleolithic site of Mehtakheda and further exploration of Nimar;
- Collection of tribal artifacts in Madhya Pradesh.

Institutional responsibility for these actions was specified in the action plan whereby the first two elements were completed by Deccan College, Pune and the third by Adivasi Kala Farishad, for the Rashtriya Manav Sanghralaya, Bhopal.

The End

INDIRA SAGAR PROJECT

The Action Plans and status of studies and implementation of Environmental Safeguard Measures upto quarter ending March 2000 are summarised in this report.

The parameters: The suggested environmental safeguard parameters are indicated below

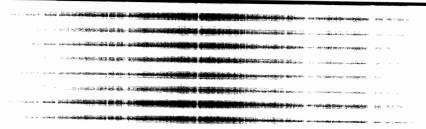
- Phased Catchment Area Treatment
- ♦ Compensatory Afforestation
- ♦ Command Area Development
- Flora ,Fauna, Wildlife and Carrying Capacity
- Seismicity
- Health Aspects
- Archaeological Survey, and Anthropological Studies

As 'Resettlement and Rehabilitation' is dealt with separately, current status of other suggested parameters is presented hereunder.

1. PHASED CATCHMENT AREA TREATMENT

The MOEF clearance granted in 1987 contained two conditions pertaining to CAT, as follows:

 More detailed surveys for prioritisation of the sub-catchments in the ISP area should be undertaken;



In addition, plans are required to be prepared for the treatment of the balance of the critically degraded sub-watersheds but the cost of this will be met from other ongoing schemes and in a timeframe to be determined.

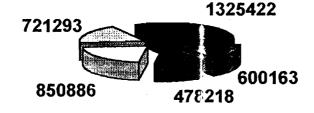
Studies

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the ISP catchment. They are: -

- Report of Inter-Departmental Committee on Soil Conservation and Afforestation, (the Dewan Committee Report), 1985.
- Report on Prioritisation of Sub-watersheds in sub-catchments of the Narmada Catchment, 1991 by AIS&LUSO, New Delhi. Revised subsequently in 1994

According to the above studies the freely draining area of India Sagar Project down stream of Bargi Dam is about 39,75,982 ha. Prioritisation survey of the watersheds was entrusted to the All India Soil & Land Use Survey Organisation, New Delhi. The Survey has been completed by AIS&LU3O, New Delhi and the survey reports have been received in the Narmada Valley Development Authority (NVDA) Government of Madhya Pradesh. Findings of the AIS&LUSO indicated that about 28% of the catchment was yielding SY of 1200 and above. As such these were considered as critically degraded. Results of the prioritisation are summarised in pie chart --1.

PIE CHART-1 showing degradation in the catchment of ISP(area in ha.)

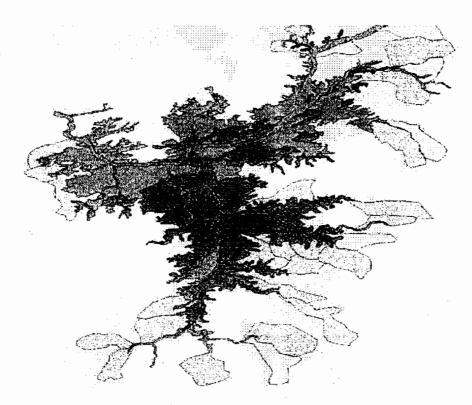


and high priority categories only, are to be treated pari-passu with the construction of the dam and at the project cost.

to be a second and the supplement of the second

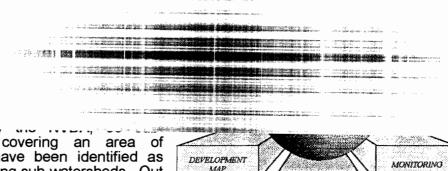
PHASE-I Programme

On the basis of the reports submitted by the AIS&LUSO, sub-watersheds belonging to the very high and high priority categories and directly draining into the reservoir have been identified for treatment. There are 30 such subwatersheds. They cover an area of about 73,456 ha. Map showing the location of the identified sub-watersheds is depicted in Map-1.



Map-1 Showing submerge nce area of Indira Sagar Project and location of critically degraded directly draining subwatershed S.

Action Plan:



SURVEY WORK

watersheds covering an area of 73,456 ha have been identified as directly draining sub-watersheds. Out of the gross area of 73,456 ha,

directly draining sub-watersheds, 57,697 ha is non-forest and the remaining 15,769 ha is forestland. The net area available for treatment, however, is 62,975 ha of which 51,927 ha area is non-forest and the balance 11,048 ha is forestland. Graphic presentation of the same is given below in Chart-1.

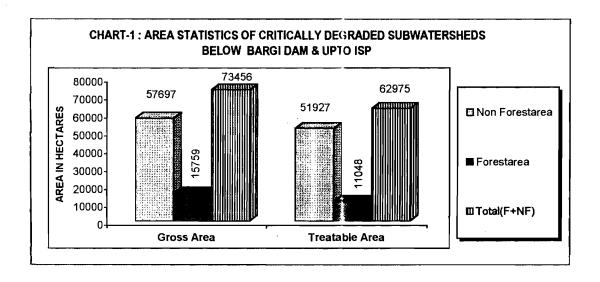
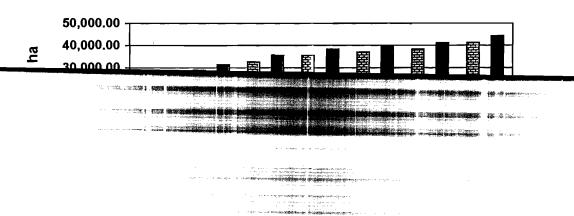


Chart-2: Cummulative Progress of CAT works



IMPLEMENTATION:

NVDA have planned to treat the Phase-I area in about 10 years' time commencing 1991, at the cost of the project and pari-passu with the construction work on the project.

By the end of March, 2000, during the year 1999-2000, an area of 3,057 ha of non-forestland was treated up. The cumulative progress as on March, 2000 was 2,863 ha in forestland and 41,413 ha in non-forestland. The net area treated so far is 44,276 ha. In addition an area of 1636 ha was treated up under pilot project earlier. NVDA proposes to treat the balance areas during the next four years.

25,000 20,000 15,000 un 15,000 000,000 5,000 0 Upto 93 95-96 96-97 97-98 98-99 99-2000 94-95 94 21,700 3,878 7,224 2,757 1,561 1,236 3,057 ■ Non-forestarea (51,927 ha) □ Forestarea (11,048ha) 0 2,623 240 0 0 0 0 21,700 9,847 4,118 2,757 1,561 1,236 3,057 □ Total Area: (62,975 ha)

Chart-3: Schedule of treatment of Phase-I

AUTION FLAN .

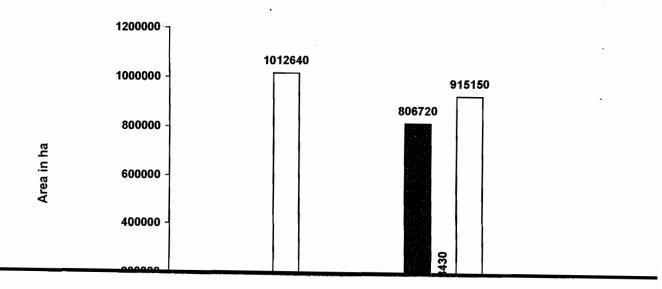
NVDA have submitted macro-watershed plans covering the above area during 1993. NVDA have planned to treat the Phase-II area in about 30 years' time commencing 1994-95, as per the schedule of implementation given in Table-5 below.

However, detailed micro-watershed schemes are required to be submitted to the funding agencies like NAEB, RVP etc. in accordance with the guidelines of these schemes. A few schemes have been submitted and got approved while the remaining schemes are under formulation.

IMPLEMENTATION:

The project authorities have submitted CAT Phase-II plans for NAEB/RVP funding for seeking funds. Five projects for 40 sub-watersheds covering an area of 53,709 ha. of forest were submitted by NVDA to National Afforestation & Eco-Development Board.

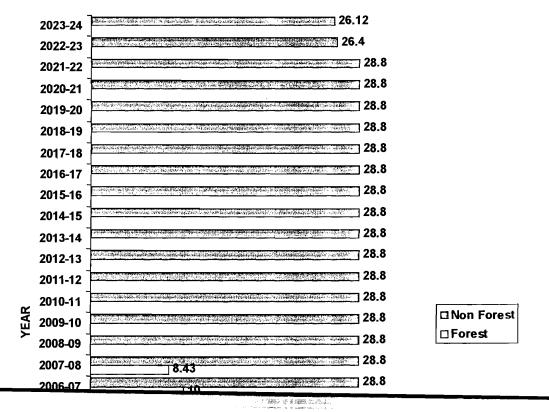
Chart-4: Area statistics of ISP catchment

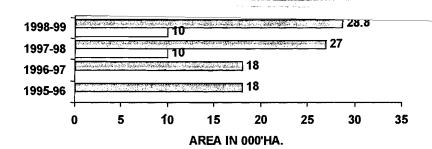


REQUIREMENT OF FUNDS:

The plan drawn up for treatment of Phase-II treatment works places requirement of total funds at Rs. 603 crores. It is proposed by GOMP to treat the non-forest area at an estimated cost of Rs.602.57 crores and forest area Rs.435.12 crores.

Chart-5: Schedule of treatment of CAT works, Phase-II





2. COMPENSATORY AFFORESTATION:

A total of 40,332 ha forestland would come under submergence and an additional 779.90 ha. of forestland has been diverted for the residential colony, powerhouse complex, main dam, saddle dam and approach roads.

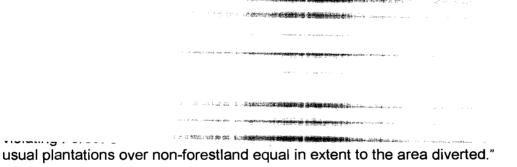
Subsequently, another 308.40 ha. of forestland was permitted to be diverted for powerhouse. Thus a total of 41,420 ha of forestland has been permitted to be utilised for the construction of ISP. Area proposed to be utilised for the ISP covers three districts as shown in Table-1 below.

TABLE-1: Showing area taken by the ISP from three districts in M.P.

District	Area in hectares diverted for ISP
Khandwa	33,383
Dewas	4,528
Hoshangabad	3,678
Total	41,589

MOEF clearance granted in 1987 contained several conditions pertaining to compensatory afforestation. The key conditions among others was that

"Since the project involves violation of Forest (Conservation) Act, 1980, compensatory afforestation will be carried out over suitable degraded forest land double the diverted forest area in extent and in addition to the equivalent area in



ACTION PLAN:

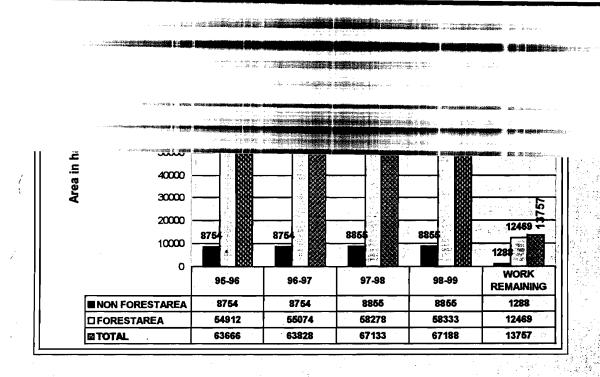
To compensate for this loss of forest the M.P. Forest Department had submitted an Action Plan for Compensatory Afforestation for the Indira Sagar Project in December, 1986. Area offered to this plan was accepted. The acceptance was acknowledged through the clearance order.

Accordingly, 10,143 ha of non-forest and 70,802 ha of degraded forestland has been identified for compensatory afforestation, in the districts of Khandwa, Hoshangabad, Dewas, Sehore, Dhar and Khargone as shown in Table-2.

TABLE-2: Showing the district wise areas identified for compensatory plantation

District	Degraded Forest (In ha)	Area other than forest (In ha)
Khandwa	30,572	2,314
Hoshangabad	22,739	2,842
Dewas	17,491	802
Sehore	-	1,247
Dhar	<u>-</u>	1,001
Khargone		1,937
Total	70,802	10,143

The M.P. Forest Department has added additional areas to the prescribed afforestation hectare as a contingency to account for unforeseen circumstances. In selecting forestlands for the plantations, local requirements for grazing, firewood, and other nistar needs were kept in view. However, considering that with the dedication of vast areas to the proposed National Parks, some future adverse impacts on the local population's nistar needs may develop and that the wood from the submergence zone was expected to meet local fuel needs only for about 8 to 10 years, more emphasis was placed on fodder production in plantation areas in Khandwa and Dewas divisions. The plantations were to provide shelter and habitat to wildlife also.



IMPLEMENTATION:

NVDA started the plantation works in the degraded forests within the Narmada catchment on the areas identified in the plan. Subsequently, however, many of these areas were included in the CAT program, as these areas were identified as critically degraded areas within the catchment. Such areas were, however, excluded from the compensatory afforestation works. By the end of December 1999, the progress of plantations on the non-forest area was 8855 ha and on forest areas, the progress reported was 58333 ha as shown in Chart-1 above.

3. COMMAND AREA DEVELOPMENT

The Command area proposed to be irrigated by the NSP spreads on the left bank of the Narmada River. It comprises territory falling in the Khandwa tehsil of Khandwa District and six tehsils of Khargone District. The Satpura Ranges flank the command on the south. The northern boundary is formed by the Narmada River itself. The land of the command comprises Forest:10,055ha; Grasses and pastures:10,498ha; Cultivated land: 142,406ha; Culturable fallow: 8,116 ha; Barren:18,385 ha.

The command area has immense potential for development. The objectives of the command area development are:

- On Farm Development,
- Conjunctive Use,
- Agro-Industries
- · Regulated Market,
- Warehousing Facilities,
- Roads etc.

STUDIES AND FINDINGS

In 1975, at the request of the Narmada Water Dispute Tribunal (NWDT), the Gwalior Campus of J.N.K.V.V. University undertook a reconnaissance survey of the Narmada Sagar Command, using a 2-mile grid. Nearly 265 soil profiles were examined.

Reports on the quality of groundwater in the Indira Sagar Project area are limited, but the general assumption is that the quality is suitable for use in irrigation. Limited water quality testing was done in several blocks in the Indira Sagar Project area. These tests were apparently conducted in 1966 and 1967. In Barwaha block, five samples out of seven tested were of excellent quality.

During 1982-83, to appraise land irrigability, an area of about 2,80,000 ha falling within parts of Khandwa and Khargone districts was surveyed by the Department of Agriculture, M.P. Surveys were carried out on 1:50,000 – scale toposheets. Arial photo-interpretation was carried out wherever possible. About 366 profiles and about 2787 auger bores were examined. The rate of profile examination was about 1 per 1000 ha. A total of 30 soil series were mapped. Areas falling under different classes of depth, erosion, slope, texture, and land irrigability subclasses were identified. This report indicated that typical vertisols are not extensive in the surveyed area.

A detailed reconnaissance soil survey of the Narmada Sagar Command Area was also carried out in January 1984 by the Directorate of Agriculture in co-

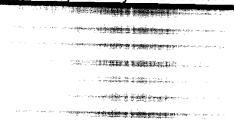


Table -3: Showing land irrigability classification

SI.N o.	Land Irrigability Class	Slope Percent	Depth of Soil (in cms.)	Percentage of gross command area
1.	2	0-3%	More than 90	29.5
2.	3	· 1-5%	22.5 to 90	21.5
3.	4	3-10%	7.5 to 45	25.7
4.	6	5-15%	0 to 22.5%	23.3

In order to study whether full irrigation would lead to water logging and salinity problems, state govt. of Madhya Pradesh commissioned special studies on subsurface drainage and groundwater behavior to the Indian Institute of Science at Bangalore. For study purposes, the entire Narmada Sagar complex Area was divided into 34 hydro-geological zones. The studies considered the following:

- Rainfall data from stations around the composite command.
- Runoff as measured in nearby gauging stations.
- Evaporation rate data.
- · Climatological data.
- Groundwater-level data from all types of wells.
- Pump test data.
- Hydro-geological information on wells and aquifers.
- Soil and soil moisture data.
- Agricultural land use data, including information on crops and the seasonal nature and extent of surface water and groundwater irrigation.
- Proposed crop-water requirements.

Jawahar Lal Nehru Krishi Vishwavidhyalaya, Jabalpur through their research centre are carrying out studies on impact of agro-chemicals run-off from fields on underground and surface water in command area with an objective of assessing the residues of toxic agricultural chemicals from fields in the ground water and surface water of command areas and ecological effects of the residues

indicated that a water balance of 70% surface water and 30% groundwater would be suitable in most project areas to avoid waterlogged conditions.

Natural drainage conditions in the Narmada Sagar Complex Command Areas are quite favourable as Narmada Sagar area has a well-developed natural drainage system. The command complex lies on both flanks of the Narmada River, with a number of tributaries draining the area towards the Narmada River. The slope of the cultivable land generally ranges from 1 to 3% and it has good natural drainage. The groundwater aquifers are deeply incised, and major problems of surface drainage do not appear to exist. Surface drainage will, however, be required after irrigation is implemented through the provision of a

and the second result of the said of the second

proper network of field drains so that excess water will be removed from the cultivated fields.

Irrigation water from the Narmada River will be of good quality, and normal irrigation applications are considered sufficient to leach out the salts from saline/sodic soils. No additional leaching requirements will generally be necessary. Project planners do not expect any salinity problems if proper surface and subsurface drainage systems are installed.

ACTION PLAN:

The Government of Madhya Pradesh have submitted command area development plan, delineating the soil classifications and land irrigability in the Narmada Sagar Command Area showing the first three phases of irrigation development by area, the land irrigability map of the Narmada Sagar Command Area showing lands of classes 2 through 6 by location in the first three phases of irrigation development during 1986.

The project on completion will provide annual irrigation to 1.69 lakh ha. Waterlogging occurs when the groundwater table rises too close to the ground surface and the soils are unable to drain properly. This concern has been carefully planned to avoid the problems. The conjunctive use of surface and groundwater resources to the extent of 30% is proposed.

The provision of drainage systems to prevent the accumulation of



field drains, and plans for conjunctive use of surface water and groundwater, the planned groundwater monitoring program would be sufficient to indicate the needed remedial measures. Essentially all of the groundwater development will be undertaken by the farmers, however the State Govt. plan to take appropriate action to encourage planned groundwater development on schedule and to ensure that the required 30% of the total irrigation demand was met from the groundwater. If groundwater development does not occur on schedule because of the lack of farmer initiative or because of problems with water quality or adverse aquifer conditions, State Govt. plan to step in and install appropriate drainage systems whenever wherever needed

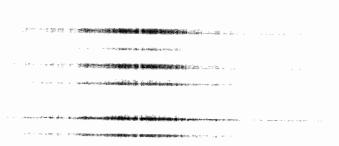
IMPLEMENTATION

The Government of Madhya Pradesh has submitted command area development plan. The project on completion will provide annual irrigation to 1.69 lakh ha. The implementation of the plan would be taken up in three phases for completion in December-2007. The study on impact of Agro chemicals, runoff from fields on surface & ground water quality in he command area has been assigned to J.L. Agricultural University, Jabalpur An MOU for this work was finalised. An allocation of Rs.24.5 lakhs was made. Studies have commenced and are making progress. The works of on farm development will be started 2 years in advance of the start of irrigation from can it system in a phased manner in the entire command area.

4. FLORA, FAUNA AND CARRYING CAPACITY

The guidelines of the MOEF require that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present can be assessed, listed (rare and endangered) species can be detected, if present, and appropriate conservation measures devised. Important survey work undertaken for the purpose had included the following

 Preliminary Report on First Botanical Exploration and Plant Collection from Narmada Valley by the Botanical Survey of India in 1986.



National institute of Oceanography

On the basis of relevant details supplied by the various states, MOEF issued clearance in 1987. A condition of this clearance, as far as it related specifically to the Flora & Fauna, was that the Narmada Control Authority would ensure in-depth studies on flora and fauna needed for implementation of environmental safeguard measures.

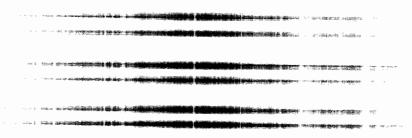
Further in-depth studies with focus on the following prime concerns were taken up.

- Relocating and protecting wildlife through setting up and maintenance of the permanent protection areas.
- Detailed surveys of both flora and fauna to determine the number of individuals of the various species, their habitat types and other needs, their status in terms of being endangered, threatened or protected under Indian Legislation, and recommendations for minimising project impacts and maximising opportunities for protecting and enhancing plant and animal life.
- Studies to ascertain the capacity of the surrounding areas to accommodate additional wildlife

The objective of the suggested studies was to assess the environmental impacts as a result of the Narmada Sagar Complex, consisting of the three dams: the Narmada Sagar, Maheshwar and Omkareshwar, to ensure minimal adverse effects on wildlife as a result of the project development works. Studies were entrusted to Wildlife Institute of India and Friends of Nature Society. Institutes carried out exhaustive studies with a view to address the above concerns. Studies focused on the following

The reports submitted by the identified premier organisation during the period 1986 and 1997 included the following

• Sociological Survey of the Fishing Families of the Narmada River by



Shirt Wallet Brown

- Wetland and aquatic flora of Narmada Valley in Madnya Pradesn was also published in 1991 in Vol. 15 No.3 in J.Econ. Toxicology Bot.
- Studies on EIA of Flora & Fauna of NSP were entrusted to the Wildlife Institute of India, Dehradun in December, 1989 and were completed by March 1994.

Key concerns addressed on the terrestrial ecosystem were as follows:

- A wildlife inventory giving reliable estimates of the numbers of various species of wildlife in the project impact area.
- A catalogue of habitat types found in the project area.

- A status report on individual species indicating ones that are endangered, threatened, or protected under prevailing Indian wildlife Laws. The report on these special status species was also included the recommendations for actions to be taken to safeguard threatened species
- Recommendations for the creation of new protected areas for wildlife in the areas neighboring the submergence area.
- An assessment of the impact of the project gene pool reserves of wildlife in the project area.

SUGGESTED STRATEGIES

Establishments of protected areas in many parts of the country in the last three decades has largely been and outcome of the Govt. concern for mitigation of the environmental degradation specially for preservation of species diversity and the genetic valuation within them. Besides maintaining productive capacities of Eco-system and safeguarding habitat critically for the local range of species. Three new protected areas were proposed to mitigate the losses. This includes Narmada National Park, Suryamanya Sanctuary and Omkareshwar Sanctuary.

Name of the Sanctuary/Park

Area in ha.

Narmada National Park

47522

Curvamanya Canatuar

16370

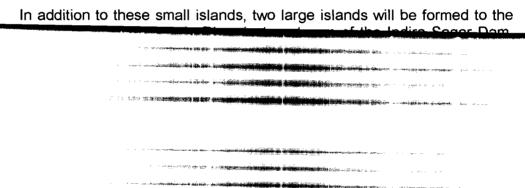
has similar conservation values that are being lost in submergence and to elevate its status to a protected area – a combination of a national park and sanctuary. Key aquatic vertebrates species like otter is proposed to be restored and translocated. It was suggested to explore the possibility of capturing and translocation of impacted otters of Narmada Sagar into identified localities of the vacant niches in central Indian rivers. Besides, a species restoration plan for aquatic reptile (turtle) was also suggested within the submergence zone and also in other stretches of the river with rocky structure and sandy banks. The restoration program for muggar crocodile as being practices in other districts of M.P. was also suggested.

ACTION PLAN AND IMPLEMENTATION

Actions have been taken by NVDA to implement the recommendation of the WLI regarding declaration of National Park & protected areas. Matter is under consideration of the State Govt.

The studies of certain aspects of fisheries and reservoir sciences have been included in the Limnological studies being conducted by the three Universities of the State. Studies in the Upper Narmada, (Bargi Reservoir) by Rani Durgawati University, Jabalpur, studies in the Middle Narmada (Tawa, Barna and Kolar Reservoirs) by Barkatullah University, Bhopal, studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have completed the studies in their respective areas as per MOU and final report is available. Accordingly Action Plan has also been drawn up

Since the topography in the reservoir area consists of rolling hills, NVDA expected the higher peaks to remain above the water surface level and constitute islands in the reservoir. These islands would contain remnant flora and fauna that would remain isolated and would be subjected to changes in microclimate by virtue of being surrounded by a large body of water. NVDA scientists have expressed an interest in the possible effects these special circumstances could induce.



The studies of certain aspects of fisheries have been included in the limnological studies being conducted by the three Universities of the State. Studies in the Upper Narmada, (Bargi Reservoir) by Rani Durgawati University, Jabalpur, and studies in the Middle Narmada (Tawa, Barna and Kolar Reservoirs) by Barkatullah University, Bhopal, and studies in the Lower Narmada by Vikram University, Ujjain. All the three Universities have completed the studies in their respective areas as per MOU and final report is available. Accordingly Action Plan has also been drawn up.

Aquatic fauna has also been covered under the studies completed by Friends of Nature Society, Bhopal. The draft report of FONS is also available. Action Plan submitted earlier is being updated.

5. SEISMICITY AND RIM STABILITY

The Narmada Sagar reservoir has a gross capacity of 12,200 million cubic meters, or about 9.9 million acre-feet, by far the largest-capacity reservoir planned in the Narmada River basin. Therefore the issues of seismicity, the potential for reservoir-induced seismicity (RIS) and the rim stability have been carefully studied and addressed.

STUDIES

Investigations have considered the Narmada Sagar complex dam sites at Indira Sagar, Omkareshwar and Maheshwar together for the studies. Geological Survey of India, the Central Water and Power Research Station of Pune, the University of Roorkee, GOG, GOMP and World Bank Consultants Pinkerton, Markwell and others have been closely associated with the studies and the mitigation planning. Several reports on seismological factors affecting design of the dam, including the following are available

Technical Memorandum 3.09, Evaluation of the Earthquake Parameters of the Indira Sagar Dam, by the Department of Earthquake Engineering, Roorkee University. Technical Memorandum 4.12, Seismological Considerations for Indira Secret Dam Part-1: Evaluation of Earthquake Parameters for Design of Dam.

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suggested that reserveir impoundment's by general agreement can trigger significant earthquakes only where tectonic deformations already exist in the geological structures. Thus it was concluded that filling the Narmada Sagar reservoir might cause an earthquake to occur sooner, but it would not affect the magnitude or intensity of ground motion associated with the earthquake. Consequently, RIS was assumed to have no influence on seismic design requirements for structures near to the reservoir.

Detailed studies got done from the University of Roorkee, by consultancy with Dr. Guha and expert opinion obtained from Dr. Ray W.Clough, were placed before the Dam Review Panel. The Indira Sagar Dam Review Panel considered all

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available reports and data and recommended that

To monitor seismicity during the pre and post-impoundment phases. Network of about five stations each be developed in the Narmada Sagar, Omkareshwar, and Maheshwar areas.

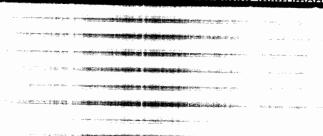
To record the ground motion intensity and response of the dams for any significant earthquake in the vicinity, installation of three strong motion seismographs at each dam site.

To record any significant ground motion that occurs during construction, one strong motion instrument near each dam site

Based on the recommendations of the Dam Review Panel, detailed designs for the dam have been prepared by the Central Water Commission.

At present, three experimental seismological stations have been established with the guidance of Central Water & Power Research Station, Pune, at Narmada Sagar, Omkareshwar and Maheshwar dam sites. The experimental station at Indira Sagar Dam site consists of a RV-320 Micro Earthquake Recorder, a Wood Anderson Seismograph and a Digital Recorder - 100 strong motion accellograph. The results are analysed by the Central Water & Power Research Station, Pune & IMD.

In order to study the seismic effects in the Narmada Sagar Complex Zone



The dam is, in effect, over-designed in the interests of public safety. As for the Indira Sagar Dam, Seismic design coefficients, though higher than needed, also meaning higher costs have been preferred.

RESERVOIR RIM STABILITY

. . .

The reservoir competency survey has been done by GSI and report is submitted. In the report, GSI suggested further studies for some patches of narrow water divide. However environment sub-group decided not to have further

studies as experts were of the opinion that there was no water loss between Mandla & Rajghat.

Establishment of 10 nos. of seismic observatories in the Narmada Sagar Complex area is taken up by NVDA. Order has been placed and supply has commenced. Besides, 12 nos. of Wood Anderson Seismometers and 6 nos. of photographic recorders are being procured from IMD supply has commenced. Procurement of Micro Earthquake recorders is completed. In the mean time on the initiatives taken by NVDA, CWPRS has already installed the instrument to record, pre-impounding data and for undertaking seismic studies at NSP, Omkareshwar & Maheshwar projects through Analogue micro earthquake recorder & strong motion occillograph as an interim measure. IMD will interpret data.

6. HEALTH ASPECT:

The Indira Sagar Project would create a 913 km 2 reservoir, a main canal of 332 km. and 1,820 km of distributories. Surveys have been conducted in the Indira Sagar impact areas to investigate existing levels of health and to gather information on specific diseases.

STUDIES AND FINDINGS:

Three specific diseases namely Malaria, Schistosomiasis, and Filaria were

J.L.University which carried out initial studies for the planning commission on the aspects related with the use of insecticides and pesticides in the command through there research station at Khandwa have been entrusted with studies on impacts of application of insecticides etc.

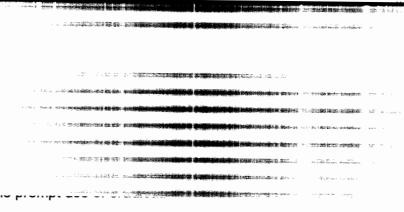
According to the above studies, key findings included the following:

- Malaria is increasing in Khandwa and Khargone Districts surrounding the Indira Sagar Dam site.
- Cholera and gastroenteritis are endemic in Indore, Dhar and Jhabua Districts for more than seven months each year.

- Other common diseases are typhoid and dengue fever, although they are not often found in the project area.
- Filarasis is endemic to at least eight districts of MP, including Chindwara, adjacent to the Narmada Sagar Site. The vector mosquito (mainly Culex fatignas responsible for this parasitic diseases proliferates in dirty water in ponded areas and artificial containers and also to a lesser extent in stagnant irrigation tributaries and lakes.
- Little or no autochthonous leishmaniasis exists at present in MP. This
 disease is not water related since it is spread by sand flies that do not need
 water to breed. However, according to NICD, Delhi, leishmaniasis flared up
 following the construction of the Rajasthan canal.
- Guinea worm disease (dracontiasis) affects 3,000 villages in MP. This
 disease is caused by a nematode worm and the vector for its transmission is
 Cyclops, the fresh water fleas.

SUGGESTED STRATEGIES:

Health problems related to these causes are expected to improve when the projects are implemented. The incidence of water-washed diseases should be reduced by the increased availability of water. The point has also been made that large water supply and irrigation projects often cause problems related to the expanded water environment. Plans have been prepared in both project areas to increase public health-related facilities, staffing, and services during project



Malaria is another disease that requires monitoring and control actions in the project areas. It was found that most of the existing diseases in the project area were related to prevailing socio-economic levels, mainly hygiene. Since the Anopheline mosquito vector has the potential to proliferate in the reservoir, the large draw down strip, and the canals and drains, preventive measures are to be in place to keep the mosquitoes in check. Some experimental resistance of adult mosquitoes to commonly used biocides has been noted under laboratory conditions. Thus research to maintain effective biocides will have to be continued on long term basis. Land levelling and land filling operations as well

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as appropriate vegetation clearing are being integrated. Control measures will include larvae-eating fish in water bodies, mosquito-inhibiting planes, and clearing of vegetation and other actions to destroy breeding sites.

WHEN THE

NVDA has submitted the revised plan costing Rs.278.55 lacs for the preventive and curative aspects of health. The plan includes establishment a 30 bed hospital at Punasa. Other facilities includes the following:

- Mobile unit
- PHC 3 nos., equipped with 5 beds each, equipments, vehicles, staff etc.
- 2 civil dispensaries with labs
- 24 sub-health centres with equipments etc.

Action Plan includes continued investigations of the Central and Western Zone of Narmada at selected sites for the identified parameters. In addition, plan proposes biological characteristic study, microphytes, phytoplankiones, zooplanktones, micro invertibrates, biomass etc. The proposal includes among others continued limnological studies, ecological studies. A note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and comments were sent for modifying the report. NVDA has submitted the revised plan costing Rs.748.73 lac for the preventive and curative aspects of health. Regarding preventive aspects, a MOU has been signed with the Department of

biological monitoring, one well equiped laboratory has been established at Barwani.

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7. ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY:

Archaeological Aspects

Investigations of the basin revealed that valley was rich in archaeological belongings:

- Paleolithic sites are to be found in Nemavar, Kannod, Punjapura, Chirapahad, Sitabau, Dhardi, Moretakka, Maheshwar, Kasrawad, Sahastradhara, Khalghat, Dharampuri, Kalibaodi, Manawar, Budada, Barwani, and Kukshi.
- Mesolithic sites are to be found all over the valley.
- Chaeolithic sites are to be found in Chikalda, Khedi, Badada, Mohipura, Hathnawar, Piplada, Khalghat, Maheshwar, Nawada, Todi, Kapila Sangam, Veda Sangam and Mardana.
- Rock-cut caves and sculptures are to be found at Piploda, Dharampuri, Bijagadha, Bagha and Mandogarh.

None of the archaeological sites mentioned above, that have special significance, would fall within the area of submergence of the projects.

SURVEYS:

A survey of the 254 villages for identification of the archaeological monuments falling within the submergence area was carried out by the State Department of Archaeology and Museum, Bhopal.

Archaeological Survey of India has also completed the survey for 167 villages for centrally protected monuments for identification of the monuments of significance. Implementation of the Action Plan is already initiated.

No. | Mound at village Khedinema.

Excavated

CONTRACTOR OF THE PROPERTY OF

Later on GOMP has revised its plan as Action Plan 1997. The details are depicted in the table below:

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Relocation / Protection

SI.		3tatus -			
No	Name of mounment	Village / Tehsil	Distt.	RL in m	
1.	Shiv Mandir, Dharikotla	Harsud	Khandwa	229.500	80% of the relocation work is nearly completed.
2.	Shiv Mandir, Punghat	Harsud	Khandwa	240.315	Pregress is nil.
3.	Shiv Mandir, Badkeshwar	Harsud	Khandwa	263.805	Scrapping, numbering, detailed drawing and photography completed.
4.	Shiv Mandir (Durga Mandir), Chandel	Khandwa	Khandwa	254.917	Progress is nil
5.	Chhatri Ghisor	Harsud	Khandwa	239.300	Pregress is nil
6.	Shiv Mandir (2), Khudiamal	Harsud	Khandwa	266.215	Progress is nil
7.	Ridheshwar Mandir, Handia	Harda	Hoshanga bad	273.380	Progress is nil
8.	Abdul Hasan's Tomb	Harda	Hoshanga bad	269.680	Pregress is nil
9.	Rock-cut statues	Deyat	Dewas	267.830	Pregress is nil
10.	St. Singhaji's Samadhi	Singhajimafi	Khandwa	247.915	Pregress is nil

Excavation

Archaeological Survey of India have prepared a plan for protection of monuments coming under the submergence of Narmada Sagar Complex area. According to this plan, in the area of submergence of Indira Sagar Project, only lower bastion in north of the Joga Fort is likely to be affected by scour action of water.

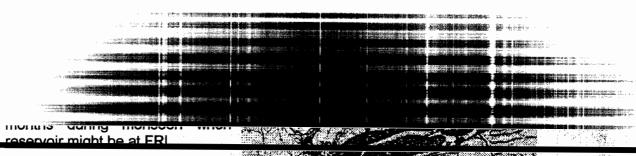
IMPLEMENTATION:

Plan of Archaeological Survey of India

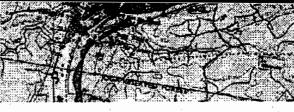
Environment Sub-group constituted a committee to look into the plans to protect the Joga Fort. The committee met twice and undertook field visits and observed as follows:

Field data collected was as follows:

R.L.of plinth of Joga Fort + 274.80 M R.L. of TOP of Joga Fort + 284.75 M R.L. of Main Gate of Joga Fort +271.035 M R.L. of TOP of well + 261.39 M F.R.L. of ISP + 262.10 M Observed Highest Flood Level + 264.27 M (54,000 cumecs) HFL corresponding to 1 in 100 + 265.52 M year Flood (62,500 cumecs) HFL corresponding to 1 in 100 + 266.029M year Flood (83,366 cumecs) BWL corresponding to 1 in 100 +265.00 M year Flood BWL corresponding to 1 in 100 + 266.637M



As far as backwater effect is concerned, the temporary rise due to backwater will be about 0.60 M near well, above HFL. Archaeological Survey of India is reviewing it's Action Plan for safeguarding the monument.



A V Land Control

About 134 statues were collected from districts Hoshangabad, Dewas and Khandwa and are displayed in the museums there.

Photo(s) shown here are of statute displayed at Dewas museum. About 100 statues were treated chemically. Construction of Museum is over.



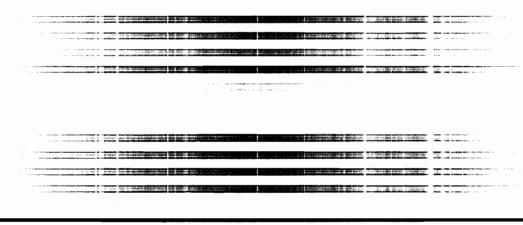
the



Anthropological aspects:

The Narmada Valley can be divided into three physiographic units (1) Western Vindhyas (2) Narmada through West and South and (3) Western Satpuras. Some Indologists place the Narmada-Chambal civilisation of Malwa as a contemporary of Indus civilisation. Navada Toli is a site contemporary to Harappa where evidence of early farming villages were discovered. Findings of a hominoid skull from Hathnora indicated the possibilities of the existence of human bio-cultural remains within the basin.

SURVEYS/STUDIES:



culture.

the 24 submergence villages and identified 75 sculpturists and eight groups of exhibitionists besides documentation of identified important sculptures. Cultural aspects of the tribes including marriages and their lifestyle were collected.

The Bhil Track, a study of displaced tribal, sponsored by NVDA, of the 17 submergence villages of SSP compiled the information on their status, layout of their resettlements, construction of houses, social structure, division into

clans, economic structure, in-depth, dependence on forests for living, intercommunity relationship, leadership pattern, women's role, religion, superstitions and festivals.

- Besides Anthropological Survey of India has covered these studies under its own project called "People of India". The report is in 61 volumes out of which 7 volumes are under final editing.
- A Narmada salvage plan is also launched by Anthropological Survey of India.

ACTION PLAN:

Archaeological Survey of India is carrying out excavation at selected sites. Reports are available.

State Department has reviewed the Action Plan and has proposed 5 excavation sites as shown in table -4, in addition to the earlier proposal of collection of sculptures and excavation at Khedinama.

Table 4. Showing, status of works, at excavation sites

IMPLEMENTATION:

report is available in NCA.

The entire area was scanned by the Anthropological Survey of India under Narmada Salvage Plan and some ancient tools have been found.

ANNEX - XXXIV- (3)



नर्भदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

क्मांक- पर्या-4(5)/2000/12 86-99

दिनाँक: 13-7-2000

प्रति,

माननीय सदस्य/ आमंत्रितगण (संलग्न सूची के अनुसार)।

विषय: सरदार सरोवर और नर्मदा सागर परियोजना के पर्यावरणीय सुरक्षा उपाय प्रतिप्रवाह पर्यावरण : वनस्पति, जीव-जन्तु और संवहन क्षमता के कार्यवृत्त के सम्बन्ध में ।

महोदय,

भी र्माटा माम्य परियोजना के पर्यावरणीय सरक्षा

क्पया इसका प्रााप्त स्पापगर पर ।

संलग्नक- कार्यवृत्त

(*डा० पवन कुमार*) विशेषज्ञ (पर्यावरण)

114

BG 79, Scheme No. 74-C, Vijay Nagar, Indore - 452 010 (M.P.) 제 한 79, २ कीम नं. 74 - 전, विजय नगर, इन्दौर 452 010 (म.प्र.) Phono No: Mem (E&R)- 554333, SPI (Env)- 571587, IAO-558603, APRO-557691

Gram: NARCONTROL

Fax: 91-731-554333

LIST OF INVITEES

Govt. of Gujarat

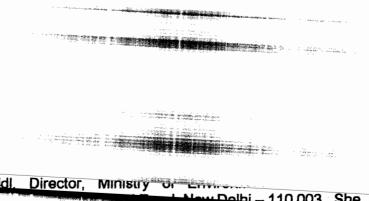
1. Shri C.K. Koshy, Managing Director, Sardar Sarovar Narmada Nigam Ltd., Block No.12, New Sachivalaya Complex, Gandhinagar-382 010.

2. Dr. S.A. Chavan, Chief Conservator of Forests, Sardar Sarovar Punarvasavat Agency, Block No.12, New Sachivalaya Complex, Gandhinagar-382 010.

3. Dr. Mahesh Pathak, Executive Member, Narmada Planning Group, Block No 12, New Sachivalaya Complex, Gandhinagar-382 010.

Govt. of Maharashtra

- The Secretary (Environment), Govt. of Maharashtra, Environment Deptt., New Administrative Building, 2nd Floor, Near Chetna College, Bandra (East), Mumbai – 400 051.
- Dr. Shailesh K. Sharma, Joint Secretary & Director (Environment), Govt. of Maharashtra, Environment Deptt. New Administrative Building, 2nd Floor, Near Chetna College, Bandra (East), Mumbai – 400 051.
- Mrs. Shomita Biswas, Scientist-I, Govt. of Maharashtra, Environment Deptt., New Administrative Building, 2nd Floor, Near Chetna College, Bandra (East),



- 4. Dr. K.P. Tiwari, Project Director, State Forest Research Institute, rompourous, Jabalpur 482 008.
- Dr. Asha Rajvanshi, Scientist, Wildlife Institute of India, Post Box No.18, Dehradun – 248 001.
- 6. Dr. R.D. Dixit, Joint Director, Botanical Survey of India, Central Circle, 10, Chathem Line, Allahabad 211 008.



केवल सरकारी प्रयोग के लिए For Official Use Only

सरदार सरोवर और नर्मदा सागर परियोजना के पर्यावरणीय सुरक्षा उपाय प्रतिप्रवाह पर्यावरण : वनस्पति, जीव-जन्तु और संवहन क्षमता

SSP & NSP ENVIRONMENTAL PROTECTION MEASURES UPSTREAM ENVIRONMENT: FLORA FAUNA AND CARRYING CAPACITY

तीसरी बैठक का कार्यवृत्त Minutes of the 3rd Meeting

23 जन. 2000 को समिति कक्ष, नर्मदा नियंत्रण प्राधिकरण

जुलाई, 2000

Indore July, 2000 MINUTES OF THE 3RD MEETING OF FLORA, FAUNA AND CARRYING CAPACITY ASPECTS OF UPSTREAM ENVIRONMENT OF SARDAR SAROVAR AND NARMADA SAGAR PROJECTS HELD ON 23RD JUNE 2000 IN THE COMMITTEE ROOM OF NCA'S LIAISON OFFICE AT NEW DELHI.

Introduction

The Chairman welcomed the participants and after a brief introduction of the participants, discussions on the subject was taken up. A list of the participants is enclosed at **Annex-1**.

Item No.1 : Review of the current status of the studies and presentation of the main recommendations.

The Chairman drew attention of the participants towards the need for a review of the status of studies, development of Action Plan and their implementation specially in view of the conditions contained in the clearance order. He invited the attention of the members to the conditions laid down by the MOEF while granting the clearance, from the environmental-angle to the Sardar Sarovar and Narmada Sagar projects. He also read out from the communication received from the then Secretary, MOEF, Shri T.N. Sheshan which was circulated by the NCA vide letter No.3/87/90/RCT/Env-5/IA, dated 4.2.88 [copy enclosed for ready reference, Annex-2]. It was pointed out that this letter provided frame work for preparation of action plan on the issue of Flora, Fauna & Carrying Capacity aspects. The Chairman desired that discussions should be focused towards compliances the issues identified in the above mentioned letter. He, thereafter invited the representatives of the State Govts, to present the

Mell Implementation

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taken by the State Govt. vis-a-vis the recommendations of the study groups:

Govt. of Maharashtra

Sint. Shomita Biswas, Scientist-I, GOM informed the study group had pointed out that there were no endemic endangered species of Flora & Fauna within the submergence zone and that its main recommendation related to the Catchment Area Treatment and social-forestry. Catchment Area Treatment programme for Phase-I has already been completed and programme for Phase-II was under implementation.

Shri Shailendra Bahadur, Nodal Officer, GOM informed the detailed progress of CAT works for Phase-I & II programme in Maharashtra. A copy of the information provided during the meeting is placed at **Annex-3**. Regarding creation of sanctuaries as per recommendations of the study group, he informed that this issue was considered by GOM and as the areas were honeycombed with habitation there was difficulty in accepting this recommendation and

rected by the SSP was entrusted to the State

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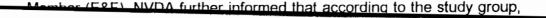
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the Environment Sub-group. The institute completed the study group were related to improvement in the carrying capacity through catchment protection works, restablishment of indigenous forest eco-system and local bio-diversity. He

asserted that CAT and CAF programmes undertaken by the State Govts, as part of the environmental management for the Sardar Sarovar Project aims at the same. In other words the objectives of catchment area treatment overlapped with the recommendation of the study groups for improving the carrying capacity. Substantial progress is already achieved under Catchment Area Treatment programme whereas plantation works are nearly completed.

Regarding islands those would be formed during the progressive filling of the reservoir, it was informed that recommendations for keeping them as habitat for birds or declaring these as sanctuaries is under consideration of the State Govts. The area of such island put together is expected to be of the order of 2000 ha. The Member (E&F), NVDA summarized the findings of the report and stated that there was nothing unique in the submergence area but on the periphery of the reservoir forest areas could be conserved.



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sparse wildlife present, SFRI have recommended placing some impact areas of the SSP under protected areas. Member (E&F), NVDA pointed out that in terms of conditions of the clearances a wildlife committee consisting of the officers of the Zoological Survey of India, Botanical Survey of India and Wildlife Institute of

India etc. was formed and the plan prepared by the GOMP was put up to this Committee in accordance with the requirement of the conditions. He informed that next meeting of this committee is scheduled during July 2000. He was of the view that for the scarce wildlife, proposal of the SFRI for creation of protected areas on either side of the river Narmada in M.P. will also be considered by the Wildlife Committee constituted by the GOMP,

Indira Sagar Project

The Member (E&F), NVDA informed that Friends of Nature Society (FONS) report have included the Action Plan for retrieval and conservation of bio-cultural material from the submergence of ISP whereas report of the WII has delineated an Action Plan for the creation of National park / sanctuary within the impact zone of Omkareshwar, Maheshwar and Indira Sagar Projects and therefore the two studies are quite comprehensive and interrelated.

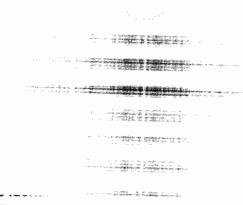
Hora and Faulia aspects, one ug. --

The Additional Director, BSI informed that BSI have published an inventory of flora of M.P in three volumes of which third volume was under editing. He pointed out that these were priced publications and might be obtained by all those who were working in the project area. He was of the

opinion that there was no threat of extinction of any species by the construction of the dam but suggested plantations of those species which are rare in the area.

The Additional Director, MOEF expressed concern over the missing targets in terms of conditions contained in the clearance order. She stated that a comprehensive documents on key recommendations and their implementation should be prepared and submitted to the Ministry as early as possible. She suggested that the recommendations contained in the study group should be translated into Action Plans if not already done so. She was of the view that if any help is needed by the State Govt. in devising the plans, she suggested that experts in NCA, MOEF, ZSI or BSI can be consulted and the help may be sought even during the mid course correction. She advised that we should remain in time for completion of the needed actions.

After detailed discussion on the issues involved, following emerged



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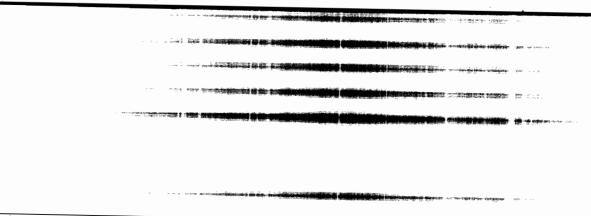
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forestry component were also required to be addressed.

4. In Maharashtra, considering that forests going under submergence in Maharashtra were only a small part of the large tract of contiguous forests and problems of honeycombed habitation, the proposal for creation of a

sanctuary was not feasible, it was agreed that since Shoolpaneshwar sanctuary was on the border, it should cater to the requirement, if any. The CAT and CAF programmes encompasses plantations as a major component which in turn would improve the carrying capacity and would also mitigate the pressure on the adjoining areas. Regarding action taken by State Govt. on the recommendations of the study of Pune University in a tabular form within 15 days. GQM agreed to expedite its response within one month's time.

- 5. For the proposed plan for the SSP areas in M.P., it was suggested that response of the Wildlife Committee constituted by GOMP, would be obtained and the approved plan would be made available within a month's time.
- 6. A need for Integrated Management Plan on Flora & Fauna for the SSP as suggested during the 2nd meeting of Flora & Fauna was reiterated. WII was requested to help project authorities for preparation of a map of the Narmada Basin showing relevant details related to Flora and Fauna aspects.



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Annex-1.

LIST OF PARTICIPANTS OF THE 3RD MEETING ON FLORA AND FAUNA HELD ON 23.6.2000 AT LIAISON OFFICE, NCA, NEW DELHI

GOVT. OF INDIA

Narmada Control Authority

- 1) Shri N.D. Tiwari, Member (E&R), NCA, Indore.
- 2) Dr. Pawan Kumar, Specialist (Environment) NCA, Indore.
- 3) Shri Rakesh Gaurana, Astt. Director (Environment), NCA, Indore.

Ministry of Environment & Forests

- 1) Dr. Nalini Bhat, Addl. Director, MOE&F, New Delhi.
- 2) Dr. R.D. Dixit, Addl. Director, Botanical Survey of India, Allahabad.
- 3) Dr. Asha Rajvanshi, Wildlife Institute of India, Dehradun.

GOVT. OF MADHYA PRADESH

Shri Suresh Chandra, Member (E&F), NVDA, Bhopal.

नमंदा नियन्त्रण प्राधिकरण NARMADA CONTROL AUTHORITY

Flut No.1.1. Mathx Mack
Pulika Bhavan,
Sector-XIII, R. K. Puram
New Delhi-110086

Dated .. 1.7 . 2 . 1.948 .. 19

HO. U-34(3)/80/153

Toi

thri K.C.S. Acharya Thief Secretary to the Govt. of Madnya Pradesh Vallabn Bhawan Bhopal-462006.

Shri K.G. Paranjpe Chief Secretary to the Govt. of Maharashtra Mantralaya Bombay-400 032, Shri R.v. Chandramouli Chiet Secretary to the Govt. of Gujarat New Sachivalaya Complex Gandhinagar-382010.

Shri V.B.L. Mathur Chief Secretary to the Govt. of Rajasthan Secretariat Jaipur-302005

Subject:- Environmental action vis-a-vis clearance of Sardar Sarovar and Narmada Sagar Projects.

frame by which time action prans are expected ...

Yours faithfully,

541-

(Y.V. Dharma Rao)
Secretary
Tel: 676078

Encl: As above

Capy alongwith a copy of enclosures forwarded for information and not seary action to:

GIVEHAMENT OF MACHYA IHALLON

- 1. Shri R.S. Khanna, Vice-Chairman, Narmada Valley Devalopment Authority, Narmada Unavan, Tuleinagan, Uhepal-402 UUS.
- Shri S. Seshauri, Member (Engineering), Harmada Valley Davelupment Department, Harmaya bhavan, Tulelnagar, Ohopal-462003.
- Shirk Vijey Singh, Member (Nenabilitation), Narmade Valley Development Department, Narmada Bhaden, Fulbinager, Bhepal-462 003.
- 4. Shri T.N. Manapishi, Chief Censervator of Furests, Narmada Valley Development Department, Narmada Bhauan, Tulsinagar, Uhepul-462 003.

TARACUD TO THEMMINDE

- 5. Shri 1.M. Shah, Secretary(Narmada), Narmada Development Department, Block Ne.B, 6th fleer, New Sachivalaya Complex, Gandhinagar-382 010.
 - Shri P.A. Raj, Additional Chief Secretary, Narmada Development Department, New Sachivalaya Complex, Gandhinagar—382 010.
 - Shri T.v. Krishnamuithy, Secretary (Rehabilitation), Narmada Development Department, Block Ne.9, 8th floor, Neu Sachivalaya Complex, Gandhinagar— 382 010.
 - B. Shri H.A. Vaishnav, Enlef Conservator of Forests & Wild Life, Government of Gujarat, C/o Shri I.M. Shan, Narmada Dovelopment Department, New Sachivalaya Complex, Ganehinagar-382 010.

COVERNERT OF MANAGASTORIA

9. Shil V. Banganathan, Secretary (Relief & Rehabilitation), Revenue and Component of Paharashtra, Mantralaya, Gumbay-400 03:

net h.S. Meens, Decience, January 102 1005

Capy also forwarded for información.

Unri A.K. Venkatesha, Superintending Engineer(WM), Ministry of Water
Resources, S.S. Bhawan, Rafi Marg, New Delhi.

Dr. S.C. Maudgal, Director, Ministry of Environment and Forests, Paryavaran Bhawan, CGO Cemplex, Phase 11, Lodh& Roue, New Delhi-110003.

and the state of the state of the same

Cop, or D.O. Letter No. 5/07/50/NCI/Chy. 5/10 dated February 4, 1988 from Shri T.N. Seshan, Secretary to the Covt. or India, Ministry of Environment and Forests, Paryavaran phawan, Louni Road, New Delhi addressed to unri Naresh Chandra, Secretary to the Covt. of India, Ministry of Water Rusources, New Delhi.

.

You may kindly recurs that in the last meeting of the ACA, it was considered desirable that to facilitate basic environmental data collection and preparation or needed action Flans a framework may be worked out to be followed uniformly by all the four States. Accordingly, on each of the major environmental aspects for which necessary action plans have to be prepared, details worked out are enclosed. You may like to convey these details to the concerned Chief Secretaries for necessary follow-up action.

ENVIRONMENTAL DATA AND ACTION PLANS .

CATCHMENT AREA TREATMENT

Catchment Area Treatment should cover both submergence area as well as free draining catchment. The important parameters under both these heads are given below:

SUBMERGENCE AREA

Extent, land use, population affected, some-economic profile of arrected population, inter-linkages with outer population, special characteristics, flora and fauna - endangered, rate, habitat sufficiency, seismic status, geological features, ground water status, geomorphological aspects.

FREE DRAINING CATCHMENT AREA

Land use, extent of awgradation, erodability, precipitation pattern, . Id bursts, land slides, biotic pressures, siltation load, other existing and proposed activities.

CATCHMENT AREA THEATMENT PLAN

- Criteria adopted for identifying degraded and vulnerable areas;
- Map showing critically degraded area requiring engineering and

- Phased action Plan for compensatory afforestation;
- 6. Public participation details;
- Details of after-care and monitoring.

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REHABILITATION AND MASTER PLAN

- Enumeration of affected population including those whose land
 submerged but houses are not as well as the landless workers;
- 2. Socio-economic studies and profile of the affected population;
- 3. Details of the rehabilitation sites along with the land capability surveys and availability of water at the selected sites;
- 4. Map of rehabilitation colonies and type, designs of the houses proposed;
- b. Details of the occupational training programme proposed for the oustees;
- 6. Measures needed to make the identified land fit for agriculture and rehabilitation alongwith a phased action Plan.

COMMAND AREA DEVELOPMENT

Command area involves both the management of plant as well as human aspects. The details have to be collected on the following:

LAND MANAGEMENT

Existing land use, irrigation status, cropping pattern, water

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3. Details of the drainage works proposed in the command and the norms based on which these details have been planned;

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- 4. Un-firm development works proposed and the assistance proposed to be given to the farmers to ensure conjunctive use of water;
- 5. Details of the present and proposed cropping patterns;
- 5. Steps proposed to prevent contamination of ground and surface water due to fertilisers, pesticides, runoff.

FLOKA

Hare and endangered species, gene-pool reserve.

EAUNA

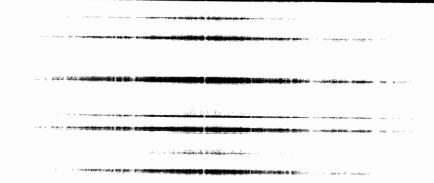
Rare and endangered species, migratory species, migration roubreeding habitat, sanctuary, national park.

Accordingly, the rehabilitation of Flora and Fauna Action Plan would cover the following:

- Survey of flora and fauna in the region going to be affe due to implementation of the scheme;
- 2. Gene-pool, it any, likely to be affected;
- 3. Details of wildlife habitats in the region;
- 4. Measures proposed to rehabilitate endangered species of tlora and tauna, if any;
- b. Assessment of the carrying capacity of the neighbouring wherein the wildlife would disperse if the scheme is imp
- b. Klan for rehabilitation of endangered Flora and Fauna.

b. HEALTH ASPECTS

1. Present status of the water-borne disease in the area;



OFFICE OF THE POOF M.S. NAGPUR	Park of	
DC8K. 17/St 22/6/2000 011-6185078 NAGPUR	***	,
Please handover To Shi Chaileach & Brhader Model Officer		
Mehrershter istele Specialist Environment.	•:	
Nasmada Control Authority Committee Office at 1001, Bhikaji Coma Bhawan,	هر بر	
New Delhi - 1:0066		
Subject: Sesder Enroval Meeting. dt 23rd June 2000 at 1100 hrs		

1) Opto 18:99 4106 hr. 226.2011th 3646 hr. 203.25/1 11) 99.2000 955 hr. 66.50 hth 789 hr. 66.33 f 5061 ha. 292-70lath 443.5 ha. 269.586 Total - .. Submitted to kind jostokmation

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ANNEX - XXXIV- (4)

Statement Showing the activities carried out for improvement of habitat in Shooipaneshwar Sanctuary, during the year 1998-99.

Sr. No.		Work component	Physical Progr ess		!
1	Protect	tion to the sanctuary.			
	i.	Fencing	Proposed		
	II.	Watch Tower (Maintenance)	3 No.		
	iii.	Fire Lines	100 Km.		
	lv.	Vaccination to the cattle.	Proposed	!	
	٧.	Stone wall fencing	10262 Rmt.	ì	
	vi.	Fire chowki	15 No.		
	vii.	Fire watchers	35 No.		
	V 11.	The watchers	33 110.		
II	Habita	t improvement & facilities for wildlife) .		
	l.	Supply of water for wildlife	L.S.		
	II.	Supply of fodder	Proposed		
	III.	Bird observation hut	Proposed		
	lv.	SMC works (Barricades)	2 No.		
	٧.	Creation of habitat(Check Dam)	1 No.		
	vl.	Construction of small ponds	2 No.		
	vii.	Removal of unwanted species	Proposed		
	vill.	Advance work of plantations	35 Ha.		
	ix.	Fodder plantation for wildlife.	22 Ha.		
	IA.	Todder plantauon for wildlife.	2113 Cu.mt.		
			ZIIJ Cu.iii.		

VII Wildlife week celebration

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ANNEX - XXXIV- (5)



नर्भदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

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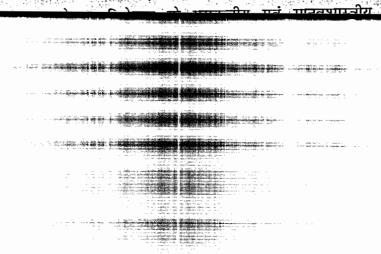
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प्रति,

माननीय सदस्य/ आमंत्रितगण (संलग्न सूची के अनुसार)।

विषय: सरदार सरोवर परियोजना के पुरातत्वीय एवं मानवशास्त्रीय सम्बन्धित प्रगति के पुनरीक्षण के कार्यवृत्त के सम्बन्ध में ।

संदर्भ इस कार्यालय का पत्र कमांक Env.-4(11)/99/1115 dated 16.6.1999.



संलग्नक- कार्यवृत्त

(*डा० पवन कुमार*) विशेषज्ञ (पर्यावरण)

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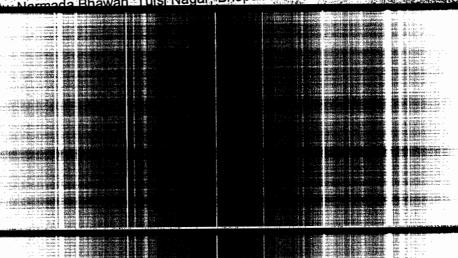
जारी की हमा

3-79, Scheme No. 74-C, Vijay Nagar, Indore - 452 010 (M.P.) .ਗੀ. - 79, ਣਹੀਮ ਗੰ. 74-ਵੀਂ, ਰਿजय ਗਗਵ, ਫ਼ਰਫੀਵ 452 010 (ਸ.ਸ.) one No.: Mem (E&R)- 554333, SPL(Env)- 571587, IAO-558603, APRO-557691 Gram : NARCONTROL

Fax: 91-731-554333

LIST OF MEMBERS/ INVITEES

- 1 Shri N.D. Tiwari, IFS Member (E&R), Narmada Control ∆uthority, BG-79 Scheme No.74-C, Vijay Nagar, Indore – 452 010.
- 2. Dr. Pawan Kumar, Specialist (Environment), Narmada Control Authority, BG-79, Scheme No.74-C, Vijay Nagar, Indore-452 010
- 3. Shri KKK Chakravarty, Director, Indira Gandhi Rashtriya Manav Sanghralaya, Post Bag No.2, Shyamala Hills, Bhopal-462 013
- 4. Dr. P.K. Mishra, Superintending Archaeologist, Archaeological Survey of India, Bhopal Circle, Guru Teg Bahadur Complex, TT Nagar, Bhopal 462003.
- 5. Dr. Gopal Krishnan, Anthropologist, Anthropological Survey of India Central Region, 11, Seminary Hills, Nagpur-440 006 (Maharashtra)
- Shri Suresh Chandra, IES, Member (E&F), Narmada Valley Developments
 Authority, Narmada Bhawan, Tulsi Nagar, Bhopal.
- 7. Dr. S.C. Mazumder, Member (Rehab.), Narmada Valley Development





सरदार सरोवर परियोजना के पुरातत्वीय एवं मानवशास्त्रीय सम्बन्धित प्रगति के पुनरीक्षण का कार्यवृत्त

Minutes to Review the Progress on Archaeological and Anthropological Aspects in Relation to Sardar Sarovar Project

> दूसरी बैठक का कार्यवृत्त Minutes of the 2nd Meeting

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इ**न्दार** जून, ...2000 Indore

June, 2000

Minutes of the 2nd meeting to review the progress on Archaeological and Anthropological aspects in relation to Sardar Sarovar Project.

Index ,

Contents	Page No.
Introduction	1
Confirmation of minutes of 2 nd meeting	2
Minutes of 2 nd meeting	3-5

)	State Department of Auditage.	, .	
Annex-5	Current status regarding progress and survey work by State Department of Archaeology & Museum, GOMP	29-41	

Minutes for the 2nd meeting to review the progress on Archaeological and Anthropological aspects in relation to Sardar Sarovar Project.

Introduction

The 2nd meeting to review the progress on Archaeological and Anthropological aspects in relation to Sardar Sarovar Project was held on 23.6.99 under the chairmanship of Member (E&R), NCA at 11 a.m. in the Committee Room of NVDA, Narmada Bhawan, Tulsi Nagar, Bhopal. List of participants is at **Annex-1** (page-6).

The Chairman welcomed the participants and urged the committee to discuss the issues listed in agenda. Thereafter, he invited Specialist (Environment), NCA to take up the agenda for discussion.

Confirmation of Minutes of the 2nd meeting.

The 1st meeting on Archaeological and Anthropological aspects on Narmada Basin was held on 20.5.92 at 3 p.m. at NCA office, Indore.

Minutes were confirmed as circulated vide this office letter No.Env-4(11)/92/1075, dtd. 22.5.92.

Review of Dr. Romila Thapar's letter.

Dr. Romila Thapar's letter addressed to Dr. Shekhar Singh was discussed. It was pointed out that she in her letter has pointed out important archaeological sites to be looked into. Letter is enclosed at **Annex-2** (page-7-10).

1. Archaeological Survey of India

Dr. P.K. Mishra, Superintending Archaeologist, ASI, Bhopal stated that apparently her concern is based on Dr. Ota's report of 1984. The archaeological sites surveyed by ASI and State Department of Archaeology & Museum, M.P. subsequently included most of the sites listed by Dr. Romila Thapar. It was agreed that only those monuments or excavation sites are to be taken up which are of National significance and not all the archaeological sites.

made available by ASI, it was informed that about 50% of the works was completed and that the balance work was likely to be completed soon.

F INTEREST CARRESTS

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Further, it was brought out that most of the monuments are of *Parmar style* and some of these are related with archaeological significance and others are of emotional nature, e.g., *Chaubees Avtar Temple* which is already relocated. Dr. S.C. Mazumder, Member (R) NVDA agreed that all identified sites need to be relocated as early as possible.

2. Anthropological Survey of India

Shri Gopalkrishnan, Anthropologist informed that the detailed survey of the area was completed much earlier and that a book titled as "Land and People" by D. Tyagi from ASI, Calcutta was published on Narmada Basin. This report dealt with aspects of anthropology in Narmada Basin.

3. Indira Gandhi Rashtriya Manav Sanghrayala

Some of its topics are appended at Annex-3 (page-11-27). Representatives of State Department of Archaeology & Museum, M.P. pointed out that they are not getting the funds in time, the funds received by them were very meager and that the land is also not being made

available for relocation in time. The Chairman drew the attention of GOMP and requested for an early settlement of the issues.

Regarding the monuments proposed to be handed over to the ASI for protection work, representative of ASI informed that proposal was under consideration of ASI. List of monuments proposed to be handed over to ASI is at **Annex-4** (page-28).

Current status regarding progress and survey work is given during meeting by the representative of State Department of Archaeology & Museum, GOMP is enclosed at **Annex-5** (page-29-41).

ANNEX-1

List of participants of 2nd meeting to review the progress on Archaeology & Anthropology aspects in relation to Sardar Sarovar Project

Narmada Control Authority

1. Shri N.D. Tiwari, Member (E&R), NCA, Indore -

Chairman

A STATE OF THE STA

- 2. Dr. Pawan Kumar, Specialist (Environment), Indore
- 3. Shri R.G. Pandey, Deputy Director (Environment), Indore

Indira Gandhi Rashtriya Manav Sanghralaya

1. Shri K.K.K. Chakravarty, Director, IGRMS, Bhopal

Archaeological Survey of India

- 1. Dr. P.K. Mishra, Superintending Archaeologist, ASI, Bhopal
- 2. Shri Narayan Aiyar, Dy. Superintending Archaeologist, ASI, Bhopal
- 3. Shri N. Taher, Dy. Superintending Archaeologist, ASI, Bhopal

- 1. Shri R.R. Singh, Project Officer, SDA&M, M.P., Bhopai
- 2. Dr. Prakashendra Mathur, Archaeologist, SDA&M, M.P., Indore

ANNEX-2

-1

THEFT W331

Dr.(Mr.:.) Natini Erat Additional Director

D.O.No.3-27/30-IA.I.

दूरमाप : Telephone :

4360478

6.949 :

Telex: W-66185 DOE IN

FAX: 4360678

भारत सरकार

पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
पर्यावरण भवन, सी. जी. ओ. कॉम्पलेक्स
PARYAVARAN BHAVAN, C.G.O. COMPLEX
लोदी रोड, नई दिल्ली-110003

LODHI ROAD, NEW DELHI-110003

May 1, 1997.

Dear Shri Sekhar,

Enclosed please find a copy of the communication received from Shri Shekhar Singh of Indian Institute of Public Administration. New Celhi regarding

Member (E&R).

Narraca Control Authority, EG-113, Scheme No.74-C. Vijay Nagar, Indore-+52 010.

The second secon

23 March 1997

Dear Professor Shekar Singh,

I am enclosing a list of archaeological and historical sites which need to be investigated and recorded before they are submerged. The list is based on reports in Indian Archaeology - A Review, a regular journal brought out by the Archaeological Survey of India, and on discussions which I have be de-

Romila Thapar

Spi 144

The offing of the rich ecological and historical sites to be poplared in greater divide or entarested in more which are being submerged or likely to be submarged soon.

P : Preliistorie

EH - Early Historic

M - Medieval

East Nimar Dt.

Harsud Tehsil:

Bijalpur Kalan М

Bijalpur Khand P and iron emciting

Ganor

Gullar P

Harsud λ.(

Jogibica

Chota Tawa valley and its liber y.

Rupard valley

Chorapachar valley

Other site: include !

Beribandi Ghari

Kotara

Balikeshwara

important M temple. Consider relocation

Now the water with the same of the same

Chandel

71

On going escavations which need to be completed: Harsud Gashi Sarasavatī kunda Balwera Khandwa Tehsil: P Baiwara P Chandei Dharikotia Junapani Etjoramañ Gulgaonmai Р

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ANNEX-3

अध्याय ३

संशोधित कार्य योजना 1997 (1997 से 2004 तक)

कार्य भोजना 1993 में प्रस्तावित कार्यों के समयावधि में पूर्ण न होने एवं उसमें उत्पन्न परिस्थितियों से निपटने एवं भविष्य में कार्यों को प्राथमिकता के आधार पर श्रीव्रतिशीव्र निप्पादित करने के उद्देश्य से नर्मदा घाटी विकास प्राधिकरण के अधिकारियों से चर्चा की गई. इस संबंध में यह सुझाव सामने आया कि परियोजना के कार्यों को समय-सीमा में चरणबद्ध तरीके से किया जाना आवश्यक है. अत: उचित होगा कि सर्वप्रथम सरदार सरोवर परियोजना को प्राथमिकता देते हुए 436 फीट बांध की ऊंचाई में प्रभावित होने वाले स्मारकों के विस्थापन/ पुनर्स्थापन तथा टीलों के उत्खनन कार्य का प्राथमिकता के आधार पर किये जाये. चूंकि 455 फीट की ऊंचाई तक सरदार सरोवर बांध के निर्माण संबंधी प्रकरण माननीय उच्चतम न्यायालय के अधीन विचासभीन है. अत: 436 फीट की ऊंचाई पर प्रभावित होने वाले स्मारकों के पुनर्स्थापन तथा टीलों के उत्खनन कार्य को प्राथमिकता दी जावे. तदुपरान 455 फीट बांध की ऊंचाई होने पर प्रभावित होने वाले कार्य यथा समय निष्पादित किये जावेंगे. तद्नुसार क्रमबद्ध रूप से इन्दिरा सागर, महेश्वर तथा ओंकारेश्वर, परियोजनाओं के प्रसम्मदा/स्मारकों के प्रवर्शापन का कार्य निष्पादित किया जाय.

इस संबंध में यह भी मुद्दा सामने आया कि सरदार सरोकर परियोजना के कार्यों को समय सीमा में कराये जाने के उद्देश्य से कविषय स्मारक मृतरर्थापन के लिए वथा कविषय टीले उत्खनन के लिए भारतीय पुमत्रत्व सर्वेक्षण विभाग को सींभे जाना है, तद्विपयक विशद् कार्य योजना तैयार किया जाना निर्वात आनश्यक है,

नये कार्य योजना 1997 में नर्मदा बचाओं अभियान, इन्ट्रेक, भारतीय पुरातत्व सर्वेक्षण विभाग एवं अन्य एजेन्सियों द्वास पुरासम्पदा के संस्थण एवं पुनर्शापन के संबंध में उठाये गये मुद्दों को ध्यान में रखते हुए कार्य योजना में आवश्यक संशोधन किये गये हैं. सरोत्तर परियोजना के लिए प्रस्तावित स्मारकों में से किन्हीं स्मारकों को स्थानांतरण के लिए नतीन संशोधित सूची में सम्मिणित किया गया है.

(....) हो हो न ने हें हिएकांत कार्य हम क्रिक्मण अन्य प्रमृतन्त्रीय होतों को उत्पवनन

स्मारकों की सूची एवं अनुमानिक व्यय (रूपयों में) :

1.	शिवमंदिर, रोलीगांव	9,20,000.00
2.	जलालेश्वर मंदिर, खुजावा	6,60,000.00
3.	कलंजेश्वर मंदिर, सेमल्दा	7,40,000.00
	नीलकंठेश्वर मंदिर, चिखिल्दा	8,31,000.00
4.	विल्वामृतेश्वर मंदिर, धरमपुरी	8,40,000.00
5.	पशुपतेश्वर मंदिर, चिखिल्दा	6,38,200.00
6.		4,70,000.00
7.	कोटेश्वर मंदिर, कोठरा, जिला धार	5,20,000.00
8.	नागेश्वर मंदिर, धरमपुरी	5,00,000.00
9.	भीलखेड़ा स्थित 6 छत्रियाँ	
10.	शिवमंदिर, छोटी कसरावद, जिला खरगौन	4,60,000.00

कुल ..

64,79,200.00

पुरातत्वीय टीलें :

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कार्य योजना (एक्श

परियोजना का	स्मारक का नाम	
नाम		
(1)	(2)	

- - 2. रौलोर्ट्यार्ण प्रतिमाएं
 - 3. शॅलीत्कोर्ण गुफाएं चुजावा
 - विशाल प्रतिमाएं खुजावा
 - शिव मंदिर क्र. 1 खुजावा
 - . 6. शिव मंदिर क्र. 🕏
 - 7. शिव मंदिर क्र. 3
 - नर्मदेश्वर मंदिर डेहर
 - त्राणेश्वर मंदिर

- भवानी माता चंदिर खुजावा
- देवप्रतिलिंग शिव मंदिर, बोधवाड़ा

र स्मारकों का पुनर्स्थापन कार्य एवं उनकी समयावधि

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अधिकतम	पुनस्थापन के लिए	अनुमानिक अभ	भै तक किया गया	रिमार्क -
जल जर	अनुमानित समय	ञ्चय न्यय	ालाख मपयों में)	
(7)	(8)	(9)	1.10)	(11)
463.56 ਾਸ਼ੀਟ	जुन १९९७ से अक्टूबर १७ तक	9,42,663,00	4.30	
491,21	अक्टूबर-नवम्बर १९९७	2,29,000.00	20.0	
481.27	-"-	2, 21,000/-		
481.27	_"-	2,30,000.00		
481.27	करवरी-सर्च 1998	2,15,000/-	* .	
481.27	_ 1	2.51.000/		
481.27	माचे 1998	2,34,000/-		
248.34	अग्रैल-मई 1998	6.15,500/-		
-	_"-	10.36,500/-	होते प नदो	र बांध को फंचाई 455 कीट रर प्रभावित होगा परन्तु मंदिर के बीच में स्थित होने के 1 436 बीट पर ही डूब में ग्रा.
481.27	अप्रैल-मई 1998	4,35,000/-		के गिलपखंडों के नम्बरिंग गए चूने का प्लास्टर हटाया जा है.
457	जून-जुलाइं 1998	8,63,500/-	होने	मई 1998 तक भूमि उपलब्ध के उपरान्त कार्य ग्रारम्भ किया किया.

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(1)	(2)	(3)
	12. सोमेश्वर मंदिर, खुजावा	धरमपुरी, धा
	13. शिवमंदिर, पिपल्दागढ़ी	-''-
इंदिस सागर (नर्मदा सागर) परियोजना	1. शिवमंदिर, धारो कोटला	खण्डवा जि. खण्डव
31/419111	 शिवमंदिर (2) खुदिया माल 	हरसूद खण्ड
	3. शिव मंदिर, पुनघाट	हरसृद (ख
50	4. शिव मंदिर, बडकरवर	हरसुद जि. खण्डव
n. 🕶	5. छत्री घिसोर	€ -''-
	6. सिंगाजी की समाधि सिंगाजी	खण्डवा जिला खण्ड
	7. रिद्धेश्वर मंदिर हण्डिया	हरदा होशं
	 अब्दुल हसन का मकबरा, हण्डिया 	_"_
	9. शिव मंदिर, चन्देल	खण्डवा जिला खण
	 शैलोत्कीर्ण प्रतिमाएं टैट्यत 	खातेगांव देवास

	(8)	(9)	(10) (11)	
1.27	जुन-नचम्बर १९९8	2,74,500/		
1.22	अप्रैल, 1998	7,80,990/-		
6.70 मीटर	जनवरी-फरवरी १९९8	5,26,500/-	 मंदिर 225 मीटर बांध की ऊंचाः होने पर डूब प्रभावित क्षेत्र स्थित है 	
	अपैल-मई 1998	9.73.000/-	जल स्तर 225 मी. जल स्तर कं ऊंचाई पर लिया गया है.	ते
0.05 मोटर	नवम्बर-दिसम्बर १९९8	9,36.000/-	मंदिर 230 मीटर बांध की ऊंचा होने पर डूब से प्रभावित है.	ई
-	मार्च, 1999	11,41,200/-	बांध की ऊंचाई 239 मी. से अधिव होने पर दूब से प्रभावित होगा.	क
-	नानं, 1999	6,78,000/-	त्रांध की ऊ. 239 मी. से अधि होने पर डूब से प्रभावित होगा.	क
	अपैल-मर्ड 1999	13,00.000/-	जिलाध्यक्ष एवं सासन द्वारा भू उपलब्ध कराये जाने के उपरा स्मारक की स्थानान्तरण प्रार किया जा संकेगा.	न्त
	नवस्त्रर-दिसम्बर ;२९९	11,68,500/-	वर्तमान में मंदिर को मूल स्थान सुरक्षित रखना है जिसके दि सुरक्षा प्राचीर का निर्माण करा जावेगा.	गए
	जनवरी-मार्च 2000	15,45,000/-		
-	नवम्बर-दिसम्बर २००७	10,64,000/-		
-	नवम्बर, २०००	3,03,500/-	प्रतिमाएं नदी के मध्य में स्थित अत: पुनर्स्थापन/स्थानान्तरण व डूबने के पूर्व किया जाना है.	

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		१. जिब मंदिर	-;
	परियोजना	प्रथिया	1
		 प्रमुपांत नाथ मंदिर पंथिया 	
		 कुबेर भण्डारी मंदिर (गोदडपुरा, ऑकारेश्वर) 	-
		4. सतमाता मंदिर सैलानी	
		5. शिवमंदिर प्रेमगढ्	
15°		६ रेणुका मंदिर हे	, ,
	महेश्वर परि योजना	 विमलेश्वर मंदिर वेलसर 	1
	2	30.00	
F 3.		 चन्द्रशेखर महादेव मंदिर, बेलसर 	
,		3. शिवमंदिर मरदाना	
		1) इंदिरा सागर परियोज 2) इंदिरा सागर परियोजन	

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	दिसम्बर २००० ई.	9.71,000/-	-	
	जनवरी-सार्च 2000 डॅ.	10,95,000/-		मंदिर में १३ गती के गिलाखण्डों का उपयोग किया गया है ज्वं जीतमार्ग मेलान है.
	मानं, २००० ई.	10,61,000/-		मंदिर 13 वों गती के मूल मंदिर के अधिष्ठान पर 18 वों गती में निर्मित है धार्मिक महत्व का होने के कारण महत्वपूर्ण है,
	मार्च. 2003 ई. 	14,56,000/-		मंदिर के दोबार में प्रतिमाएं चुनी हुई होने के एवं धार्मिक महत्व के कारण महत्वपूर्ण है,
	अप्रैल-सई २००२ डं.	5,06,000/-	· -	-
-	अक्टूबर- : नवम्बर, २००३ ई.	7.47,000/-		• =
	नवम्बर, २००२ ई.	21,31,000/-	-	ग्राम वेलसर का वास्तविक जलस्तर ग्राप्त नहीं हो सका है जिसके कारण वरियता निश्चित
	जनवरी, 2003 ई	2,56,500/-		करना संभव नहीं हो सका है.
	जनवरी, 2004 ई.	9.30,000/-		

महेश्वर परियोजनाओं के जलस्तर की पूर्ण जानकारी उपलब्ध नहीं है. राशि अन्य अमुमानिकों के आधार पर आंकी गयी है. अनुमानिक तैयार नहीं हैं. 1.

अध्याय ४

सरदार सरोवर परियोजना

नर्मता परियोजना के अंतर्गत नर्मदा नदी पर निर्मित हो रहे बांधों में सरदार सरोवर परियोजना का प्रमुख स्थान है. इस परियोजना के अंतर्गत गुजरात प्रान्त के बड़ोदा जिले में बांध निर्मित होने पर मध्यप्रदेश के झाबुआ, खरगोन तथा धार जिले के कुल 193 ग्राम डूब से प्रभावित हो रहे हैं.

माना मरोवर परियोजना के डूब में आने वाले कुल 193 ग्रामों में बिखरे पुरासम्पदा तथा पुरातत्वीय स्मारकों एवं टीलों के चिन्हांकन के लिए नर्मरा घाटी िशकाम प्राधिकरण के वित्तीय सहयोग से विभाग द्वारा डूब क्षेत्र का विस्तृत सर्वेक्षण कराया गया. सर्वेक्षण में प्रागैतिहासिक काल से उत्तर गथा कालीन मंग्कृति तक के पुरावशेग एवं स्थल चिन्हांकित किये गये. परन्तु इस क्षेत्र के सर्वेक्षण में नर्मदा घाटी यथा नर्मदा सागर परियोजना के अंतर्गत इब में आने गाले खण्डवा तथा होशंगाबाद के नदी घाटी की तरह प्रागैतिहासिक स्थल कम संख्या में प्राप्त हुए हैं, जबकि ताम्राश्म कालीन स्थल अधिक गंग्ला में चिन्हांकित किए गये. इस क्षेत्र के सर्वेक्षण में उचावद, भवगांव, दगड़पुरा, सेमल्दा, मलवाड़ा, डेहर, मलवाड़ो (जिला धार), मोहीपुरा, जलकोटा, गलकोट, गिपरी तथा जागरवा (खरगोन) से प्रागैतिहासिक उपकरण पाये गये. ये उपकरण मध्य पापाण एवं उत्तर पापाण काल में मानव द्वारा उपयोग में लाये गये हैं जबिक गिपरी व उटावद में महापापाण तथा नव पापाण संस्कृति से संबंधित पुरावशेग एवं पात्रावशेग प्राप्त हुए इसकी पुष्टि भारतीय पुरातत्व गर्नेक्षण नामपुर शाखा द्वारा वर्ष 1994-95 में किये गये उत्खनन से भी हुई है.

नर्मदा घाटी का यह क्षेत्र ताम्राश्म कालीन संस्कृति का महत्वपूर्ण केन्द्र रहा है. नर्मदा घाटी के इस क्षेत्र में स्थित मलवाड़ा, कल्याणपुरा, सेमल्दा, गांगली, कचठी, सरसगांव, चिखिल्दा, कटनेरा, खापरखेड़ा, नावदाटोली, राजपुरा, हतनावर, गांगली, एकलवारा, कठोरा, नावदाखेड़ी, ब्राह्मण गांव, पिछोड़ी से ताम्रश्म कालीन संस्कृति के अवशेष पाये गये. इन स्थलों के सर्वेक्षण में ताम्राश्म कालीन सृक्ष्म उपकरण कोर. ब्लेड, स्केपर ल्यूनेट, व्यूरीन आदि प्राप्त हुए. जयिक पारम्थिक ऐतिहासिक टीले छोटा बड़दा, किरमोही, खेड़ा, गोपालपुरा, गंवरिया, घाट बड़्या एवं भाट बड़ या तथा मारू चिचली

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e centro em					and the second
	2 %			2.0	

तथा ब्राह्मण गांव किरमोही तथा उटावद (खरगोन) स्थित टीलों का प्रस्ताव तैयार किया गया था. वर्तमान में संशोधित कार्य योजना में निम्नानुसार कार्य प्रस्तावित है:--

(क) स्मारकों का पुनरश्रीपन :

रगारकों का पुनर्स्थापन की योजना में संशोधन करते हुए वर्तमान में निम्नानुसार स्मारकों को पुनर्स्थापन के लिए चयन किया गया है.

ऊंचाई

शिवमंदिर बड़ा बड़दा

ंतहसील मनावर, जिला धार

15 वीं शती ई.

344.40 फीट

भवानी माता मंदिर

थरमपुरी, जिला धार

13 वीं शती ई? खुजावा

377.20 फीट

		-		
3.	सोमेश्वर मंदिर, खुजाता	जिला भार	16 17 वीं शती ई.	377.20 ਾਜੀਟ
4.	शिवमंदिर क्रमांक । खुजावा	***	18 वीं शती ई.	377.20 फीट
5.	शिवमंदिर क्र. २ खुजावा		18 वीं शती ई.	377.20 फੀਟ
6.	शिव मंदिर क्र. 3 खुजाता	''	। 8 वीं शती ई .	377.20 फीट
7.	शैलोत्कीर्ण गुफाएं खुजावा	''	15 - 16 त्रीं शती ई.	377.20 फीट
8.	विशाल प्रतिमाएं खुजावा	''	12-13 वीं शती ई.	377.20 फीट
9.	शिवमंदिर पिपल्दागढ़ी	11	13-19 वीं शती ई.	399.89 फीट
10.	शैलोत्कीर्ण प्रतीमाएं, पिपल्दागढ़ी	''	. 12-13 वीं शती ई.	399.89 फीट
11.	शिवमंदिर बोधवाड़ा	-"-	12 वीं शती ई.	380.73 फीट
12.	नर्मदेश्वर मंदिर, डेहर	·	16 वीं शती ई	367.43 फीट
13.	वाणेश्वर मंदिर शिवमंदिर	कसरावद (खरगोन)	18 वी शती ई.	मन्दिर 455 फीट की
	(नवदाटोली)			ऊंचाई पर डूब से
				प्रभावित होगा. परन्तु
		<u>}</u>		नदी के मध्य में स्थित
		••		•
			•	होने के कारण पुन-
				स्थापन आवश्यक है.

पुनर्म्भापना के लिए चयनित स्मारकों की ऐतिहासिक एवं सांस्कृतिक पृष्ठ भूमि पृथक से संलग्न है (परिशिष्ट-अ) शिव मंदिर बड़ा बड़दा एवं खुजावा तथा पिपल्दागढ़ी के स्मारकों के पुनर्स्थापन के लिए क्रमश: ग्राम बड़दा के निकट तथा ग्राम लिम्बोदा में भूमि का आवंटन हो चुका है. शेष स्मारकों के लिए भूमि सम्बन्धित ग्रामों के पास ही दब क्षेत्र के बाहर स्थल का चयन किया जावेगा.

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			The second second second second	
1-1 militaringsmission-negative steps specific at		Marie and Property and the con-		

2,	ग्राम एकलवारा	जिला धार्	पूर्व ऐतिहासिक काल	367.40 फीट
3.	ग्राम कटनेरा	ज़िला धार	ताम्राश्म युँगीन	367.00 फीट
4.	ग्राम खलघाट (खलखुर्द)	जिला धार	पूर्व ऐतिहासिक	376.90 फीट
5.	ग्राम कल्याणपुरा	जिला धार	ताम्राश्म एवं पूर्व ऐतिहासिक काल	344 फीट

उक्त सभी टीले बांध की ऊंचाई 436 फीट होने पर ही-डूब से प्रभावित हो जावेंगे.

(ग) संग्रहालय निर्माण:

सरदार सरोवर परियोजना के अन्तर्गत नर्मदा घाटी विकास प्राधिकरण द्वारा पूर्व में स्वीकृत एवशन प्लान 1993 के अनुसार लालबाग परिसर, इन्दौर तथा तहसील मुख्यालय बड़वानी जिला खरगोन में संग्रहालय स्थापना तथा महेश्वर स्थित संभागीय संग्रहालय में नर्मदा दीर्घा का निर्माण का प्रस्ताव मान्य करतें हुए कसरावद (जिला खरगोन) में संग्रहालय की स्थापना एवं राज्य संग्रहालय भोषाल में नर्मदा गैलरी के निर्माण की स्वीकृति प्रदान की गयी थी.

इस प्रकार सरदार सरोवर परियोजना के अन्तर्गत अनुमोदित संग्रहालयों में से नर्मदा पार्क एवं संग्रहालय लालबाग, इन्दौर, बड़वानी तथा कसरावद में संग्रहलयों की स्थापना तथा राज्य संग्रहालय भोपाल में नर्मदा विधिका का निर्माण का प्रस्ताव वर्तमान में भी यथावत रखा जा रहा है.

उक्त संग्रहालयों के निर्माण तथा प्रदर्शन पर होने वाले व्यय की राशि सरदार सरोवर परियोजना मद से विकलित की जावेगी. इन संग्रहालयों के स्थापना के उपरान्त पृथक से पदों की आवश्यकता होगी. जिनका विवरण एवं उन पर अनुमानिक व्ययों का उल्लेख स्थापना (अध्याय 8) शीर्ष में किया गया है. संग्रहालयों के निर्माण एवं प्रदर्शन का प्रस्ताव पृथक रूप से परिशिष्ट में किया गया है. लालबाग परिसर इन्दौर में नर्मदा पार्क के विकास के लिए अनुमानित राशि 2, 08.33,000=00 का प्रस्ताव प्रस्तुत कार्य योजना में सम्मिलत किया गया है. परन्तु इसकी विस्तृत कार्य योजना पृथक से तैयार की गई है. इसकी घोषणा पूर्व में माननीय मुख्य मंत्री द्वारा इन्दौर में ही बनाने के लिए की गई है. अत: लालबाग में ही नर्मदा पार्क बनाया जावेगा.

(घ्र) पुरासम्पदा का संकलन :

सम्दार मरोबर परियोजना के अन्तर्गत झाबुआ तथा खरगोन जिलों की कुल 186 महत्वपूर्ण प्रतिमाओं के संकलन का लक्ष्य था जिसमें से 118 प्रतिमाओं का संकलन किया गया है संकलित प्रतिमाएं जिला संग्रहालय धार में संग्रहित हैं शेष प्रतिमाएं जनविरोध तथा पृजा के अधीन होने के कारण के किया जिल्ला के कियापित होने के उपरान्त इन प्रतिमाओं को संकलित किया जानेगा जिस पर कुल लगभग 50,000=00 का व्यय

(च) डाक्यूमेन्टशन (मध्यप्रदरा नाज्य . 🔉

फिल्म डाक्यूमेन्टेशन विगत स्मृतियों को भविष्य के लिए सुरक्षित रखने का एक महत्वपूर्ण माध्यम है फिल्म डाक्यूमेन्टेशन द्वारा किसी स्मृति (पुरास्मारक) आदि की यथास्थिति को चिरकाल तक सहेजकर कम जगह में व्यवस्थित ढंग से रखा जा सकता है.

अत: फिल्म डाक्यूमेन्टेशन के इन्हीं विशेषताओं के कारण कार्य योजना 1993 में स्मारकों का डाक्यूमेन्टेशन कार्य प्रस्तावित था. वर्तमान में म.प्र. माध्यम द्वारा सरदार सरोवर परियोजना के डाक्यूमेन्टेशन का कार्य निम्नानुसार बिटाकेम फार्मेट में पूर्ण किया गया है. (कार्य पूर्णता प्रतिवेदन एवं व्यय कि लगा अप्राप्त).

मध्यप्रदेश माध्यम द्वारा अवगत कराया गया है कि वे डाक्यूमेन्टेशन कार्य के कैसेट में ध्विन संमिश्रण तथा उसकी प्रतियां तैयार करने में पूर्व में आवंटित राशि रु. 2012500 के अतिरिक्त भी राशि की आवश्यकता होगी. जिसके लिए पूर्व में दिये गये अनुमानिक में 30% की वृद्धि मानते हुए रु. 6,03,750.00 की राशि का प्रावधान किया गया है. इस राशि का उपयोग डाक्यूमेन्टेशन कैसेट के शीर्षक ध्विन संमिश्रण एवं उनकी प्रतियां तैयार करने में किया जावेगा.

(छ) रसायनीकरण :

स्मारकों तथा प्रतिमाओं के पुनर्स्थापना कार्य के दौरान उनकी सुरक्षा के लिए पुरावशेषों त स्मारकों का रसायनिक कार्य अनिवार्य है इसी प्रकार पुनर्म्थापन के पश्चात् उनकी सुरक्षा के लिए भी उनका रसायनीकरण कराया जाना आवश्यक होता है. इसी प्रकार उत्खितित सामग्री तथा प्रदर्शित सामग्री का भी रसायनिक उपचार समय-समय पर आवश्यक होता है. सरदार सरोवर परियोजना के अन्तर्गत 13 स्मारकों के पुनर्स्थापन किया जाता है. इसके अतिरिक्त संकलित प्रतिमाओं तथा उत्खिनन में प्राप्त पुरावशेषों का भी रसायनिक उपचार कराया जाना होगा. जिसके लिए 7,40,000.00 का प्रावधान रखा जाना आवश्यक है.

(ग) प्रकाशन:

सम्दार ससेवर परियोजना के कार्यी यथा उल्बनन प्रतिवेदन तथा स्मारकों के पुनर्स्थान सम्बन्धी प्रतिवेदनों का प्रकाशन कराया जाना आवश्यक ै माथ ही जो स्मारक इब से प्रभावित हो रहे हैं परन्तु उनका पुनर्स्थापन नहीं किया जा रहा है, उनका रेखांकन एवं छायांकन द्वारा दस्तावेजीकरण कराया जाना भी आवश्यक है, इसी एकार संप्रहालयों के कैटनाय, पिक्चर पोस्ट कार्ड, फोल्डर्स तथा गाइड्स आदि तैयार कराने होंगे, अत: प्रतिवेदनों के प्रकाशन आदि कार्यों पर रुपये 6,00,000.00 क्यय होने का अनुमान लगाया गया है.

(इा) उपकरण क्रय :

सरदार सरोवर परियोजना के अंतर्गत कुल प्रस्तावित व्यय

(वृहद निर्माण कार्य)

霜.	<i>'</i>	कार्य का नाम	अनुमानित राशि	कुल व्यय	
	,	स्मारकों कः पुनर्स्थापन		63,20,700.00	
1		शिवमंदिर, बड़दा, मनावर जिला∸धार	9,42,663.00		
2		शैलोत्कीर्ण प्रतिमाएं पिपल्दागढ़ी जिला धार	2,20,000.00		:
3		शैलोत्कीर्ण गुफाएं, खुजावा	2,21,000.00		,
4		विशाल प्रतिपाएं, खुजाना	2.30,000		
5		शिवमंदिर क्रमांक ।, खुजाना	2.15,000.00		
6	ı	शिवमंदिर क्रमांक 2, खुजाता	2,51,000.00		

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क्र.	कार्य का नाम	अनुमानित राशि	कुल व्यय
(1)	(2)	(3)	(4)
	म्य पुरावस्वीय टीली का उत्पन्नगर		9,50,089.00
1	खलम्बुर्द (खलमाट) जिला भार	2.28,477	
. 2	मारूचिमली, जिला खरगोन	1,80,403	
3	एकलवारा, धार	1,80,403	
4	कटनेस, भार	1,80.403	
5	कल्याणपुरा, धार	1,80,403	
	म-संग्रहालयों का निर्माण एवं भूमि विकास कार्य		2,83,21,000.00
1	नमेदा पार्क एवं मंग्रहालय लालवाम इंदीर	2,08,33,000.00	
2	बङ्खानी जिला खरगोन	24,00,000	

ङ –स्मारकों / प्रतिमाओं का प्रतिकृति निर्माण		13,00,000
खुजावा स्थित विशाल प्रतिमाओं की प्रतिकृति	2,00,000.00	
खुजावा स्थित शैलोत्कीर्ण गुफाओं की प्रतिकृति 🗼 🔑	2,00,000.00	
रोलीगांव, झाबुआ स्थित शिवमंदिर की प्रतिकृति	2,00,000,00	
T 7 1	· ·	

(1)	. (2)	(3)	(4)	
4	श्री विल्वामृतेश्वर गंदिर, धरमपुरी धार की प्रतिकृति	3,00,000.00		
5	अन्य महत्वपूर्ण प्रतिमा एवं स्मारक	4,00,000.00		
	ı	· ·		
	च-डावयूगेन्टेशन	•	60,32,50	
	छ-रसायनीकरण कार्य		7,40,000	
ţ	स्मारकों का रसायनीकरण	5,00,000	7	
2	प्रतिभाओं का संकलन एवं रसायनीकरण	2,40.000		
	ज-प्रकाशन		6,50,000	
1	छायांकन एवं अन्य लघ् प्रकाशन	1,50,000		
	77701 11811 041 040	2 50 000	į į	

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अध्याय 5

इंदिरा सागर परियोजना

नर्मदा सागर परियोजना के अंतर्गत पुनाया जिला खण्डवा में बनाया जा रहा बांध नर्मदा नदी पर निर्मित हो रहे बांधों में एक महत्वपूर्ण बांध है. जिसके पूर्ण होने पर खण्डवा, देवास तथा होशंगाबाद जिले के कुल 254 ग्राम पूर्णत: अथवा आंशिक रूप से डूब से प्रभावित होंगे. इन ग्रामों में बिखरी पुरासम्पदा का आंकलन कर उनके संरक्षण तथा पुनर्स्थापन का कार्य नर्मदा घाटी विकास प्राधिकरण के आर्थिक सहयोग से इस विभाग द्वारा किया जा रहा है.

नर्मया सागर परियोजना के अंतर्गत डूब में आने वाले पुरासम्पदा का आंकलन करने के उद्देश्य से डूब क्षेत्र का विभाग द्वारा गहन सर्वेक्षण कराया गया जिसमें प्रागैतिहासिक काल से उत्तर मध्यकाल तक की संस्कृतियों के अवशेष प्राप्त हुए. सर्वेक्षण में प्रागैतिहासिक कालीन असूलियन संस्कृति के अयशेष खण्डया जिले के विन्ध्य पर्वत श्रृंखला में स्थित नर्मदा नदी के घादी तथा पहाड़ी की तलहरी में स्थित बिजलपुर खुर्द बलवाड़ा, पुरनी, अभवा, यिम्लौद आदि ग्रामों से चिन्हांकित किये गये, ये वस्तुत: असूलियन संस्कृति के उपकरण क्लीवर, हेण्डेक्स तथा चाँपर है. जो इस बात की पुष्टी करते हैं कि प्रारंभिक मानव विकास के इतिहास से यह क्षेत्र अछूता नहीं रहा है. इनके अश्मोपकरणों के तैयार करने में स्थानीय क्षेत्र में उपलब्ध होने वाले क्यार्थन प्राप्त है.

मध्य√पापाण कालीन संस्कृति के प्राप्त अवशेषों में स्क्रेपर तथा पलेक मुख्य है. इन मध्य पाषाण कालीन उपकरणों को तैयार करने के लिए वहां उपलब्ध क्वार्टस पत्थर को चुना गया. जबिक यदाकदा चर्ट तथा अन्य उपलब्ध प्रस्तरों को भी उपयोग में लिया गया. सर्वेक्षण के दौरान प्राप्त सूक्ष्म अश्मोपकरणों की उपलब्धि इसक्षेत्र में ताम्राश्कालीन संस्कृति के विस्तार की ओर इंगित करती है. सूक्ष्म अश्मोपकरण वस्तुत: नालों के आसपास सतही

का चरमात्कप कला परमार काल तथा उसका समकालान काल रहा ए. ३५ जीत है . के निर्माण हैं. मंदिर को इस काल में निर्मित किया गया ये मंदिर कला की दृष्टि से 12-13 वीं शती ई. के निर्माण हैं.

तृतीय चरण के मंदिर के निर्माण में ईंट व प्रस्तर दोनों का उपयोग हुआ है इनका निर्माण बहुदा मुस्लिम तथा मराठा काल में किया गया. खुदिया माल, तोरनिया तथा भरवली स्थित मंदिर इस काल के निर्माण केला का प्रतिनिधित्व करते है. ये मंदिर प्राय: अलंकरण रहित तथा सादे पूजागृह हैं.

मध्यकालीन स्मारकों में मंदिरों के अतिरिवत हण्डिया स्थित मुस्लिम कालीङ, स्मारकों, अब्दुल हसन का मकबरा, टोली की सराय, मुल्ला दो पियाजा का मकबरा तथा अन्य तत्कालीन स्मारक मुगल कालीन स्थापत्य कला का प्रतिनिधित्व करते हैं.

उनत प्रावशेषों के अतिरिक्त चन्देल, जमोटी, कुकडाल, पुनघाट:धृशिक्कोटला, जोगोबीड़ा, हरसूद (जिला खण्डवा) दैयत, नेमावर, खातेगांव,

नवाड़ा, निमनपुर, करोद माफी, तुरनात (देवास) तथा उतां, विछीता, खेड़ीनेमा आदि स्थलों चिन्हांकित विभिन्न हिन्दू देवी देवताओं तथा जैन प्रतीमा की प्राप्ति इस क्षेत्र के जन मानस की धार्मिक प्रवृक्ति की ओर इंगित करती है.

इस क्षेत्र के परवर्ती मध्यकालीन (18 - 19 शती ई.) के इतिहास में संग मिंगाजी का महस्वपूर्ण स्थान है ग्राम सिंगाजी माफी में संतसिंगाजी की समाधि आज भी गिमाड़ क्षेत्र के जन मानस का केन्द्र बिन्दु है.

इंदिरा सागर ड्व से प्रभावित क्षेत्र में स्थित इन पुगतत्वीय सम्पदा के संकलन तथा संरक्षण के लिए विभाग द्वारा 1993 में एक्शन प्लान तैयार किया किया गया था. जिसके अनुसार डूब से प्रभावित स्मारकों का फिल्म डाक्यूमेंटेशन कराया जाना तथा प्रतिमाओं का संकलन खण्डवा में संग्रहालय का निर्माण तथा खेड़ीनेमा स्थित टीले का उत्खनन कराया जाने का प्रस्ताव था.

अतः सुनियोजित योजना के अनुसार खेड़ीनेमा टीले का उत्खनन कार्य निष्पादित किया गया. उत्खनन में न केवल ऐतिहासिक अपितु ताम्राश्म कालीन संस्कृति से सम्बन्धित भवन अवशेष, लौह उपकरण आदि प्रकाश में लाये गये. डूब क्षेत्र में स्थित प्रतिमाओं का संकलन किया गया तथा खण्डवा में संग्रहालय का निर्माण जिलाध्यक्ष खण्डवा के माध्यम से कराया गया है.

वर्तमान में इंदिरा सागर परियोजना के अंतर्गत निम्नानुसार कार्य प्रम्तावित है.

स्मारकों का पुनर्स्थापन

इंदिस सागर परियोजना के डूब में स्थित पुरासम्पदा के संरक्षण तथा संवर्द्धन की दृष्टि से निम्नानुसार 10 स्मारकों को पुनस्थापन के लिए चयन किया गया है. स्मारकों टीट्सों की जानकारी परिशिष्ट में पृथक से दी गयी है.

असमानित तिथि

ख. उत्खनन कार्य योजना 1997 में नर्मदा परियोजना क अन्तयत लन्नानुकार 🗸 д ...

		.,v
1.	बिजलपुर खुर्द स्थित टीला	(खण्डवा, खण्डवा)
2.	छालपाकला स्थित टीला	(खण्डवा, खण्डवा)
3.	गाजनपुर स्थित टीला	(खातेंगांव, देवास)
4.	नवलपुरा स्थित टीला	(खण्डवा, खण्डिवा)
	>- 0 2	

गनोर स्थित टीला

ग. संग्रहालय निर्माण :

एक्शन प्लान 1993 के अनुसार इंदिरा सागर परियोजना के अंतर्गत जिला मुख्यालय खण्डवा में संग्रहालय का निर्माण प्रस्तावित था. इस संबंध में खण्डवा में संग्रहालय निर्माण के लिए प्राधिकरण द्वारा अपने ही स्तर से जिलाध्यक्ष खण्डवा को नजट उपलब्ध कराते हुए संग्रहालय भवन का निर्माण कराया गया है. इस भवन के निरीक्षण में विभागीय अधिकारियों द्वारा नवनिर्मित भवन संग्रहालय के लिए अनुपयुक्त पाया गया तथा तद्विषयक प्रतिवेदन से नर्मदा घाटी विकास प्राधिकरण को अवगत कराया गया है तथापि जिला पुरातत्व संघ खण्डवा तथा विभाग द्वारा संकलित प्रतिमाओं को सुरक्षा की दृष्टि से नवीन संग्रहालय भवन में रखा गया है.

वर्तमान में संग्रहालय के लिए निर्धारित मापदण्ड के अनुसार संग्रहालय भवन का निर्माण कराया जाना प्रस्तावित है तथा पूर्व से निर्मित भवन को उपयोगिता की दृष्टि से संग्रहालय का हिस्सा वनाकर सभागृह पुरातत्व संघ द्वारा स्व. किशोर कुमार को समर्पित गैलरी को यथावत रखते हुए किशोर विधिका में परिणित किया जाना उपयुक्त होगा ताकि स्थानीय जन मानस को संतुष्ट किया जा सके. एवं संग्रहालय परिसर में उपलब्ध स्थान में पुरातत्वीय सम्पदा के प्रदर्शन हेतु दो अन्य तीथिकाओं को निर्माण किया जाना प्रस्तावित है प्रस्तावनुसार दो अन्य विधिकाओं के निर्माण पर लगभग रू. 15.00 लाख का व्यय सम्भावित है. नर्मदा घाटी विकास प्राधिकरण द्वारा प्रस्ताव मान्य किये जाने पर संग्रहालय के विस्तार की योजना है.

खण्डता स्थित इस संग्रहालय की स्थापम पूर्ण होने पर जिला पुगतल संघ को कर्मचारियों सहित परियोजना के अधीन लिया जा सकेगा इस प्रकार संग्रहालय का संचालन हेत् पृथक से पदों की आवश्यकता होगी. जिनका उठलेख यथा स्थान स्थापमा अध्याय में किया गया.

आतंत्रा है कि जिला पुरातत्व संघ के वर्तमान में दो कर्मचारी यथा मार्गदर्शक एवं चौकीदार पदस्थ हैं जिनकी सेवाएं परियोजनांतर्गत संबीलियत करने पर मात्र सहायक संचालक (संग्रहालय) निम्न श्रेणी लिपिक व भृत्य एवं केयर टेकर तथा स्वीपर के पद पृथक् से आवश्यक होंगे. इन पदों का समावेश स्थापना अध्याय में पृ. 59 व पृष्ट 63 64 दिये गये पदों में किया गया है. प्रस्ताय के अनुमोदित होने पर नियमित कर्मचारियों को पदस्थ करने को कार्रवाई की जानेगी.

एक्शन प्लान 1993 के अनुसार इन्दिरा सागर परियोजना के डाक्यूमेन्ट्रेशन का कार्य म. प्र. फिल्म विकास निगम एवं निगम के विलय के उपरान्त म. प्र. माध्यम के माध्यम से कराया जाना था परन्तु मध्यप्रदेश माध्यम द्वारा सरदार सरोवर परियोजना के डाक्यूमेन्ट्रेशन का कार्य समय सीमा में पूर्ण न किये जाने के कारण इन्दिरा सागर के डाक्यूमेन्ट्रेशन कार्य की कार्यवाही नहीं की गयी है. डाक्यूमेन्ट्रेशन का कार्य सम्बन्धित बाघ क्रियान्वयन एजेन्सी गर्मदा घाटी विकास प्राधिकरण द्वारा किया जावेगा.

डूब से प्रभावित होने वाले स्मारकों से सम्बन्धित दस्तावेजी (जीवन्त रिकार्ड) को भविष्य के लिए सुरक्षित रखने में फिल्म डाक्यूमेन्टेशन की भूमिका को देखते हुए स्मारकों का डाक्यूमेन्टेशन कार्य कराया जाना प्रस्तावित है. जिस पर रु. 32,51,625.00 का व्यय अनुमानित है.

छ. रसायनीकरण :

इन्द्रिंग सागर परियोजना के अन्तर्गत 10 स्मारकों का पुनर्स्थापन तथा 5 पुरातत्वीय टीलों का उत्खनन किया जाना है. स्मारकों के पुनर्स्थापन के पुर्व तथा उसके पश्चात् सुरक्षा की दृष्टि से उनका रसायनीकरण किया जाना आवश्यक है ताकि स्मारकों को क्षरण से बचाया जा सके. इसी प्रकार उत्खनन में प्राप्त पुरासस्पदा का सुरक्षा की दृष्टि से रसायनीकरण कार्य निवान्त आवश्यक है. अत: रसायनीकरण कार्य के लिए रु. 3,50,000.00 का प्रावधान रखा जाना प्रस्तावित है.

ज. प्रकाशन :

इन्दिरा सागर परियोजना के अन्तर्गत स्मारकों के पुनर्स्थापन तथा उत्खननों के प्रतिवेदनों का प्रकाशन अध्ययन के लिए एवं शोधार्थियों तथा जनमामान्य तक पहुचाना नितान्त आवश्यक होता है. इन प्रतिवेदनों के तैयार करने तथा ब्रोशर के प्रकाशन आदि के लिए भी राशि की आवश्यकता होगी साथ ही स्मारकों व भिवप्य के लिए, पुरासम्पदा के जीवन्त दस्तावेज सुरक्षित रखने के लिए उनका विस्तृत छायांकन एवं रेखांकन कार्य भी कराया जाना आवश्यक है जिसके लिए ह. 7,00,000.00 का व्यय होना अनुमानित है. इस राशि का उपयोग सन्दर्भ ग्रन्थों का क्रय तथा प्रतिवेदनों के प्रकाशन तथा जनसामान्य के लिए ब्रोशर प्रकाशन के लिए किया जावेगा.

इंदिरा सागर परियोजना के अंतर्गत सकल व्यय

d.	क्यास्कों का स्थानांतरण / पनस्थीपन		96,35,588.00	
(1)	(2)	(3)	(4)	
豖.	कार्य का नाम	ल्यय	सकल व्यय	
•			 	

हिण्डिया, होशंगाचाद

8. अब्दुल हसन का मकबरा, हिण्डिया 15,45,000.00 होशंगाबाद

9. शिवमंदिर चन्देल 10,64,000.00

10. शैलोत्कीणं प्रतिमाएं दैय्यत 3,03,500.00

38t 162 !

(1)	(2)	(3)	(4)
ख.	उत्खनग		9,00,000.00
1.	गाजनपुर	1,80,000.00	
2.	न्त्रिजलपुर	1,80,000.00	
3.	गन्नोर	1,80,000.00	
4.	छालपाकला	1,80,000.00	
5.	नवलखेड़ा	1,80,000.00	
ग.	संग्रहालय की स्थापना		
	खण्डवा संग्रहालय का विकास एवं अतिरिक्त गैलरी का निर्माण	15,00,000.00	15,00,000.00
- 된,	पुरासम्पदा का संकरान		50,000.00

ज.	प्रकाशन ^	.46*	7,00,000.00
1.	छायांकन एवं अन्य लघु प्रकाशन	2,00,000.00	
2.	संदर्भ ग्रंथों का क्रय	2,50,000.00	•
3.	प्रतिवेदनों का प्रकाशन	2,50,000.00	
· <u>-</u> .	कुल त्र्यय		1,69,87,213.00

HINITY'S

भारतीय पुरातत्व सर्वेक्षण विभाग को दिये जाने हतु प्रस्ता । वत कुल 15 स्मारकों एवं 6 पुरातत्वीय टीलों की सूची -

(l.,	विव मंदिर, रोलीगांव, झाबुआ	12वी शती ई
2.	जनालेश्वर मंदिर, खुत्राचा, धार	। उदी एवं । 8वी शती
3.	कलंजेशवर मंदिर, तेमल्दा, धार	15-16वी शती ई॰
4.	नागेशवर मंदिर ,धरमपुरी,धार	।6वी शती ई.
₹ 5•	परुमतेश्वर मंदिर, चिखिल्दा, धार	18वी इती ई
6.	नीलकण ठेशवर मंदिर, विखिल्दा, धार	18वी इती ई.
7.	विल्वामृतेश्वर मंदिर, धरमपुरी, धार	10-11वी शती ईं-
8∙	भीलखेड़ा हिथत छः छत्रियां, खरगोन	17-18वी शती ई.
9.	पिम मंदिर छोटी कसरावद, खरगोन	16 वी शती ई.
10	को देशवर मंदिर, कोठरा, धार	18 वी शती ई.

पुरातत्वीय टीने

ANNEX-5

विक्यः - इंदिरा सागर एवं तरदार तरोवर बांध परियोजनाओं ते संबंधित नर्मदा नियंत्रण प्राध्किरण की बैटक ।

नर्मदा परियोजनां तर्गत तरदार तरोवर व इंदिरा तर्गर परियोजनाओं के इक देन में आने वाले क्रमाः 13 स्मारके कि इ उरक्लन स्थल तथा इंदिरा सागर परियोजना के 10 स्मारके जिर 5 उरक्लन स्थल रहे। गये हैं । इनके पुनर्स्थापन व उत्तनन के लिये नर्मदा प्यादी विकास प्राधिकरणे द्वारा उपलब्ध कराये गये बजद से कार्य कराये जाने का संशोधित कार्य योजना 1997 में उल्लेख किया गया है । ब्री औटा व ब्रीमती रोमिला थापर द्वारा उठाये गये बिन्दु स्वं दी गयी पुरातत्वीय/ रेतिहातिक महत्व के स्थलों की सूधी के आधार पर पुनः कर्य किया गया । सर्वेद्धा के दौरान विकास सर्वेदित ग्रामों में उपलब्ध पुरातत्वीय महत्व के स्थारकों व स्थलों जो कि किसी कारणसभ दूही के

विरोध के कारण तथा जिलाध्यक्ष थार व नर्मदा घाटी विकास प्रशासकरण दारा पुनरथांपम कार्य सक्याये जाने के कारण पूर्ण नहीं किया जा तका। सबं अतस्य द्वन रमारकों के पुनरथांपन के लिए उपलब्ध राजि से विगत वर्ष 1997-98 में पुनरथांपित स्मारक रखं जिल मंदिर बहु बहुदा की सुरक्षा प्राचीर रखं आवागमन मार्ग बनाने का कार्य पूर्ण किया गया।

इस परियोजना में बालू वित्तीय वर्ष 1999-2000 के लिये

5 स्मारकों के पुनरपापन व । टीले के उत्पनन का लक्ष्य रखा गया है

किन पर विभाग उत्तरा तै पर किये गये अनुमा निक के अनुसार रू. 60-00

लाल व्यय होने का अनुमान है क्लिक इस तर्द है। नर्मदा चाटी विकास

प्राध्करण उत्तरा माथ रू. 10-00लाख का वज्य उपलब्ध कराया गया ।

जो कि स्मारकों के पुनरथापन के लिए अपयाप्ति है ।

इती तरह विगत वित्तीय क्की 1998-99 में बंदिरा तागर परियोजनांतर्गत नर्गदा घाटी किकास प्राध्किरण असा केवल रू. 6.00 लाख का बजट आवंटन दिया गया था जिसमें ते पित्र मंदिर क ग्राम धारी कोटला के पुनस्थापन का कार्य प्रारम्भ किया गया परस्तु पुनस्थापन कार्यों के दौरान गणभास्य नागरिकों सारा गतिरोध किये जाने के कारण तथा नर्गदा धाटी विकास प्राध्किरण सारा कार्य रूकवाने

मादर आवि का भूनत्यापना न जान कार्यवाही की जावेगी ।
होते नर्मदा भाटी विकास प्राधिकरण प्रारा देवात, खण्डवा, हरदा के
जिलाध्यक्षों को सूचित किया गया । अतः समिति प्रारा निर्णय उपरांत
समारकों के पुनस्थापन हेतू भूमि, उपून्तव्य कराने तथा नर्मदा भाटी विकास
प्राधिकरण प्रारा नजट उपलब्ध कराये नाने पर पुनस्थापन कार्य किया
जावेगा ।

इस वित्तीय वर्ध में इंदिरा सागर परियोजनांतर्गत 4 रमारकों का पुनर्थापन य । टीले के उएजन का लक्ष्य रखा गया है । इसमें धारी कोटला विद्यादिर का अधूरा कार्य भी शामिल है । नर्मदा धाटी चिकास प्राध्करण दारा पिगत माह मई-99 में केच्छा रू. 2.00 लाख का बजट उपलब्ध कराया गया है । परम्मु इस उपलब्ध रावि ते धारी कोटला का अधूरा कार्य पूर्ण किया जाना भी संगव नहीं है ।

उन्त परिस्थितियों एवं साय पर पर्याप्त बनट उपनल्थ न होने से समय समय पर उत्तम्न किलाइयों के कारण पुनस्थापन कार्य समय पर एवं समय सीमा में पूर्ण किया जाना है विभाग द्वारा संभ्व नहीं है । इतने सीमित साध्मों के बोते हुए भी विगत वित्तीय वर्ष में विभाग द्वारा 2 स्थानों पर उत्तान भी कराया गया है जहां से आधैतिहासिक काल 1 1700 ईसा पूर्व 1 के अवशेष्य प्राप्त हुए है । कार्य के निष्पादन में

विनोद/

-:: सरदार सरोवर षरियोजना ::-

सरदार तरोवर ष रियोजनान्तर्गत डूब में आने वाले कुल 193 ग्रामों में बिखरे पुरासंपदा तथा पुरातत्वीय स्मारकों स्वं टीलों के चिन्हांकन के लिये नर्मदा थाटी विकास प्राधिकरण के वित्तीय सहयोग से विभाग ट्दारा डूब क्षेत्र का विस्तृत सर्वेक्षण कराया गया ।

सरदार तरोवर परियोजनान्तर्गत डूब से मुशावित पुरा महत्व के 13 स्मारकों एवं 5 टीनों को मुनस्थापन एवं खुदाई के लिये चिन्हा किंत कर योजना 97 में तम्मिलित किया है।

वित्तीय वर्ष 1997 से वर्ष 1999 तक विभाग व्यारा किये गये कार्यों का विवरण निम्नानुतार हैं।

१। । विम मंदिर बड़ा बडदा १।५ वी शती ई • १ :-

करेर के अन्या 130 कि.मी.एवं तहसील

The state of the s

15, 16 वी तती ई के हैं। गर्भेगृह में जलाधारी फिल्लिंग प्रतिष्ठित हैं। ललाट बिम्ब पर गणेश का अंकन हैं मंदिर के फिल्लर का आंधिक रूप गुम्बदाकार हैं।

डूब ते प्रभावित होने के कारण मंदिरों के पुनस्थावन का कार्य विभाग विदारा प्रारंभ किया किन्तु जन विरोध के कारण जिलाध्यक्ष धार व्यारा पुन-स्थापन का कार्य बंद करा दिया निर्मा ।

§ उर्हे जिल्ला में दिर विपल्दा गढ़ी हुँ मौनी बाबा आश्रम 🚦 :-

ग्राम विषयागदी तहतील धरमपुरी से १ कि॰मी॰ पूर्व में नर्मदा नदी के उत्तारी तट पर स्थित हैं।

मौनी बाबा आश्रम के तमीष त्थित शाचीन मंदिर मात्र गर्भगृह के रूप में शेष बचा हैं। वर्तमान में मंदिर को डूब क्षेत्र ते हटाकर लगमग 4 कि•मी• दूर निम्बोला पहाड़ी पर पुनर्थांषीयत किया जा चुका हैं।

१४१ ौनोरकीर्ण गृतिसवर पिपल्दागदी १ 12,13 वी शती ई०१ :--

खनधाद मनावर मार्ग पर खनधाद से करीब 4 कि॰मी॰ दूरी पर मोनी बाबा आश्रम के समीब नर्मदा नदी के तल पर घटदानों पर गणेंद्र, विष्णु त्रिपाद /शिव, उपासक, राम सीता , हनुमान, लक्ष्मीनारायण , मालाधारी एवं उपासक प्रतिका शैलोरकीण है।

पतिपाओं को गटटानों से काट कर सुरक्षित निकाल कर उनको **इब**

स्मारक का नाम जाल

्श्रित मंदिर बड़ा बड़दा 15 दी

श्रिष्ठ मंदिर बड़ा बड़दा 15 दी

श्रिष्ठ बादा स्थित शिव मंदिर कु. 1 15.1

श्रिष्ठ बुद्धादा स्थित शिव मंदिर कु. 3 हे — 13 होनो स्थित शिव मंदिर कु. 3 हे — 14 होनो स्थित शिव मंदिर कु. 3 हे — 15 होनो स्कीण प्रतिमाजों की प्रतिकृति

श्रिष्ठ विमाण

विमन्दा गदी स्थित शिव मंदिर कु. 2 15 हिन्दा सिंदा होने का पुरातत्त्वीय उरहनन कार्य

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Archaeologist,
Archaeology & Museum
INDORE DIVISION (M. P.)

नर्मदा १इंदि भौगो निक स्थिति उपलब्ध कराये गये ग्राम कुमांक 2. ~ बलवाड़ा ं पूरनी 3∙ ∨ . चन्देल अमूल्नी ਕੁਰਤੀ 5• बां**द**ीरया 6.

7.

दल्ड

क्षिण में चिन्हां	कित पुरासम्पदा	
चिन्हां कित	पुनर्निरीक्षण में प्राप्त पुरासम्पदा निरीक्षण कार्य अहमद अली, तकनीर्क सहायक 5	6•
	असूलियन उपकरण, हैंड क्स, स्क्रेपर क्लीवरआदि ।	
	असूनियन उपकरण, समूदम अश्मोपकरण मध्य युगीन टीना व नौह राख (व इमेरेन कीहणातु शाला ट्याटा है।	
खं प्रतिमारं तीई.!	संदिर के भग्नावशेषा व प्रतिमार । 12-13 वी शती । एवं सूक्ष्म अक्षमोपकरणः	
	ग्राम इमलानी में तूक्ष्मोपकरण	अमूली नाम न होकर ग्राम है•
म का ग्राम जेसमें बडकेश्वर तिहै	शिवमंदिर बड़केशवर हैब लिकेशवर है एवं स्थापत्य खण्ड गाम के पश्चिम में असूलियनतकनीकी के पूर्व पाषाण एवं उत्तर पूर्व पाषाण कालीन उपव उत्तर पाषाण कालीन सूक्ष्म उपकरण सुक्षम अश्रमोपकरण	क् रण
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८. बेडी	या	मध्य र
9• भवर	ली	मध्यक ईट रू
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।।• किल	लपुर कला	पुरका नामक काली ध्रु २— ।
12. विर	लोद हरसूद	सूक्ष्म ः
13• বিব	ल्लोद्धमाल्	मध्य
।4. दो	रीवान्दरी	तूक्ष्म [ं]
15. ~ वो १ ख	री वान्दरी रख्डा	सूक्ष्म
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डीगांव	मध्यकालीन टीना स्वं उत्तर पाद्याण कालीन सूक्ष्म उपकरण	
	ईट एवं पाषाण निर्मित मंदिर खण्डहर एवं मध्य कालीन टीला	
। नालीन तिमारं १	पूर्व पाष्ट्राण कालीन उपकरण प्रारंभिक रेतिहास कालीन टीला एवं लौह कर्मशाला	
	तुरक्षा प्राचीर ते धिरा मध्य कालीन स्थन स्मारक एवं अत्रूलियन उपकरण	
	सूक्ष्म अञ्चापकरण एवं मध्यकालीन बस्ती के अवशेष	विल्लोद स्वं विल्ल वस्तुतः एक ही ग्रा
	***	गाम खरेब्डा गाम हिथत है परन्तु वर्त विरान है।
	मध्यकालीन टीला खं प्रतिमारं सूक्ष्म अञ्चमोपकरण	•,
	तूक्ष्मीपकरण	
	प्रारंभिक ऐतिहासिक टीला एवं महापाधाण कालीन बस्ती	

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17.	गर ेड्रा	तूदमोप एवं मध
18.	क्टि रवा	तूक्म अ
19•	चीुच	मध्यकाः
20.	द्रगडख्डिी	उत्तर भग्नाव
21.	गन्नोर	सूक्ष्म, अ टीला
22.	ॅगोदी ढेड़ा	तूक्ष्म ३
23.	ॅगुल्लास	मृध्य व सर्वे ली
24•	थारी कोटला	मध्य व § 12-1 प्रतिमा टीला
25•	कसरावद	मध्य र
~26.	खुदियामाल	मध्य प पाठाप उत्तर मंदिर कालीः

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र का पुनत्थः गाजा रहाः
भवतः अन्युगा यतं पुरातम्पदा गेर्मेभी यह ज

मंदिर एवं टीला मध्य अश्मोपकरण सती स्तम असू लियन, ह कालीन टी सुक्षम अइमी कालीन रव 27. कला अस्परट गणेका प्रतिष अभिनेख 28 सिंगाजी मध्य कैंग्ली मध्यकालीः स्मारक 29. शक्तापुर मध्य कार्ल ✓30. मुसरेल १ हुछरेल १ ईट निर्मि √३। तो तिया त्र्धम अशम् भगनावश्रेष्ट्री प्रारम्भिक 32∙ नवलखेड़⊤ √33• कुकडाल प्रतिमारं

ग्राम का नाम स्पष्ट सिंगाजी की तमाधि खं 3 स्थनों पर मध्य कालीन टीला मध्य कालीन टीला १जंगल में १ ईट निर्मित मंदिर के खण्डहर एवं गाम के पूर्व उत्तर पाषाण कालीन उपकरण तुक्षम अञ्चलोपकरण प्रतिमारं।6वी शती का मीदर एवं मध्य कालीन टीला प्रारम्भिक रेतिहातिक टीला तती स्तम्भ कुकदाल गाम का पुनः सक्रम किया जाना है 74

सरत्वती कृ 34• _८ हरतूद ∕ पुनमा ट हनुमान 35. **ग्रागरिया** 36. जमुनिया 37. - 38-मान्द **डा** खा 39. जैतापुर 40. .जुनापानी -41. भोगानी 42. ब्रहमोगांव 43. नन्दगांव 44. पामढेड्री 45. चांदगढ़ 46.

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तरस्वती कृण्ड परिसर में प्रतिमाएं एवं 12-13 शती ई. के मंदिर के खण्डहर के उपर मराठा कालीन मंदिर व करेंबे के बाहर पठार पर सूक्ष्म अश्मोपकरण मंदिर§5§ व मराठा कालीन प्रतिमाएं व वास्तु खण्डः। मध्य पाष्णण कालीन उपकरण एवं महा पाष्णण कालीन बस्ती ।

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खण्डित प्रतिमारं एवं स्थापत्य खण्ड उत्तर पाषाण कालीन सूक्ष्म उपकरण ।

उ स्थां पर असूलियन उपकरण ।

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47. जटाम नवधाट 48. 49• बौरिया 50 भौगानी 51. जामकोट 52. *)*गुलगांव 53. पिजोरा 54-) जूनापानी डॉटव्डी 55• सडियापानी 56. रेवापुर 57• 58. ं काशीपुरा बोधिया दुर्द 59• पलानीभाल 60• मौ**जर** १काशीपुरा१ हथनोरा 62• मुगल 63.

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अभागिकरण। अपमोपकरण। महापादम कालीन उपकरण । पाद्याण कालीन सूक्ष्म अश्मोपकरण । गा, भग्न मंदिर के तथापत्य खण्ड तथा र पाडाण कालीन उपकरण। र पाषाण कालीन सूक्ष्म उपकरण । अक्मोपकरण । अक्रमोपकरण । ान पृतिमा वर्तमान में ग्रामवा सियों दारा नदी में प्रवाहित। गीन टीला प्रतिमारं व उत्तर पाषाण कालीन करण स्थापत्य खण्डः। तर पाषाण कालीन स्व उपकरण । तर पाषाण कालीन उपकरण एवं पृतिमाएं रे चीन प्रतिमाएं सूक्ष्म अवमोपकरण \ चीन प्रतिमारं व उत्तर पाष्णण कालीन उपकरण \ चीन मंदिर प्रतिमारं टीला व सूदम अश्मोपकरण \





भारत सरकार GOVERNMENT QF INDIA

ANNEX - XXXIV- (6)

फैक्स : ,,,755) 558250 फोन : 558250,558270,763294 अधीक्षण पुरातत्विद् भारतीय पुरातत्व सर्वेक्षण जी.टी.बी.काम्पलेक्स टी.टी. नगर, भोपाल — 462003

Superintending Archaeologist Archaeological Survey of India G.T.B. Complex, T.T. Nagar, Bhopal • 462003 फाईल क्रमांक_________________________ दिनांक____________________________

To,

Dr.Pawan Kumar,
Narmada Control Authority,
Indore.

Sub: (a) Minutes of the meeting in relation to Sardar Sarovar Project.

Survey of India, directly under intimation to this office.

Encl:As above

Yours faithfully,

heenerika

(Dr.P.K.Mishra)
Superintending Archaeologist

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Endt.No.

Bhopal,dt.

- 1. Director General, ASI, for information and necessary action.
 - 2. Director Planning, ASI, for confirmation and to communicate to NVDA and NCA authorities of the same.
 - 3. Chairman, NVDA for information and necessary action.

Superintending Archaeologist



A.C. GROVER 3014821

Dear Dr. Mishra,

अ. स. पत्र सं० 9-6/93-EE निदेशक (संरक्षण) DIRECTOR (CONSERVATION) ...भारतीय पुरातत्व सर्वेक्षण ARCHAEOLOGICAL SURVEY OF INDIA

नई दिल्ली-।।0011, तारीख-----19 New Delhi-110011, the.....30.6.....19 99

जनपथ/Janpath.

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I would like to invite your attention to the D.O. letter no. 6/120/98-M-6272 dated 31.8.98 addressed to the DG regarding the construction of a safeguarding wall around the Joga Fort for its protection from submergence.

The construction of a RCC retaining wall at a cost of Rs. 1.67 crores is an original work which does not come within the delegated powers of the DG for sanction. As such, it would be appropriate that the design and construction of this wall is taken up by the NVDA. The aesthetic appearance of the wall shall however be as per the requirement of the ASI.

You may inform the NVDA accordingly.

This issues with the approval of the DG. With regards...

ANNEX - XXXIV- (7)

NOTE ON HEALTH ASPECTS

During the meeting convened following issues emerged:

 State Governments have planned preventive measures as per prevalent standards in consultation with the premier organisations like Malaria Research Centre, NICD, National Anti-Malaria Programme, ICMR etc.

NICD have agreed to include a couple of districts of Madhya Pradesh in their annual surveillance programme.

MRC have agreed to lend any needed technical inputs to the project authorities.

Indian Council of Medical Research (ICMR) have made certain recommendations which have been accepted by the NVDA and Gandhi Medical College, Bhopal and Sixth Report was redrafted accordingly.

• State Deptt. of GOG made presentation showing decline of Malaria in the SSP

However a study on hydrobiological characteristics reservoir of some tributaries draining in the reservoir entrusted to CICFR! are long over due. GOM have agreed to take up the issue with the HQ. of the CICFRI.

 It was agreed during the 2nd meeting on health issues that all the data on identified parameter would be sent to the NCA by the State Govts. for its compilation and publication.

ANNEX - XXXIV- (8)



नर्मदा नियंत्रण प्राधिक्रण NARMADA CONTROL AUTHORITY

सं: पर्या-4(10)/2000/ 369 - 81

29-2-2000

सेवा मै.

सभी सदस्य/आमंत्रितगण, संलग्न सूची के अनुसार ।

विषय: अन्तर्रान्धीय मत्स्य विकास बोर्ड के गठन की पहली बैठक के कार्यवृत्त के सम्बंध में ।

महोदय,

इस पत्र के साथ अन्तर्राज्यीय मत्स्य विकास बोर्ड के गठन की पहली बैठक दिनांक 04–11–1999 को निप्रा, समिति कक्षा, नई दिल्ली में सदस्य, पर्यावरण एवं पुनर्वास, नर्मदा नियंद्रण प्राधिकरण की अध्यक्षता में हुई थी के कार्यवृत्त की एक प्रति संलग्न कर भेजी जा रही है ।

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विशेषज्ञ पर्यावरण

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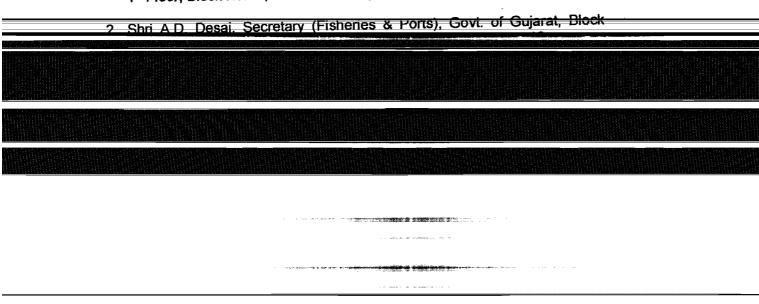
LIST OF INVITEES

Govt. of M.P.

- Shri Ravindra Sharma, Vice-Chairman, Narmada Valley Development Authority, Narmada Bhawan, Tulsi Nagar, Bhopal.
- 2. Shri Suresh Chandra, Member (E&F), Narmada Valley Development Authority, Narmada Bhawan, Tulsi Nagar, Bhopal.
- 3. The Secretary (Fisheries), Govt. of M.P., Satpura Bhawan, Bhopal.
- 4. Shri R.K. Nigam, Director (Fisheries), Govt. of M.P., Satpura Bhawan, Bhopal.

Govt. of Gujarat

 Shri C.K. Koshy, Managing Director, Sardar Sarovar Narmada Nigam Ltd., 1st Floor, Block No.12, New Sachivalaya Complex, Gandhnagar-382 010.



Administrative Building, Opp. Chetana Conege, 1302, 51. 2012 Ambedkar Garden, Bandra East, Mumbai – 400 051.

 Shri N.N. Magar, Dy. Director (Fisheries), Govt. of Maharashtra, New Administrative Building, Opp. Chetana College, Near Dr. Baba Saheb Ambedkar Garden, Bandra East, Mumbai – 400 051.

FIRST MEETING OF 1999 ON CONSTITUTION OF INTERSTATE FISHERIES DEVELOPMENT BOARD HELD AT NEW DELHI UNDER THE CHAIRMANSHIP OF MEMBER (E&R), NCA, AT BIHKAJI CAMA BIIAWAN, BIHKAJI CAMA PLACE, NEW DELIH.

In order to discuss the modalities for constitution of interstate fisheries development board for conservation of fisheries in the Sardar Sarovar Dam a meeting of the concerned officer of the State Govt. of M.P., Maharashtra and Gujarat was convened on the 4th November, 1999 at Committee room of NCA office at Bhikaji Cama Bhawan, New Delhi at 11.30 A.M. under the Chairmanship by Member (E&R), NCA.

List of participants is enclosed at Annex - 1.

WAT DIEP HITTORICATION, THE A

Member (E&R), welcomed all the participants. Discussions on the subject

Now, that guidelines for conservation and development are on the attractive is a need to evolve best alternatives for establishing an institution to carryout the fisheries in the reservoir on a sustainable basis. He invited the members for a

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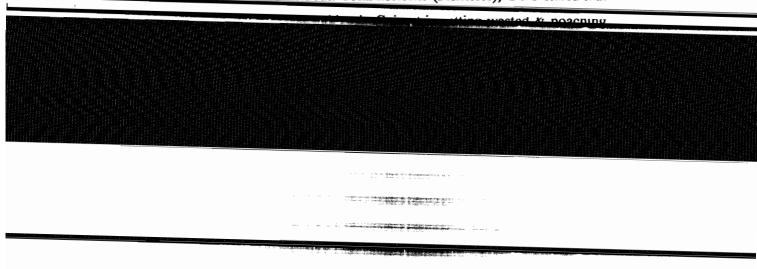
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brain storming session to evolve the alternatives.

Govt. of Maharashtra

The Commissioner (Fisheries), GOM stated that they had responsibilities for 33 villages. Although no rights of fishing in the river are available but there are chances that Revenue Department might have some record. According to him quite a good number of families were willing to carryout fishing in the reservoir in Maharashtra portion. The plan prepared by GOM earlier included facilities for fishing operation in the reservoir and needed training and infrastructure. He cautioned that in Maharashtra most of the land getting submerged was forest land and that whether commercial fisheries would be permissible, this has to be looked into.

He however explained, the view of Govt. of Maharashtra that "if there was commercial activities, GOM would like to participate on pro-rata basis". Commissioner (Fisheries), GOM stated that GOM agreed for constitution of a board details of which out yet to be worked out. Commissioner (Fisheries), GOG stated that



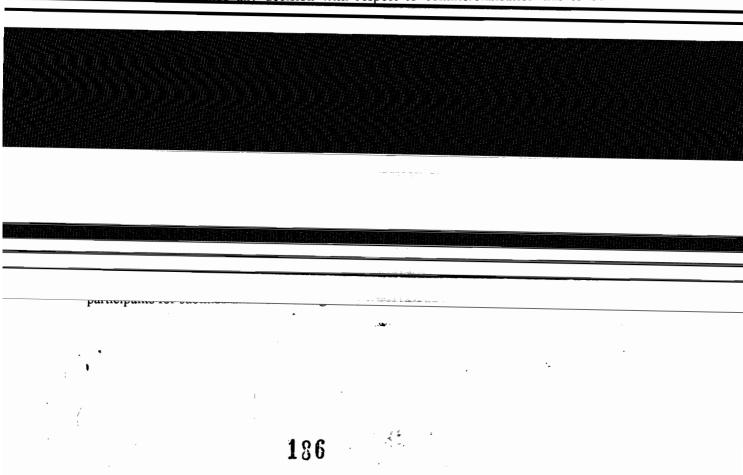
Member (Finance), NVDA stated that the proposal sent by GOMP was in accordance with the conscious decision taken by the State Cabinet after considering all the aspects. He made available a copy of the Summary and recommendations of the Committee on leasing policies of Inland Fisheries and pointed out that, for the SSP also, a board may be constituted in accordance of the norms suggested by this committee. This committee suggested that "In cases where a reservoir lies in more than one State, the approach should be to secure an agreement under which the

responsibility for development of fisheries and the right of exploitation vests in the State within whose territory the major part of the reservoir, is situated. This policy can be broadly adopted in the case of interstate rivers as well". A copy of this is placed at Annex – III.

He also presented a copy of the letter received from GOM, nominating Commissioner of (Fisheries) Maharashtra State as Member of SSP interstate Fisheries Board received in response to their letter No. F-1177/2/229/27/91-1 dated 27.10.93 (Hindi version). A copy is placed at Annex-IV.

He requested to expedite its response to the proposal under reference.

He further pointed out that in M.P. Narmada river is loaded with rights and concessions and hence any decision with respect to commercialisation has to be



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LIST OF PARTICIPANTS ATTENDED THE FIRST MEETING OF INTERSTATE FISHERIES DEVELOPMENT BOARD HELD AT NEW DELHI UNDER THE CHAIRMANSHIP OF MEMBER (E&R), NCA, AT BHIKAJI CAMA BHAWAN, BHIKAJI CAMA PLACE, NEW DELHI ON 4.11.1999.

Narmada Control Authority:

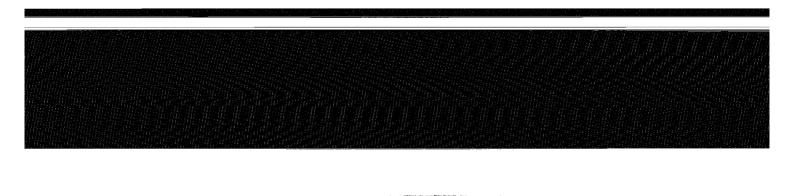
- 1. Shri N.D. Tiwari, Member (E&R), NCA, Indore.
- 2. Dr. Pawan Kumar, Specialist (Env.), NCA, Indore.

Ministry of Agriculture & Co-operation:

1. Dr. Y.S. Yadav, Development Commissioner (Fisheries), MOA, New Delhi.

Govt. of Madhya Pradesh:

- 1. Shri P. Bhargava, Member (Finance), NVDA, Bhopal.
- 2. Shri Suresh Chandra, Member (E&F), NVDA, Bhopal.
- 3. Shri R.K. Nigam, Director (Fisheries), Govt. of M.P., Bhopal.
- 4. Shri R.K. Behre, SMS (HRS), NVDA, Bhopal.



ANNEX – II

अवस्य पुरेशा शास्त्र र्मद्वा पादी क्रिकात दिशाल

भाषिताल, जिस्सीक 19/95-কুলা কিন্দুক /2/ 教理/27/91ール

प्राध.

- श्चिव, 11 मह्म गालन विभाग, गुनसत शासन, भारी सबन गुज्यता
- [2] मिय, म्रस्मा निगा प महाराष्ट्र धालन, नंबर्ड महाराष्ट्र ।

विष्णाः - सरदार सरो गः अभारां जीय मरमासीय पिषास पार्ध के गठन

ब्रिश्तिम में होगा । बहा, तर भद्रता नद्रणाम का काम भद्रभवण का तल्ला में का रहेगा । जुमारा यह प्रस्ताध है कि नर्मता माटी फिबात रिवार के जीवित मरदार सरीधर बर्गाम में गामा विकास के विविधान हेत अंतर्राणधीय भट्टम म्लाज का ,गान, पिया बाम । इसी नर्धदा निर्माण प्रास्क्रिक्त की भाषीदारी की आधार्यका नेवी है। सरवार यही वर मतरम् मुल्डल याच सदस्यीम् पृत्ता कित है। इसमें सम्बद्धिया महारा ग्र 129

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तथा भुवरास राज्यों के पृतिभिन्ध मिनानित साम । मण्डन की संस्थान निम्नानुसार पृत्ता वित है:--

म्हा प्रदेश - । उपाहमध् गर्भा धारी विकास

2. सारण इंदुनपांच है, नजीर घाटी चिकास प्राधिसरण अपना सचित, मुख्यातन, गुक्ती – पारन

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अ संवासक शास्त्रया, सर्वाः वादी विभागं पुर्गीअरण

महाराष्ट्र - 4 संगर्ण, मत्स्योवीय विकास

1090-1198/1/202/27/91-1. 1997a. Regiu 25. /11/93.

निकार प्रतिमंदमा, तक्षण विद्यान्तम वर्ष प्राप्ति निकार प्रतिमंदित प्रतिमादित की अपेर उनके प्रतिमादित । भारम्भाव, विद्याप 20. १. १३ के संदर्भ में सुंहतार्थ ।

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्रा स्थान के प्रधान । ज्या स्थानित

REPORT OF THE COMMITTEE ON -LEASING POLICIES OF INLAND FISHERIES

ANNEX - III

SUMLAY OF CONCLUSIONS AND RECOMMENDATIONS

Present Inland Fishery Leasing Systems.

The leasing systems relating to inland fisheries, owned by Government/local bodies all over the country fall under the following four categories:

- i) Outright leasing system: Under this system outright leases are granted either through upon auction, tender or preferential nominations. This is prevalent in most of the States and followed by the State Covernments as well as local bodies and a few religious institutions.
- ii) <u>Royalty systems</u> Under this system rights of catching fish are leased out subject to payment of royalties by the Iessees at stipulated rates per kg. of fish caught. This is adopted in Madhya Fradesh and Uttar Pradesh.
- iii) Bifurcated lessing system: According to this system rights of fishing on one hand and rights of purchase of fish on the other are granted separately. Fishermen's Cooperatives or groups of fishermen are engaged by the Figheries Department for conducting fishing only at stipulated rates and another contractor is given the right to purchase the fish from time to time, at rates

entoure scientific development of Fisheries. In some Sautes (e.g. no som, Bihar, Orissa and West Bengal), however, the Revenue Departments continue to have a major hold on the fisheries rights. Leasing of fisheries within the reserve forest limits is the exclusive preserve of the State Forest Departments. No State Government seems to have framed specific rules governing the leases of these waters.

While in some of the States, procedures governing leases of fisheries of waters transferred to local bodies are laid down by the Governments concerned (e.g. Andhra Pradesh, Tamil Nadu and Maharushtra), in others, no specific procedure is laid down. Granting preferential leases to fishemen's co-operatives or conducting open auctions are the systems followed by Panchayats or Municipalities. (Paras 8.2.12.1 and 12.2.2)



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referential and lon, -term leases:

In order to promote long range interest in the development of fisheries, all State Covernments excepting Haryana, Lunjab, Tamil Nach. Kerala and Orissa have introduced longterm leasing systems under which leases to Fishermen's Cooperatives/Panchayats/Individuals are given for periods varying 3 to 7 years. (Para 9.1).

Integration of leases with developmental effort and fixation of restals Economic benefits to fishermen.

Linkage of leasing systems with developmental needs has not yet been significantly achieved in any of the States. The system of arriving at rentals in regard to preferential leases to fighermen's (cooperatives, punchayats etc. waries from Sate to State.

So far as culture fisherios are concerned, the main objective behind the prevailing leasing rules, in the case of majority of States, is to ensure maximum revenue to the Government. The leasing rules are not, however, significantly related to developmental effort.

In most of cases, fish merchants utilise the Fishermen's Societies as a means of obtaining fishery leases at concessional rates, and cover a major part of the economic benefits. Beyond bare wages or inequal share from the catches, the working fishermen do not get their due share of the economic benefits. (Paras 10.1.1, 10.1.2 and 10.2.)

Existing torms and conditions of loases:

The terms and conditions governing leases in all the States include (i) safeguards to prevent damages to embandments, sluices, etc.,

In order to undertake item contents, some of which are(i) of the existing tanks and ponds need improvements, some of which are(i) despening or desilting, (ii) deweeding, (iii) construction or repairs to sluices, screens and shutters and (iv) repairs of embankments and feeding channels. All these items and excavations of new ponds need capital investment. This being so, no individual or a Co-operative society would take the trouble and initiative to make investments and develop a fishery if the period of lass is about three years which is just sufficient to reach the take-off stage for the establishment of culture

3:/1

fisheries and is not long enough for recovering the investments made and realising the benefits of the hard work put in subsequently. The present situation is that culture fishery development has been subjected to an apathetic treatment, unwittingly though, by both the Covernment and the lesses. In order to motivate and enable the lessees to make the necessary investments, in the same way as land holders who cannot undertake agriculture on their own give their land on tenure, often on long-term basis, State Covernments and local bodies who are not in position to undertake the work on their own may adopt the system of granting long-term leases. (Paras 13.2.2 to 13,2.5).

(b) Quality of lessees and preferential leases:

Development of fish culture requires the services of a fish farmer. As there is a general shortage of this category, the need is to train suitable candidates as fish farmers and progressively entrust water areas to them for taking up fish culture. The purpose of granting long-term leases will not be fulfilled if these are given to those who have no background of fish culture. Coupled with the institution off long-term leases, therefore, first preference in leases should be given to co-operatives consisting of figh farmers, certified as such by a competent officer of the Fisheries Department. Co-operatives of this kind are, however, few and far between at present. Efforts should, therefore, be made to train fishermen or other suitable candidates in fish culture (Para 13.3.9) and bring into being societies of this kind. In the event of difficulties in implementing the first alternative, the second alternative should be to grant loases to a fishermen's cociety, at least two members of which have been trained in fish culture at a State/ Contral Fisheries Training Centre. The third preferential alternative may be . to lease out to a person or group of persons trained at a State/Central isheries Training Centre. Should this also fail, the last rescort may be

of the investments to the lease amounts arrived at following the inim indicates above. Cost of seed or other inputs applied by the State, if any, should be dealt with as an item separate from the lease amount. So far as local bodies are concerned, the Committee recommend that the procedure outlined in regard to Government-owned waters (as above) may be followed, and, since many of these depend on income from tank/pond fisheries for implementing general developmental programmes in the areas, State Covernments may compensate the loss in annual income to local bodies based on the rentals of past three years, immediately proceding the introduction of the system recommended. If, however, the local bodies propose to undertake the developmental work by themselves by engaging trained person/persons on mutually agreeable conditions, State Covernments could accopt such schemes, duly approved beforehand by the fisheries Departments.

Leasing patterns of different types of inland fishery resources.

· (o)

The Committee recommended that, while the general policy to be adopted by State Governments may be to lease out the fishery rights. of various types of resources, in exceptional cases, where leasing is not in public interest or where fisheries of certain waters need to be developed for demonstration, development of fisheries in specified resources may be taken up by the fisheries apox department. (Para 13.4.1).

Manks and ponds having no specific natural stocking:

In the case of cattle tanks/ponds, Thobi tanks/ponds, small irrigation tanks, other tanks/ponds other than temple and drinking water tanks, which normally do not have natural stocking, long-term leases by do verment /Local Bodies on a preferential basis may be given following the order of preference as recommended in Para 13.3.10. The duration of preferential leases may be about 9 years in the case of resources in a fair condition and requiring moderate investments, and about 15 years in the case of derlict resources requiring substantial investments, with provision for further extension if the lease conditions are fulfilled satisfactorily. The annual rental may be determined as recommended in Para 13.3.6. In case preferential leases do not materialise, fisheries may be sold in public auction on an annual basis, while continuing efforts to locate suitable candidates for giving training and granting lang-term leases to Societies formed or consisting partly of such candidates or to individual trainees, as the case may be, during the subsequent year/years.

The state of the s

purchase lease, with or without the construction of punchase this type of lease may be about nine years. If the construction of ponds is undertaken by the Government or local Bodies beforehand, the cost of land, construction and any other investments may be recovered in about nine annual instalments. If plots are enrmarked and given to the fish farmers for the construction of ponds, on their own, the cost of land and any other loans may be recovered in about nine annual instalments. As recommended by the Inland Fi sheries Technical Committee (1972), the promotion of fish culture as part of these leases may be entrusted to the proposed 'Fish Farmers' Development Agency'. (Para 13.4.5). 4.00

Ranufally stocked waters other than major reservoirs and rivers.

In the case of small reservoirs, irrigation tanks, beels, In the case of small reservoirs, irrigation tanks, bools,

mans (Ox-bow lakes) etc., wherever it is possible to take up intensive/
extensive culture fishery development, the leasing system may be as outlined
in Para 13.4.2. If culture fishery development is neither feasible norm
possible, the Committee recommended that any of the three systems, viz., doyalty System, Bifurcated leasing System or Outright Leasing System may be
followed. No particular order of preference need be followed in this regard
and any of the systems suitable can be selected for application (Para 13.4.6).
The Agencies to when leases may be granted on a preferential basis, or The agencies to whom loases may be granted on a preferential basis, or otherwise marmer of fixation of lease amounts and duration of leases are givon below:

Syston iby all W System (Para 13.4.7)

(3)

by may of penalts may be given to individual nembers non's Scieties Duration of lease may be one year. Royalty rates per kg may not exceed 30 6 of the average wholesale price of fish.

Preferential lease If a Society is not in a position to sponsor 5... sufficient number of candidates or if a or groups of numbers Society is not yet orgasponsored by Fighermised, penalts may be
men's Societies. Dugiven to other bonefide fishermen, Luration of loase and royalty rates as in the first alternativo.

Ist Alternative Second Alternative Third Alternative tonder system, if second alternative fails. Duration of lease may be one ycar.

i) If preferential loase Mishing contract

Loasing Systom.

be given to Fishersen's Co-operatives consisting of bornfide fishermen only. Rentals charged may be equal to the average of rentals of mast 3-5 years, but it may not exceed 25% of the yields to be estimated beforehand by the Fisheries Leptt.

not exceeding fiw years.

ed for and leaso sottled on the basis for a period not exceeding fiw years. If this also fail mpk dopth.fishing may be undertaken.

.(7) Rivers, Major Reservoirs, estuaries, back-waters, etc.

The Committee consider that licensing system is the most satisfactory system in regard to leasing of these waters. The Committee recommend that, wherever it is in wome, this system may be continued and extended to the other resources of the kind. Licenses may be given for a duration not exceeding one year at a time to groups or individual fishermen spensored by Fishermen's Co-operatives Societies. In the absence of adequate response from societies, licences may be given to other bonafide fishermen. Licence foes may be collected as prescribed by the Government. The present leasing system of riverine fisheries may be modified to provide for the above procedure.

itivalty and Bifurcated leasing systems may be adopted as alternatives as recommended for beels etc. under (6) above wherever effective arrangements for close supervision and check in compact areas can be made.

(Paras 13.4.8 and 13.4.9).

(f) <u>administration of Frideries development and leases of Inter-State Waters</u>,

In regard to reservoirs, where the States concerned come to an agreement, whatever, by the Inver-State deposition of the reservoir, the administration of its fiberies may be undertaken on the lines mutually agreed upon, subject to this being entrusted to a single authority. In the case of reservoirs situated entirely in one State but where the dam is situated in another State and the same is controlled by the State or by a Board, the fishery rights may west in the State where the reservoir lies. Where the authority which has a legal right over the fishery is not the State inwident the reservoir lies, but a Project or any other State which has acquired the underlying land, the approach should be to secure an agreement

It is recommended that the leasing system recommended by the Committee may be extended in a phased manner in a period of 5 years.

(rarus 13.7.1 to 13.7.3).

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(i) Inbuilt arrangement for the collection of statistical data on inland fish production.

It is recommended that a system of issuing Fish Catch Coupon books to the lesseds for furnishing the particulars of fish caught may be introduced. The Fisheries Officers at various levels may compile the particulars in a proforma which has been suggested. (rares 13.8.1 to 13.8.4).

In order to stimulate a competitive spirit, it is recommended that the State Governments may introduce a fish crop competition system to be held annually. (Para 13.8.5).

(j) Terms and conditions of leases.

Detailed recommendations have been made concerning the terms and conditions relating to various types of leases.

(Para 14.1to 14.8).

DIRECTOR OF FISHERIES

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ANNEX - IV

D.O.No. Matsyav1-2491/CR-236/ADF-13. Agriculture, Animal Eusbandry, Dairy Development & Fisheries Department, Mantralaya Annexe, 25th March, 1994. Borbay-32 28 MAR 1994

Sub:- Establishment of Surdar Sarovar Reservoir Inter State Fisherigs Bour d.

Dear

R.S. Bathod,

1000 TO 1000

व्याप्तास्य स्टब्स्य व्यवस्थायः १९८८ विकासित्यः

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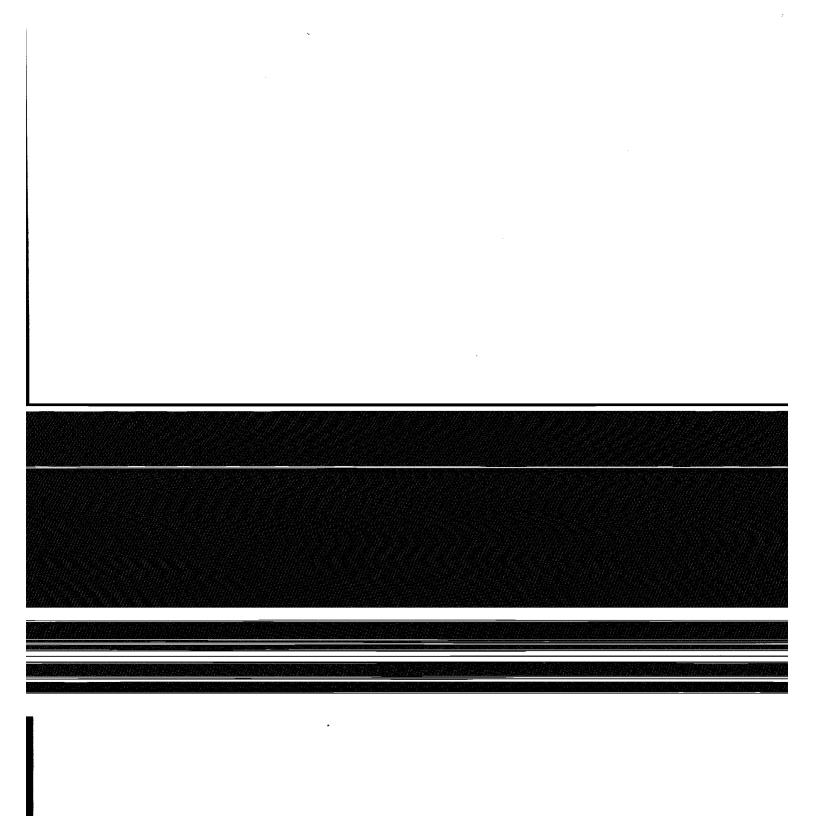
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॥ नोरमो क्षेत्रेष जियस हो जी कारिए • • • • • ०००

Kindly refer to your letter No.F-1177/2 229/27/91-I dated the 27th October, 1993 in Hindi Version on the coove noted subject.

This Government convey its approval to nominate Commissioner for Fisheries, Meharashtra rover Reservoir

Shri J.D. Dange, Comminst oner for Fisheries, Maharasitra State, Bombawa.





पर्यावरण उपदल ENVIRONMENT SUB-GROUP

चौंतीसवीं बैठक का कार्यवृत Minutes of the 34th Meeting

1 4 नवम्बर, 2000 को पर्यावरण भवन, नई दिल्ली में हुई

Held at Paryavaran Bhawan, New Delhi on 14th November, 2000

नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

इन्दीर दिसम्बर, 2000

Indore December, 2000

MINUTES OF 34th MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 14th NOVEMBER, 2000 AT PARYAVARAN BHAWAN, NEW DELHI.

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MINUTES OF 34th MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 14th NOVEMBER, 2000 AT PARYAVARAN BHAWAN, NEW DELHI.

INTRODUCTION

The 34th meeting of Environment Sub-group of Narmada Control Authority was held at Paryavaran Bhawan, Ministry of Environment & Forests, New Delhi on 14th November, 2000. A list of participants is enclosed at **Annex-XXXIV- Min-(1).**

Shri P.V. Jayakrishnan, Secretary, Ministry of Environment & Forests chaired the meeting and welcomed the participants. He asked the Member Secretary to take up the agenda items after brief introduction of the participants.

Item No.XXXIV-1(157): CONFIRMATION OF MINUTES OF THE 33rd MEETING.

Member Secretary welcomed the new Chairman of Environment Sub-group and informed about the disposal of Writ Petition No.319 of 1994 filed by Narmada Bachao Andolan Vs. Union of India & Others.

Thereafter, minutes of the 33rd meeting of Environment Sub-group circulated through letter No. Env-3(33)/98/2142-74, dated 9th November, 2000 were taken up for confirmation. Since there was no comments from any members, the minutes were confirmed as circulated.

Item No. XXXIV-2 (158): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETINGS.

1. FIELD VISIT REPORT.

The Member (E&R), NCA presented the findings of the Committee which visited the SSP areas in Gujarat during July, 2000. He requested the members of Sub-group for their comments, if any, on the report of the field visit of the Committee.

Prof. Ramaseshan stated that the progress of the planning and implementation of the environment safeguard measures taken by the State Governments was not reviewed ahead of the field visit. He therefore, suggested that this review may be considered as an activity by the NCA office. He further suggested certain modifications in the reports and promised to send his suggestions to the NCA office soon. Suggestion received from him are at **Annex-XXXIV-Min.(2).**

Dr. Shekhar Singh, expressed the opinion that Ministry of Environment & Forests should clarify the definition of the terms *pari-passu* used in the clearance order and that the Environment Sub-group should examine the progress in the light of this definition before giving a nod to any further raising of the dam. He referred to his letter addressed to Secretary, Ministry of Environment & Forests in this regard and requested the Secretary, MOEF and the Chairman of the Environment Sub-group to clarify on this issue so that the assessment by the Sub-group could be in tune with the clearance order.

Member (E&R), NCA stated that this issue was discussed in detail during the long hearing in the civil writ petition filed by the NBA and the stand of the MOEF on this issue was very clear. Environment Sub-group had also clarified this issue more than once and therefore there was no need to redefine this terms afresh.

Shri B.G. Varghese and Prof. Katti also desired that this issue may not be reopened again and again. Chairman summed-up the discussions by saying that the

points raised here have already been discussed in depth earlier. He assured Dr. Shekhar Singh that he would send a reply on the points raised by him. The Chairman requested NCA to prepare a note on the past discussions on this issue for information of the Members.

2. ENVIRONMENT MANAGEMENT OF SSP & ISP

Member (E&R), NCA informed that the MOEF desired a comprehensive documents on Environment Management of the Sardar Sarovar. He stated that copies on Environment Management of the Sardar Sarovar Projects was circulated to the members vide NCA office letter No. Env-3(34)/2000/4567-85 dated 9th November, 2000. for views of the members. He informed that this document describes the way environmental management of SSP on the parameters suggested by the Ministry of Environment & Forests in their letter of clearance, have proceeded. He further stated that each chapter has been classified into:- The Issue, Impact & Management, Studies & Findings, Proposed Management Measures, The Action Plans, Implementation and Summary of works to be done. He invited members and State Governments to offer their remarks. He further stated that Environment Management of Indira Sagar is also circulated vide letter No.Env-4(8)/2000/4561-67 dated 9th November, 2000 among the members for their remarks / comments.

Dr. Shekhar Singh, referred to the annexure of the document on Sardar Sarovar Project and pointed out that on page 171 under expanded role for NCA, it has been stated the role of the authority will mainly comprise of overall coordination and direction of the implementation of all the projects including engineering works, the environmental protection measures and the rehabilitation programme. He pointed out that as such the responsibilities of the NCA are much wider and include all the projects on Narmada river. Member (E&R), NCA pointed out that presently environment sub-group is entrusted with the responsibility for monitoring of the Sardar Sarovar and Indira Sagar Projects only. The Chairman however desired that the possibility of entrusting the environmental monitoring of the other two projects on river Narmada to the NCA may be looked into by the MOEF.

Members of the Sub-group desired more time to study the documents and after their remarks / comments.

3. SUBMISSION OF CATCHMENT AREA TREATMENT (CAT PLANS FOR FREELY DRAINING CRITICALLY DEGRADED SUB-WATERSHEDS [ITEM NO.XXII-2(112)] & DURATION OF TREATMENT IN CATCHMENT AREAS

The current status of submission of implementation of schemes in phase-II of CAT of SSP in Madhya Pradesh was given by the Member (E&F), NVDA to the Subgroup.

Member (E&R), NCA pointed out that the schedule of treatment for Phase-II areas in M.P., suggested that about 95,750 ha of land were to be treated up by the year 2000 whereas progress had been achieved on 9973 ha area only. He added that this showed a wide gap in planning & implementation of CAT works and requested the GOMP to give a serious thought to this issue.

Member (E&F), NVDA stated that 50 schemes covering an area of 91,518 ha have been submitted out of which 43 schemes covering an area of 87,884 ha have been approved by Govt. of India under RVP. Out of these 43 schemes 30 schemes pertain to Sardar Sarovar Project and 13 schemes pertain to Indira Sagar Project, 21,036 ha area from these schemes for SSP and 9,218 ha area under ISP have been treated by the end of March, 2000. He then informed that there was a problem with the sanction part of the schemes, either because of delay, in approval from the concerned agency or in release of funds. As such the budgeted funds could not be utilised during the relevant financial year. It was informed that Rs. 9 crores had been sanctioned for the year 2000-2001 but only a small part was received and that too at the end of the financial year.

The statement on progress of works received during the meeting from GOMP & GOM is at Annex-XXXIV.Min.(3).

Regarding the issue of increasing the duration of CAT works from the present three years to the five years, the Member (E&F), NVDA requested the help of the MOEF in this regard.

Govt. of Maharashtra

It was stated by Govt. of Maharashtra representative that 13 schemes out of 35 have been approved and since there have been changes in the norms for preparing schemes, there has been some delay in reframing the remaining 22 schemes. However 7,050 ha has been treated in the 13 schemes sanctioned.

It was stated that there have been delays in receiving funds from Central funding agencies and as a consequence there have been delays in work progress.

The Chairman stated that state funds can also be utilised to avoid such delays and desired that the Joint Secretary / Commissioner dealing with sanction of the scheme in the Ministry of Agriculture be included as regular invitee to the Sub-group to facilitate review of the bottlenecks.

4. SILT MONITORING

Govt. of Gujarat

Managing Director, SSNNL stated that for silt monitoring works, SSNNL has decided to entrust the work to Central Soil & Water Conservation Research and Training Institute, Vasad & the Chief Engineer (Design) will coordinate the work.

Govt. of Madhya Pradesh

Member (E&F), NVDA stated that to establish the silt-monitoring stations they are exploring the possibility of equipping the stations with indigenous equipments rather than imported equipments. For this NVDA, Bhopal had contacted office of Central Water Commission, Bhopal.

Dr. S.Ramasheshan stated that the subgroup might extend some help in this regard if GOMP feels so regarding the specifications and other data.

5. COST ESTIMATES FOR PREPARATION OF ACTION PLANS AND IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD MEASURES.

Updated cost estimates made available during the meeting by Govt. of Gujarat and Govt. of Madhya Pradesh are placed at Annex-XXXIV.Min.(4).

Regarding providing fund by the SSNNL to Maharashtra for various Environmental Safeguard Measures, a policy decision is to be taken by the appropriate authorities of the SSNNL after studying the availability of funds and financial consequences thereof.

It was earlier informed by GOM that the funds for CAF and CAT were being received by them from the project whereas on account of other safeguard measures, no such funds were forthcoming and that they had already spent about Rs. 55 lakh on the studies of flora and fauna alone. It was also informed that there was difficulty in getting the funds for the various additionalities on account of health plans, fisheries development plans, flora, fauna plans etc. It was agreed during the 33rd meeting that GOM would send their request for the budget related to implementation of various safeguard measures and the yearly indent to the Vice-Chairman, SSNNL so that the same could be provided in the budget of the project and made available to GOM. Further developments in this regard are awaited from GOM / GOG.

6. ESTABLISHING A SEPARATE AUTHORITY FOR COORDINATING ENVIRONMENTAL WORKS IN MAHARASHTRA.

The Sub-group discussed the issue in detail during earlier meeting and it was agreed that the recommendations of the sub-group for creation of an authority/cell was based on its experience as there was difficulty in getting proper response from GOM on crucial issues in time. Sub-group could not review the progress of survey, studies and implementation on environmental safeguard measures in Maharashtra due to lack of proper inter-departmental coordination in Maharashtra and emphasised the need for a Director (Environment) for the SSP along with supporting staff in office and in field. The representative of the GOM was of the view that the existing committee for the field visit in Maharashtra might suffice and it has been decided that there is no need of a separate cell as such.

7. PUBLICATIONS ON ENVIRONMENT

Representative of the GOG / GOMP informed that the publications would be brought out soon.

Item No. XXXIV-3(159): PRESENT STATUS OF STUDIES, SURVEYS AND ENVIRONMENTAL ACTION PLANS

The present status of Studies, Surveys and Environmental Action Plans as annexed in the Agenda item was noted by the Members of the Sub-group. The salient points are described below:

1) PHASED CATCHMENT AREA TREATMENT (Phase-I)

Government of Madhya Pradesh

Member (E&F), NVDA informed the latest progress corresponding to September, 2000, stated in the following paras.

Sardar Sarovar Project

An area of 82,380 ha had been treated against the target of 1,25,725 ha. He assured that the remaining areas will be treated in next two years.

Indira Sagar Project

Against a target of 62,975 ha an area of 46,958 ha had been treated.

Govt. of Maharashtra

It was informed that all the works have been completed in Maharashtra and that divisions created have been wound up. Further the maintenance works have been entrusted to the regular CAT divisions in Maharashtra. Prof.S. Ramasheshan stated that a permanent record of the works completed under various programmes of the Sardar Sarovar Project must be kept and should retrievable on request.

2) COMPENSATORY AFFORESTATION

Govt. of M.P.

Sardar Sarovar Project

By the End of 9/2000 an area of 8,736 ha has been completed against a target of 8,737 ha.

Indira Sagar Project

Against a target of 80,945 ha an area of 70,031 ha has been completed by the end of September, 2000.

Govt. of Maharashtra - Sardar Sarovar Project

Maharashtra has completed compensatory afforestation works over an area of 19.468 ha.

Govt. of Gujarat - Sardar Sarovar Project

By the end of September, 1994 afforestation on the entire area of 13,950 ha had been completed.

3) COMMAND AREA DEVELOPMENT

Govt. of Madhya Pradesh - Indira Sagar Project

The Member (E&F), NVDA informed that there existed a separate department namely AYACUT department under GOMP. Keeping this in view NVDA assured to have an interdepartmental committee to look into the details of TOR which were to be finalised but GOMP had abolished this department. NVDA will be taking up this issue with the Water Resources Department of M.P. It will therefore take some more time for a result on this issue.

Regarding the study pertaining to the effect of agricultural runoff from fields on surface and ground water, the Chairman requested for a note on the study under progress.

Govt. of Gujarat - Sardar Sarovar Project

Vice-Chairman, SSNNL briefly reiterated the strategies for Environmental Management of Command Area Development works. He said that the main environmental concern for the command area is waterlogging apart from aspects relating to flora and fauna and problems of agricultural pollutants etc. To take care of water logging sufficient planning is in place like the delta for the command has been adopted as 53 cm which is sufficiently low, the farmers would be supplied water on volumetric basis for conjunctive use, to avoid waterlogging and computerised water distribution system will ensure strict control on water distribution.

Govt. of Rajasthan

The progress in Rajasthan could not be reviewed as no representative of the Govt. of Rajasthan was present during the meeting.

4) SURVEY OF FLORA, FAUNA & CARRYING CAPACITY STUDIES

Govt. of Madhya Pradesh

Indira Sagar Project

The Member (E&F), NVDA informed that as reported earlier all formalities related to declaration of national park and sanctuary were being examined by the finance department for further submission to the Cabinet of GOMP and that there has been no change in its status.

Sardar Sarovar Project

The Member (E&F), NVDA information that the Action Plan for SSP was already sent to the NCA & MOEF vide letter No. Env./Forests/Tech./ 1896 dated 7th November, 2000. It was further informed the plan was under implementation.

Government of Gujarat - Sardar Sarovar Project

Progress submitted by Govt. of Gujarat during the meeting is placed at **Annex-**XXXIV.Min.(5).

Govt. of Maharashtra - Sardar Sarovar Project

Representative of the GOM informed that there was no endangered species in the submergence area in Maharashtra. Plan is under formulation for providing safe corridors for the migration of wild animals due to submergence.

5) ARCHAEOLOGICAL & ANTHROPOLOGICAL SURVEY

ARCHAEOLOGY

Government of Gujarat - Sardar Sarovar Project

Member (E&R), NCA requested GOG to speed up relocation of the Hamfeshwar temple whose plinth level is at 105 metre.

Managing Director, SSNNL informed that in addition to completion of all works related to Shoolpaneshwar temple, about 87% work of relocation of Hampheshwar temple is completed.

6) HEALTH ASPECTS

Sardar Sarovar Project & Indira Sagar Project

Govt. of M.P.

Regarding Epideomological surveillance studies entrusted to Gandhi Medical College, Bhopal the Member (E&F), NVDA informed that Sixth & final report has been received and is being compiled.

Dr. R.C. Sharma, Director, National Institute of Communicable Diseases, New Delhi, informed that as per the programme of the NICD there were 11 Districts in the three States.

Govt. of Maharashtra

Information submitted by Govt. of Maharashtra during the meeting is placed at Annex-XXXIV.Min.(6).

Govt. of Gujarat

Information submitted by Govt. of Gujarat during the meeting is placed at Annex-XXXIV.Min.(7)

7) FISHERIES DEVELOPMENT OF SARDAR SAROVAR PROJECT & INDIRA SAGAR PROJECT RESERVOIR

Govt. of Maharashtra

It was reported by Deputy Director (Fisheries), Govt. of Maharashtra that a study was entrusted to CICFRI, Vadodara to be completed in 1995. But despite reminders they have not received the said report for CICFRI, the last extension was granted upto October, 2000. He requested help from the Sub-group / NCA to request CICFRI, Vadodara to expedite the completion of the study and submission of the report to Govt. of Maharashtra.

Item No. XXXIV-4(160): ANY OTHER ITEM

A) JUDGEMENT OF THE SUPREME COURT

Member (E&R), NCA informed the Sub-group that while dismissing the civil Writ Petition No.319 of 1994, the Hon'ble Supreme Court has bestowed greater responsibility on this Sub-group. The Court has commended the functioning of the Sub-group and has entrusted it with the responsibility of clearing the further construction of the dam based on its assessment of pari-passu implementation of Environmental Safeguard Measures and asked it to monitor the environmental management in much wider sense with a purpose to improve the environment. A copy of the directions given by the Supreme Court along with key observations related to environment were circulated to the members during the meeting. A copy is placed at Annex-XXXIV.Min.(8).

B) REQUEST OF THE GOVT. OF GUJARAT FOR PERMISSION TO RAISE THE HEIGHT OF THE DAM TO 110 METRE.

A request received from Govt. of Gujarat for raising the height of the dam to 110 metre is placed at Annex-XXXIV.Min.(9) The Chairman desired a review of the progress of works on implementation of the suggested environment safeguard measures during the next meeting before considering the request of the Govt. of Guiarat.

DATE & VENUE OF THE NEXT MEETING

It was agreed to hold the 35th meeting of the Environment Sub-group on 10th January, 2001 at Kevadia Colony, District Narmada, Gujarat.

ANNEXURES

ANNEX-XXXIV-Min-I

LIST OF PARTICIPANTS OF THE 34TH MEETING OF ENVIRONMENT SUB-GROUP OF NCA HELD ON 14TH NOVEMBER, 2000 AT PARYAVARAN BHAWAN, NEW DELHI.

GOVERNMENT OF INDIA

Ministry of Environment & Forests

S / Shri/Smt.

- 1. P. V. Jayakrishnan, Secretary, MOEF, New Delhi
- 2. V. Rajgopalan, Joint Secretary, MOEF, New Delhi
- 3. Dr. Nalini Bhat, Additional Director, MOEF, New Delhi
- 4. A.N. Prasad, DIG, MOEF, New Delhi.

Narmada Control Authority

- 1. Suresh Chandra, Executive Member, NCA, Indore
- 2. N.D. Tiwari, Member (E&R), NCA, Indore
- 3. Dr. Pawan Kumar, Specialist (Environment), NCA, Indore
- 4. R.G. Pandey, Deputy Director (Environment), NCA, Indore
- 5. Rakesh Gaurana, Asstt. Director (Environment), NCA, Indore

Sardar Sarovar Narmada Nigam Ltd.

- 1. A.K. Mahana, Secretary, SSCAC, Vadodara
- 2. N.K. Bhandari, Dy. Secretary, SSCAC, Vadodara

Ministry of Water Resources

1. B.S. Ahuja, Commissioner (PP), MOWR, New Delhi

Indian Council of Medical Research

Dr. R. Arora, Deputy Director, ICMR, New Delhi

National Institute of Communicable Diseases

1. Dr. R.C. Sharma, Joint Director, NICD, New Delhi

Botanical Survey of India

1. Dr. R.D. Dixit, Addl. Director, BSI, Allahabad

GOVERNMENT OF GUJARAT

- 1. V.B. Buch, Vice-Chairman, SSNNL, Gandhinagar
- 2. K.C. Kapoor, Managing Director, SSNNL, Gandhinagar
- 3. Namita Priyadarshee, Environment Specialist, SSNNL, Gandhinagar.
- 4. B.G. Verghese, CTR, GOG.

GOVERNMENT OF MADHYA PRADESH

- 1. V.T. Londhe, Member (E&F), NVDA, Bhopal
- 2. R.K. Behre, Subject Matter Specialist (H&S), NVDA, Bhopal
- 3. Dr. K.L. Kauraw, Prof. & Head, Soil Science, J.N.K.V.V, Jabalpur

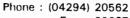
GOVERNMENT OF MAHARASHTRA

- 1. Shomita Bishwas, Scientist Grade-I, GOM, Mumbai.
- 2. D.P. Shirke, Superintending Engineer, Irrigation Dept. GOM, Mumbai.
- 3. Nandkishor N.Magar, Deputy Director of Fisheries (Inland), GOM, Mumbai

EXPERT MEMBERS

- 1. Dr. R.K. Katti, Prof. Emeritus, IIT, Mumbai and Director & Consultant, UNEECS, Mumbai.
- 2. Dr. S. Ramaseshan, Retd. Prof. IIT Kanpur, Perundurai.
- 3. Dr. Shekhar Singh, IIPA, New Delhi.

MIRRIALAUNL - AAAIV - (2)







KONGU ENGINEERING COLLEGE

PERUNDURAI, ERODE - 638 052 DEPARTMENT OF CIVIL ENGINEERING

Thiru. C. DEVARAJAN, B.E., Correspondent

Dr. A.M. NATARAJAN.

Dr. S. RAMASESHAN,

B.E., M.Sc. (Engg)., Ph.D.,

B.E., M.S., Ph.D., (Illinois)

Principal

Head of the Department

20, 02, 2000.

Ìο

Dr. Pawan Kumar. Marmada Control Authority, 79, B G Scheme, No. 74 C. Vijay Napar. INDOPE — 152 010.

Dear Dr. Pawan.

I am enclosing herewith my comments on the Report on Second Field Visit. It may be suitably incorporated in the Report

With best repards to you and Dr. Tiwari,

Yours Sincerely.

(De.S. RAMASESHAN)

COMMENTS OF DR. S. RAMASESHAN ON THE DRAFT REPORT OF SECOND FIELD VISIT, JULY 2000.

P2. 119 The committee reviewed the progress of planning and implementation of the environment safeguard measures taken by the State Governments." When?

This may be rephrased as an activity of N $\rm C$ A. Env. Member / and / or Secretary of Group.

P6 Table column - Treatment Measures 12. "Fully plugs" to "gully plugs"

P716. in left out 162 ha Remove Second "in"

116 Committee members were informed that

No experimental proof of minimisation / control of sediment transport. This part of statement may be deleted.

- L 23 the shore line (of the reservoir?)
- P9. 14 below Table agro-climatic conditions.
- P 11, P 12 Bank erosion was noted at frequent intervals. Perhaps because of nonuse of canals, they has not been repaired please add.
- P 13 115 Regarding another temple viz. Hampheswar add "the Committee was informed that"
- P 16, 1). Command Area studies are very misleading. No such output is available. Should Corrected

P 17 12 The list is annexed as Annex II

Annex II is not related to drainage (except item No. 7)

P 17 Annex IV

Except Item 1, others do not deal with Engineering Studies for CAD. The write up needs significant change

P 1912 Runn - Rann?

P 22 19 Salinity Surfacing - Surface Salinity?

1.18 The following points were brought out.

No. There was a claim that these are to be taken care of as and when irrigation develops. But details of drainage upto 40 ha chak unit is yet to be worked out; Vertical drainage as required has yet to be worked out in space; open wells and the wells are not being developed by the government and so there is only a hope that they will be developed



as required. In reality often the private uncontrolled development will lead to water logging in some areas and mining in others. Detailed plans for development of drainages larger than 40 ha chak or for groundwater do not seem to exist. While water for irrigation is yet to be supplied and problems become serious only after 5 years or so in general, plans for monitoring and control including institutionalisation are badly needed.

Item 3. Natural drainage shall be suitably modified and additional drainage/be provided.

What is the additional drainage? What are the places and magnitude of these? What are the suitable modifications? Statements like" to ensure that the floodwater gets drained out in a reasonable period and there is no spill over or chocking of drainage" are nonspecific vague terms for a technical report. There are no clear answers and so this para needs significant modification.

P 23. Item 4. As stated above there is no plan for ground water development and consequently drainage control. A system working all right on the average may have water logging and mining in different areas signifying a system design failure. The statement is not warranted

Item 7 "will be" to be replaced by "should be". Remove block to block basis so that is ready for use by the farmers-----" as farmers do not use drainage. But the system does.

There should be a clear distinction between farm level agricultural drains (surface or subsurface), surface drains and ground water development for vertical drainage.

P 23 1.15 to install

This section also brings out SSNNL point of view about drainage not reflected as pointed above, in the Draft Report

Prof. Ramaseshan suggested that, wherever clay layers are present at surface level, there may be a problem of water logging as seen during the site visit even though the local ground water table may be low. In such cases special care should be taken for land and surface / subsurface drainage.

(Perched) Water table was at surface due to saturation of clay. 5m depth, basalt with overlaying clay is not my statement.

Please remove the last line as'I am not sure what were my remarks and it is certainly not as reported.

Annexure I, Pl. correct as "Perundurai".

ANNEXURE-XXXIV-(Min.3)

GOVT. OF MAHARASHTRA

Catchment area Treatment

Agricultural area

(A) Directly Draining Watersheds (Nos.17)

Very High Priority — 8 VHP
High Priority — 9 HP
Total area of Watershed — 4611 ha.
Area avail for treat — 3175 ha.
Area improved by CAT works — 3011.9 ha.

Progress of F.D Works

Treatable Area – 23867 ha. Area Improved – 20283.48 ha.

(B) Indirectly Draining Watershed (Nos.35)

Very High Priority - 17 VHP
High Priority - 18 HP
Total area of Watershed - 80881 ha.
Area avail for Forest - 40619 ha.
Total area of the Agriculture - 36949 ha.
Total area unworkable - 3313 ha.

Forest Area

(A) <u>Directly Draining Watersheds</u> (Nos.17)

Very High Priority — 8 VHP
High Priority — 9 HP
Total area of Watershed — 23867 ha.
Area available for treatment — 20000 ha.
Area improved by CAT works — 22283 ha.

(B) Indirectly Draining Watershed (Nos.35)

Very High Priority – 17 VHP High Priority – 18 HP

Total area of Watershed — 42866.77 ha.

Area available for Forest — 40619 ha.

Total area of the Agriculture — 36949 ha.

Total area unworkable — 3313 ha.

COMPENSATORY AFFORESTATION

(1) Compensatory Afforestation on degraded forest land in lieu of submergence – 12977.08 ha.

(2) In lieu of Submergence in non forest land — 6401.71 ha.

(3) In lieu of rehabilitation – 4197.50 ha
In non forest land

STATUS OF FELLING IN SUBMERGENCE AREA

Area going under submergence – 6433.54 ha Area clear-felled – 748.01 ha.

नर्मदा घाटी विकास प्राधिकरण १पयावरण श्वं वन पुकोष्ठ**१** नर्मदा भवन, भोपाल

कृ0पर्या एवं वन/तकनीकी/2000/1936

भोपाल. दिनांक 13 11 2000

पृति,

र्त्तदस्य १पया वरण एवं पुनवा ति १, एवं सदस्य सचिव, पर्यावरण उपदल नर्मदा नियंत्रण पाधिकरण, इन्दौर

नर्मदा नियंत्रण पाधिकरण के पर्यावरण उपदल की चौतीसवीं बैठक के विषय:-तंबंध में ।

संदर्भ :- आपका सं, पर्यावरण-3-§ 34 § / 2000 / 2196-2227 दि 0 13. 10. 2000 ।

विषयान्तर्गत बैठक की कार्यसूची में अंकित मुददों से संबंधित अधतन स्थिति संलग्न है। उल्लेखनीय है कि छत्तीसगद्द राज्य के गठन स्वरूप बंटवारे की पुक्याओं में व्यस्तता का कुछ मुद्दों पर वांछित कार्यवाही पूर्ण होने में कुछ और तमय लगेगा ।

र्संलग्नः उपरोक्तानुसार

Selen)

न0घा ० वि०प्रा ०

Replies to Agenda for the 34th meeting of the Environment Sub Group of N.C.A.

Item No. XXXIV-1(157)- Confirmation of the minutes of the 33rd meeting

No Comments

Item No.XXXIV-2(158): Review of action taken on the decision of the previous meetings.

- 1. Pari-Passu context & compliance (XXI-414P)
 - No action from GoMP is required.
- 2. Environmental Management Plan for SSP & ISP:

Status Report on Environment Management March 2000 Vol XII No. 4 covering details for ISP & SSP have been received from the N.C.A. Updating of this document is in progress. This requires some more time because of busy schedule of officers in activities concerning with the partition of State.

3. Submission of catchment area treatment plans for freely draining critically degraded water sheds [Item No. XXII-2(1122)]

So for, NVDA have submitted 50 Nos. of schemes covering an area of 91518 ha. Out of this 43 schemes spread over an area of 87884 ha. were approved by GoI under River Valley Schemes. 30 schemes having an area 59566 ha pertain to SSP and balance 13 schemes to ISP. About 21036 ha area from these schemes for the SSP.9218 ha area under ISP have been treated by the end of March. 2000. No further progress is reported till September, 2000.

4. Duration of treatment on catchment area

Regarding increasing the duration of treatment from the present three years to five years, it needs persuasion at GoI, MoE&F level too as agreed during the last meetings. The present position is that the period of treatment is not raised till date.

5. Silt Monitoring

To explore possibility of indigenous equipments, CWC, Bhopal is contacted and their assistance for the same and establishing Sedimentation Monitoring Station (SMS) is sought. A copy of letter written to them is at Annexure I.

 Cost Estimates for preparation of action plans & implementation of Environmental safeguard measures.

Updating of cost estimates on environmental mitigative measures under various aspects so as to depict present picture is in progress. This also requires some more time because of the reasons mentioned earlier. However details of expenditure incurred on various aspects is enclosed as annexure -1

 Establishing a separate authority for coordinating Environmental works in Maharashtra.

It concerns with GoM.

8. Publication on Environment

The Publication on Environment for SSP requires some more time.

Item No. XXXIV-3(159): Present status of studies, Surveys and Environmental action plans.

Latest available progress of works Vis-à-vis of compliance upto

September 2000 is presented below -

1) Phased catchment area treatment GoMP

Sardar Sarovar Project

By the end of Sept 2000, an area of 82380 ha has been treated against final target are of 1,25,725 ha.

Indira Sagar Project

Against a target of 62975 ha an area of 46958 ha has been completed up to September 2000.

2). Compensatory Afforestation

Sardar Sarovar Project

By the end of Sept 2000, Govt. of M.P. have completed plantation works over an area of 8736 ha against a final target of 8737 ha.

Indira Sagar Project

By the end of Sept 2000, GoMP has completed plantation over an area of 70031 ha against a target of 80945 ha.

3) Command Area Development:

Earlier there existed a separate department namely Ayacut Department under the GoMP. Keeping this in view, NVDA assured to have inter-departmental Committee to look into the details of terms of reference which were to be finalized for Indira Sagar

Project. But sometime back GoMP had abolished this department.

Under the changed scenario, the NVDA is going to take up this issue with the Water Resources Department of the State Govt. It requires some more time to have result on the issue.

Regarding the study pertaining to the effect of Agro-Chemical runoff from Agriculture Field on surface & ground water, a progress report is received from J.N. Krishi Vishwa Vidyalaya, Jabalpur. The report is presently under scrutiny at NVDA level.

4) Survey of Flora, Fauna & Carrying Capacity Studies:

Indira Sagar Project:

The issue regarding declaration of National Parks/Sanctuaries had been examined by the State Finance Deptt. and replies to their queries had been incorporated in the cabinet précis. This is being processed by the State Forest Department for needful action.

Sardar Sarovar Project

Action plan is finalized by the State Wildlife Committee.

The plan is sent to State Forest Department for implementation as directed by the Committee. This plan is also sent to GoI, MoEF and N.C.A. for their record:

5) Archaeological & Anthropological Survey.

Archaeology:

Since Joga Fort is a centrally protected national monument under Ancient Monuments, Archaeological Sites and Remains Acts 7 of 1904 and 24 of 1958, its conservation/restoration/safeguarding and protections works can only be carried out by ASI and not by any other agency. Moreover, NVDA will not be able to take up the protection works in respect of Joga Fort in absence of required expertise and set up for the needful. As such ASI is again requested to take further action on the issue. Annexure-III.

6) Seismicity & Rim Stability of Reservoir:

Efforts are being made to identify suitable agency for analysis of data being collected by various seismic observatories in M.P. and its application with reference to SSP. Feed back from Field Staff is awaited.

As regards analysis and correlation of data being collected/proposed to be collected by various agencies in the region of NSP, the issue is under negotiation with G.S.I., Nagpur.

7) Health Aspects:

To identify the potential breeding areas of the mosquito, GoMP have requested Director MRC for the needful.

The disease surveillance programme had been assigned to Gandhi Medical College, Bhopal. On the basis of experience

7

gained in it, G.M.C. had suggested two villages to be included by NICD in their NDSP programme in M.P. Progress on this aspect is awaited from them.

In series of six monthly surveillance report from GMC, Bhopal, sixth report is sent to GoI, MoEF&F and NCA. (Annexure-IV) enclosed. GMC is now requested to submit a compiled and final report extrapolating the recommendations to the impact areas of the projects.

8) Fisheries Development of Sardar Sarovar and Indira Sagar Projet:
Response to GoMP's proposal from GoG is still awaited.

ANNEXURE-I

MARMADA VELLEY DEVELOPMENT AUTHORITY, TULSI NAGAR.

110....

To.

The Chief Engineer.

CoWejCo. (GoOol)

Paryawas Chawan.

Bhomale (MoP)

Sub: Regarding establishment of GOP in the sub water sheds of IS and GGP.

Ref :-Discussion held on 6.11.2000.

It is requested that "Wilt Nonitoring Stations" are
to be established in the catchment of Indira Sagar and Sardar
Sarovar Projects in M.P. Due to non availability of imported
t equipments (Indo German Technique) it is still pending, During
33rd meeting of Environment sub group, at Delhi. It was discussed that the possibility of Indigenous equipments is to be
explored. It was also discussed that C. W.C. Shopal can be taken
for precurement, of Indigionous equipments, technical guidance
collection selection of sits, Lab facilities and other related
works.

Therefore I am sending related technical details and list of sub watersheds, for necessary help and technical guidance.

if possible, the S.M.S. can also be established on "turn-key" basis, please inform us accordingly.

Thanking you,

((K.N. DUBEY))
DIRECTOR. (CAT)
N. V. D. A. BHOPAL

Annexure-II (Status – September, 2000)

Environmental cost of Sardar Sarovar Project

(A) Expenditure by Project Authorities:

I. Cost of Survey & Studies (Rs. in lacs):

S.No.	Component	Estimated/Actual Expenditure
1.	Compensatory Afforestation	on 2.44/2.44
2.	Catchment Area Treatmen	t 3.28/2.80
3.	Flora & Fauna	20.33/20.33
4.	Health	29.63/28.59
5.	Archaeology/Anthropolog	y 59.00/36.33
6.	Seismicity & Rim Stability	23.00/13.59
II.	Cost of Implementation	(Rs. in lacs):
S.No.	Component	Estimated/Actual Expenditure
1. (Compensatory Afforestation	1800.00/1055.10
2. (Catchment Area Treatment	8835.05/6804.87*
3. I	Flora & Fauna .	1650.00/Nil
4. l	Health 848.48/21.66	
5. A	Archaeology/Anthropology.	6819.20/74.90

NA/NA

Seismicity & Rim stability

^{*} includes expenditure on establishment.

NARMADA WAILSY DEVELOPMENT AUTHORITY NARMADA BHAWAN, BHOPAL.

Memo No. 75/Archenology/NVDA/99 1775 Bhopal, dated: 9-11-00

To,

The Member(E & R)
Marmeda Centrol Authority,
BG-79, Scheme No. 74-C
Vijay Nagar,
Indore- 452 010.

Sub; a) Minutes of the meeting in relation to Sarder Sarovar Project.

. b) Protection work of Jega Fort.

Ref: Agenda for the 34th meeting of Environment Sub Group-Item No. XXXIV-3(159): Present status of studies, surveys and environmental action plans- (5) Archeeological and Anthropological survey.

with reference to above correspondence it is mentioned that, since Joga Fort is a Centrally Protected National Monument, under Ancient Monuments, Archaeological sites and Remains Acts 7 of 1904 and 24 of 1958, the conservation, resteration, safeguarding and protection works can only be carried out by A.S.I: and not by any other agency.

Moreover N.V.D.A. will not be able to take up the protection works in respect of JOGA FORT in absence of required expertise and set up for the needful. Therefore, A.S.I. may be again requested to take further action on the issue.

Vice Chairman
Narmada Valley Dev. Authort
Narmada Bhawan, Bhopal.

Endt.No. 75/Archaeology/NVDA/99 1736 911 Bhopel, dated: 9-11-04

Copy to the Superintending Archaeologist, Archaeological Surve, of India, G.T.B. Complex, IT Negar, Bhopel for information and further needful in reference their endersement No. 4627 dated 21.7.2000.

Vice Chairman
Nermada Valley Dev. Authrity
Nermada Bhawan, Bhepal

AppendixIV

नर्मदा घाटी विकास प्राधिकरण नर्मदा मक्न, भौपाल

कुण्नघा विद्या/पया/24/2000/ 684

भीपात दिना 10-11-2000

g Rt,

- श्रीमती नितनी मद्द,
 श्रीतिरिक्त तैवालक पर्यावरण सर्व का मंत्रालय ती०बी०ओ०काम्पलेक्स पर्यावरण मक्न, नोधी रोइ नई-दिल्ली - 110 003
- श्री एन०डी तिवारी, सदस्य १ पर्यावरण एवं पुनवारा १ नर्मदा नियंत्रण प्राधिकरण 79 बी०जी स्कीम नृष्ट 74 सी विजय नगर, इन्दौर- 452 010
- विष्यः नर्मदा सागरं एवं सरदार सरोवर परियोजना के कारण स्वास्थ्य पर पृथाव का अध्यक्ष : छटवीं रिपोर्ट ।
- तंपर्न :- इत कापालिय के पत्र कुल्लामा विद्या /यपा/24/97/44 विदे 24-1-97 के त*ारतस्य* में ।

नर्मदा पादी विकास प्राध्यिकरण एवं गांधी मेडिकल कालेज दारा
हस्ताक्षित एमद्रजीवया अनुतार ". Study on Health Aspects in Project
Impact Ameas q Masmado Sagar the rugh. Spicke militagrical Surveillance
तंबंधी अध्ययन की छटवीं रिपोर्ट आपकी और अग्रिम कार्यवाही हेतु पृस्तुत है।
फिर भी उनकी और से अब तक प्राप्त 6 पृतिवेदनों पर आधारित एक तंबितत
पृतिवेदन प्राप्त होना शेष्ट है जिसके लिय उन्हें स्मरण कराया गया है, कृपया
पृतीक्षा करें।

तेलंग्नः उपरोक्तानुसार

तदस्य ध्यावरण सर्व वनाः भू नर्मदा घाटी विकास प्राधिकरण रहिष्ट्र

ANNEXURE - XXXIV - (4)

ENVIRONMENTAL COST OF SSP, GOG

A) Expenditure by project authorities

i) Cost of survey and studies (in Rs. lacs)

	Estimate	Expenditure
CAF	4.52	4.52
CAT	8.77	8.77
F&F	101.84	80.47
Health	2.5	2.5
Arch/Anth	1.3	0.6
Seismicity CAD	. 5.05 11.25	5.07 11.25

ii) Cost of Implementation (in Rs. lacs)

Estimate	Expenditure
1938.82	1769.02
3445.76	3810.07
663.31	126.26
-	71.52
3800.00	583.47
329.00	174.04
219.57	335.20
NA	NA
	1938.82 3445.76 663.31 - 3800.00 329.00 219.57

Annexure-II (Status – September, 2000)

Environmental cost of Sardar Sarovar Project

(A) Expenditure by Project Authorities:

I. Cost of Survey & Studies (Rs. in lacs):

<u>S.N</u>	lo. Component	Estimated/Actual Expenditure
1.	Compensatory Afforestati	on 2.44/2.44
2.	Catchment Area Treatmen	at 3.28/2.80
3.	Flora & Fauna	20.33/20.33
4.	Health	29.63/28.59
5.	Archaeology/Anthropolog	y 59.00/36.33
6.	Seismicity & Rim Stability	23.00/13.59
II.	Cost of Implementation	(Rs. in lacs):
<u>S.N</u>	lo. Component	Estimated/Actual Expenditure
1.	Compensatory Afforestation	1800.00/1055.10
2.	Catchment Area Treatment	8835.05/6804.87*
3.	Flora & Fauna	1650.00/Nil
4.	Health .	848.48/21.66
5.	Archaeology/Anthropology	6819.20/74.90
6.	Seismicity & Rim stability	NA/NA

^{*} includes expenditure on establishment.

ANNEXURE - XXXIV - (5)

Statement showing the activities carried out for improvement of habitat in Shoolpaneshwar Sanctuary, during the year 1998-99.

Sr. No.	Work component	Physical Progress	Financial Progress (in rupees)
I	Protection to the sanctuary.		•
,	i. Fencing		
	li. Watch Tower (Maintenance)	Proposed	39,035/-
	iii. Fire Lines	3 No.	14,970/-
	iv. Vaccination to the cattle.	100 Km.	4.64.004/
	v. Stone wall fencing	5	4,61,834/-
	vi. Fire chowki	Proposed	51,610/-
	vii. Fire watchers	10262 Rmt.	1,55,368/-
	· ,	15 No.	Jock.
II	Habitat Improvement & facilities for wildlife.	35 No.	Same and the same of the same
11	i. Supply of water for wildlife	(L.S.)	1,09,812/-
,	ii. Supply of fodder	Proposed	-
	iii. Bird observation hut	Proposed	-
	iv. SMC works (Barricades)	2 No.	99,991/-
	v. Creation of habitat(Check Dam)	1 No.	3,36,390/-
	vi. Construction of small ponds	2 No.	2,17,505/-
	vii. Removal of unwanted species	Proposed	•
	viil. Advance work of plantations	35 Ha.	1,00,941/-
	ix. Fodder plantation for wildlife.	22 Ha.	1,31,615/-
	x. Nala bunding	2113 Cu.mt.	1,09,908/-
III	Eco development		2 77 006/
	1. Trench works	C 2 1/11	2,77,886/-
	ii. To provide non conventional energy(Solar light)	6 Villages	•
	iii. Digging of tube well and Providing hand	1 No.	1,60,256/-
	pump(3 Nos.)		-,,,
	iv. Installation of hand pump	1 No.	35,000/-
IV	Nature education camp for the population in & around the Sanctuary.	Proposed	-
V	Wildlife training for the Sanctuary staff	Proposed	
VI	Compensation for the injuries caused by wildlife	4 No.	20,000/-
VII	Wildlife week celebration		6,377/-
	Tota	l Rs.	23,55,887/-

Annexure[Y-C

Statement Showing the activities carried out for improvement of habitat in Shoolpaneshwar Sanctuary, during the year 1999-2000.

	Work component	Physical Progress	Financiai Progress
Mana	gement of Sanctuary and National Park.	_	_
1	Construction of Gazler tank	1 No.	66114
2	Digging of Tube-well	1 No.	54655
.3	Digging of Trench / trench around boundary	1389 6	309943
4	Compensation	16 Case	38000
-	opment of Jesor, Ratanmahal, Dumkhal	20 0000	•
	sanctuary		
	-		
5	SMC Work	2 NO.	105967
6	· Advance works for plantation	62 ha.	125115
7	Advance works for plantation 1999-2000	35 ha.	126558
8	Current year plantation	35 ha.	78150
9	One year old plantation	62 ha.	18505
10	Two year plantation	16 ha.	40349
11	Nala bunding	2346 cu.mt	133749
12	Check dam	1 No.	132999
13	Construction of ponds	2 No.	133358
14	Creation of water holes	10 No.	117772
15	Fodder facilities	18 ha.	127997
- 16	Hand-pump '	1 No. '	44800
17	Supply of water during dry season	1 No.	108059
18	Fire-line	N.A.	999766
19	Stone wall fencing	17540 RM.	131851
20	Watch tower	5 No.	59735

Annexure - V: ACTIVITIES RECOMMENDED IN ACTION PLAN FOR SHOOLPANESHWAR SANCTUARY

Sr.			Total		
No.	(Name of action or objective to be carried out)	Physical	Financial		
1	Afforestation				
	(A) Plantation of fuel wood, timber, MFP and Bamboo	500 Ha.	150		
	(B) Plantation for making animal corridor and local migration. (gap plantations, to make compact corridors)	250 Ha.	50		
	(C) Providing and Planting fruit tree species bamboos and other mfp species to tribals around their cultivated fields(Under RDFL components CFP programme (Rate as per CFP model)	100 Ha.	-		
2	Soil and Moisture Conservation Works				
	(A) Check dam				
	(i) Pakka	25 No.	50		
	(ii) Kachcha	25 No.	5		
	(iii) Desilting of check dams.	25 No. 500 No.	5 5		
	(B) Gully Plugging (C) Van Talavadi	25 No.	25		
3	ECHO DEVELOPMENT PROGRAMME IN & AROUND VILLAGES. (A) Water facilities for villages and cattle.	•			
	(i) Well (New)	. 25 No.	12.50		
	(ii) Deepening of well	25 No.	2.50		
	(iii) Hand pumps	25 No.	10		
	(iv) Repairs of Hand Pump	25 No.	1.25		
	(v) Bore wells	5 No.	20		
	(vi) Aveda	25 No.	5		
	(B) SMC Work in agricultural fields.	500 No.	25		
	(C) School Building	5 No.	. 10		
	(D) Mobile Stores (Existing) facilities of WFP programme to be utilized.	-	<u>-</u>		
	(E) Mobile Medical unit	1 No.	6		
	(F) Providing better breed of live stock	100 No.	10		
	(G) Veterinary camps & vaccination of No. Sanctuary cattle.	-	5		
	(H) Gobar Gas Plant	100 No.	12.50		

	on- conventional energy sources wind power generation etc.)	-	5
(J)Employment oriente		1 No.	10
`	Camps (two days per camp)	150 No.	5
(L)Poultry Developme		150 140.	5
(M) Crematoria	ut	· •	-
()	•		
4 PROTECTION			
(A) Demarcation of S	anctuary Boundary	-	10
(B) Erection of dry re	ubble wall to stop encroachment	-	25
	ss net work (Already existing,	-	5
reinforcement requ	uired)		
-	fighting equipment (One Truck)	•.	5
5 Wildlife Managemen	t & Dasaarch	_	
9	ent (Removal of weeds and	_	7.50
increase of fodder			7.50
	meteorological station	2 No.	2
(C) Research station a		1 No.	4
(D) Periodical wildlife	•	1 140.	1
` ,	of case (Animals & Birds)	_	23
(ii) Regular supply		_	23
(iii) Veterinary Ser		_	
(iv) Transport	vice	-	
		-	2
(v) Bird ringing	erholes for wildlife	· -	2 2
(VI) Fermanent was	erholes for wildlife	-	2
6 TOURISM DEVELO	DPMENT		
(A) Orientation Cente	r	-	5
` '	huts at Namgir Duthar, Sagai 3	1 No.	3
Nos.	(militar m		0.50
	(T.V, V.C.R, Tape-recorder etc.)	-	0.50
(C) Publicity & Displa	ny material		1
7 CONTIGENCY		-	10
8 MAINTENANCE &	ASSETS	-	75

N.B.: Various activities carried out from 1993-94 onwards is annexed at Annex.- IV

Environment Department/T.C.1

NOTE

ANNEXURE - XXXIV - (6)

Summary of the information received dept.wise as follows: Health Department Health Activities Implemented in Narmada Valley in Nandurbar District.

Sr.No.	Subject	Action Taken.			
1	Appointment of	In Dhadgaon and Akkalkuwa Taluka 25 Health Centrtes are			
	Honourary	already started and 12 Honourary Medical Officers are appointed.			
	Medical Officer	The Hon. Medical Officers are appointed for the period from July to			
		December 2000. At the remaining 13 Health Centres regular			
		Medical Officers are deputed for the period of month since July			
		2000 and one Health Assistant (Male), one M.P.W. (Male) and one			
		Ward Boy is given to help the Medical Officer. With the help of this			
		team epidemic control programme is monitored.			
2 .	To purchase a	ı ,			
	Launch for	Launch. But due to increase in the cost of the Launch rates			
1	Implementing	additional sanction of Rs.10 lacks is under consideration of			
	floating Hospital.	Government.			
3	To purchase	For the year 2000-2001 Rs.5000/- grants are received to purchase			
	additional	the medicines and the action has already taken to purchase the			
	medicines	same.			
4	Spraying of	In Dhadgaon Taluka under 8 Primary Health Centres in 53 villages			
	Syflothrin 10%	and in Akkalkuwa Taluka under 7 Primary Health Centres in 17			
	insecticides	villages to rounds Spraying of Syflothrin 10% insecticides are			
	under Maleria				
	Control	58663 and 15870 population in Dhadgaon and Akkalkuwa Taluka			
	Programme.	is protected.			

25

6	Distribujtion of medicated mosquitonet Reproduction and distribution of Gappi Fish which eats up the mnosquito Larvae	278 single and 50 double medicated mosquitonet are distributed to 194 families. Under Maleria Control Programme in Dhadgaon and Akkalkuwa Taluka total 37 Gappi Fish reproduction centres are started to
7	Appointment of Link Workers.	In Narmada Valley at very tribal places where people are living (at Pada & Vasti) 81 Malaria Link Workers are appointed to treat fever patients and to collect the blood sputum of these patients.
8	Fever Treatment Centres.	In Dhadgaon & Akkalkuwa taluka 22 Fever Treatment Centres are started by giving Rs.25/- honouranum every month. With the help of these centres fever patients are treated.
9	Pada Workers.	In Narmada Valley area 972 Pada Workers are appointed. Water disinfection, treatment to fefvger patients and to submit the information of epidemic, etc. is done with the help of these Pada Workers.
10	Malaria Control Society.	With the help of World Bank finance, Malaria Clontrol Societhy is formed at Dhule. Purchase of anti - malarial medicines to implement reproduction centres of Gappi Fish, distribution of medicated mosquitonets, etc. is done with the help of this society.
11	Supervison of Health Activities.	As per instruction of Director of Health Services, Mumbai vide his letter dt. 20/7/20, Circle level Class-I Officers are deputed regularly to supervise the health activities. Whatever discrepancies are pointe out in there visits are brought to the notice of District Health Officer, Z.P. Nandurbar and necessary measures are taken to eliminate these discrepancies in time.

ROPOSED HEALTH INSTITUTIONS TO BE ESTABLISHED IN SARDAR SAROVER PROJECT

SR. NO.	TYPE OF PROPOSED HEALTH	NO.OF PROPOSED HEALTH	EXPECTED EXPENDITURE (RS.LAKHS)			HS)
	INSTITUTIONS .	INSTITUTIONS	RECURRING	NON RECURRING	CAPITAL	ТОТАЬ
1.	Sub -Centre Dispensaries	3	. 33	3	60	96
2	Floating Dispensaries	1	25	20		45
3	Lab. Technicians for Primary Health Centres	16 Posts	16			16
4	Sanction of 28 New Sub Centres		56.56	7	140	203.56
		Total	130.56	30	200	360.56

IN THE 9TH FIVE YEAR PLAN THE PROPOSED EXPENDITURE IS AS FOLLOWS:

(Rs. in lacks)

	1999-2000	2000-2001	2001-2002	Total
Recurring	Rs. 130.56	Rs.81.40	Rs.89.54	Rs.301.50
Non Recurring	Rs. 30.00			Rs. 30.00
Capital	Rs. 140. 00	Rs.60.00		Rs.200.00
Total	Rs. 300.00	Rs.141.00	Rs.89.54	Rs.531.50

SR. NO.	TYPE OF PROPOSED HEALTH	NO.OF PROPOSED HEALTH	EXPECTED EXPENDITURE (RS.LAKHS)							
	INSTITUTIONS	INSTITUTIONS	RECURRING	NON RECURRING	CAPITAL	ТОТАL				
1	Sub -Centre Dispensaries	3	. 33	3	60	96				
2	Floating Dispensaries	1	25	20		45				
3	Lab. Technicians for Primary Health Centres	16 Posts	16			16				
4	Sanction of 28 New Sub Centres		56.56	7	140	203.56				
		Total	130.56	30	200	360.56				

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r. 0.	Name of PHC	1998			1999			1999 Upto Sep-1999				2000 Unto Sen-2000		
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	Garudeswar	9966	296	37	7892	142	10	7817	185	15	64:	13 79	9	· .

ANNEX - XXXIV-Min.(8)

JUDGMENT OF HON'BLE SUPREME COURT IN THE MATTER OF WRIT PETITION (CIVIL) 319 OF 1994 : RESPONSIBILITIES OF ENVIRONMENT SUB-GROUP OF NCA :

DIRECTIONS OF HON'BLE SUPREME COURT

The Hon'ble Supreme Court in the writ petition (Civil) No. 319 of 1994 filed by Narmada Bachao Andolan (NBA) against the Sardar Sarovar Project (SSP) delivered judgment on 18.10.2000 to go ahead with the project as per stipulations of NWDT Award. The majority judgment while issuing directions and disposing of this case put two conditions i.e. (i) the completion of the project at the earliest & (ii) ensuring compliances with conditions on which clearance of the Project was given including completion of relief & rehabilitation works and taking of ameliorative & compensatory measures for environmental protection in compliance with the scheme framed by the Government thereby protecting the rights under Article 21 of the constitution. Keeping these principles in view, the Hon'ble Court issued several directions, in the operative part of the majority judgment. These are as follows:

Following are the directions of the judgement

- 1. Construction of the dam will continue as per the Award of the Tribunal.
- 2. As the Relief and Rehabilitation Sub-group has cleared the construction up to 90 meters, the same can be undertaken immediately. Further raising of the height will be only paripassu with the implementation of the relief and rehabilitation and on the clearance by the Relief and Rehabilitation Sub-group. The Relief and Rehabilitation Sub-group will give clearance further construction after consulting the three Grievances Redressal Authorities.
- 3. The Environment Sub-group under the Secretary, Ministry of Environment & Forests, Government of India will consider and give, at each stage of the construction of the dam, environmental clearance before further construction beyond 90 meters can be undertaken.
- 4. The permission to raise the dam height beyond 90 meters will be given by the Narmada Control Authority, from-time-to-time, after it obtains the above-mentioned clearances from the Relief and Rehabilitation Sub-group and the Environment Sub-group.
- 5. The reports of the Grievances Redressal Authorities and of Madhya Pradesh in particular, shows that there is a considerable slackness in the work of identification of land, acquisition of suitable land and the consequent steps necessary to be taken to rehabilitate the project oustees. We direct the States of Madhya Pradesh, Maharashtra and Gujarat to implement the Award and give relief and rehabilitation to the oustees in terms of the packages offered by them and these States shall comply with any direction in this regard

which is given either by the NCA or the Review Committee or the Grievances Redressal Authorities.

- Even though there has been substantial compliance with the conditions imposed under the environment clearance, the NCA and the Environment Sub-group will continue to monitor and ensure that all steps are taken not only to protect but to restore and improve the environment.
- 7. The NCA will within four weeks from today draw up an Action Plan in relation to further construction and the relief and rehabilitation work to be undertaken. Such an Action Plan will fix a time-frame so as to ensure relief and rehabilitation pari-passu with the increase in the height of the dam. Each State shall abide by the terms of the Action Plan so prepared by the NCA and in the event of any dispute or difficulty arising, representation may be made to the Review Committee. However, each State shall be bound to comply with the directions of the NCA with regard to the acquisition of land for the purpose of relief and rehabilitation to the extent and within the period specified by the NCA.
- 8. The Review Committee shall meet whenever required to do so in the event of there being any un-resolved dispute on an issue which is before the NCA. In any event, the Review Committee shall meet at least once in three months so as to oversee the progress of construction of the dam and implementation of the R&R programmes.

If for any reason serious differences in implementation of the Award arise and the same cannot be resolved in the Review Committee, the Committee may refer the same to the Prime Minister whose decision, in respect thereof shall be final and binding on all concerned.

- 9. The Grievances Redressal Authorities will be at liberty, in case the need arises, to issue appropriate directions to the respective States for due implementation of the R&R programmes and in case of non-implementation of its directions the GRAs will be at liberty to approach the Review Committee for appropriate orders.
- 10. Every endeavour shall be made to see that the project is completed as expeditiously as possible.

The and connected petitions are disposed off in the aforesaid terms. "

SUPREME COURT JUDGEMENT ON SSP

ISSUES RELATED TO ENVIRONMENT

The Ministry of Water Resources, Government of India is the Nodal Ministry for the Sardar Sarovar Project. As a consequence of the Tribunal's Award Narmada Control Authority (NCA) was created for overall coordination & direction of the implementation of the projects including the engineering works, the Environmental Protection measures & the Rehabilitation programme and to ensure the faithful compliance of the terms & conditions stipulated by the Central Government at the time of clearance of the Sardar Sarovar and Indira Sagar projects. Narmada Control Authority is a high powered Committee having the Secretary, Ministry of Water Resources, Government of India as its Chairperson, Secretaries in the Ministry of Power, Ministry of Environment and Forest, Ministry of Social Justice & Empowerment, Ministry of Tribal Welfare, Chief Secretaries of the concerned four states as Members. In addition, there are four independent Members and technical persons like Chief Engineers from the party states.

Narmada Control Authority was empowered to constitute one or more sub-committees and assign to them such of the functions and delegate such of its power as it thought fit. Accordingly, NCA has created Environment Sub-group for ensuring planning implementation and monitoring of the Environmental works for SSP & ISP. The Sub-group is headed by the Secretary, Government of India, Ministry of Environment & Forests and represented by Members / Invitees of participating states, academic institutions having experts in Environment. The key functions are as follows:

The functions of Sub-group are as follows:

- i) To work out the environmental safeguard measures to be planned and implemented for the entire Narmada Basin so that environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar and Sardar Sarovar Projects.
- ii) To determine the terms of reference of required surveys and studies necessary for implementation of environmental safeguard measures inclusive of data base required, the methods by which the data base is to be prepared and also to identify the institutions/ individuals to undertake the preparation of such documents
- iii) To get prepared for clearance by the Ministries and NCA, the Action Plans with regard to all environ- mental safeguard measures and the assessment criteria thereof.
- iv) To devise a suitable monitoring and evaluation mechanism so that the action plans are effectively implemented in consonance with stipulations at the time of clearance of the projects.

- v) To assess the necessary organisation with management capability being set up for adequate implementation of environmental safeguard measures.
- vi) To undertake all measures necessary to assist Narmada Control Authority in the planning and implementation of environmental safeguard measures.

Salient features of the judgement related to issues on environment

- 1. The petitioner has been agitating against he construction of the dam since 1986, before environmental clearance was given and construction started. It has, over the years, chosen different paths to oppose the dam. At it's instance a Five Member Group was constituted, but it's report could not result in the stoppage of construction pari-passu with relief and rehabilitation measures. Having failed in it's attempt to stall the project the petitioner has resorted to court proceedings by filing this writ petition long after the environmental clearance was given and construction started. The pleas relating to height of the dam and the extent of submergence, environment studies and clearance, hydrology, seismicity and other issues, except implementation of relief and rehabilitation, cannot be permitted to be raised at this belated stage.
- 2. This court has entertained this petition with a view to satisfy itself that there is proper implementation of the relief and rehabilitation measures at least to the extent they have been ordered by the Tribunal's Award. In short, it was only the concern of this Court for the protection of the fundamental rights of the oustees under Article 21 of the Constitution of India which led to the entertaining of this petition. It is the Relief and Rehabilitation measures that this Court is really concerned with and the petition in regard to the other issues raised is highly belated. Though it is, therefore, not necessary to do so, we however, presently propose to deal with some of the other issues raised.

The Tribunal in this Award has decided a number of issues which have been summarised hereinabove. The question which arises is as to whether it is open to the petitioners to directly or indirectly challenge the correctness of the said decision. Briefly stated the Tribunal had in no uncertain terms come to the conclusion that the height of the dam should be 455 ft. It had rejected the contention of the State of Madhya Pradesh for fixing the height at a lower level. At the same time in arriving at this figure, it had considered the relief and rehabilitation problems and had issues directions in respect thereof. Any issue which has been decided by the Tribunal would , in law, be binding on the respective States. That this is so has been recently decided by a Constitution Bench of this Court in The State of Karnataka Vs. State of Andhra Pradesh and others, 2000(3) Scale 505. That was a case relating to a water dispute regarding inter-Stare river Krishna between the three riparian States and in respect of which the Tribunal constituted under the Inter-State Water Disputes Act, 1956 had given an Award. Dealing with the Article 262 and the scheme of the Inter-State Water Disputes Act, this Court at page-572 follows:

Once the Award is binding on the States, it will not be open to a third party like the
petitioners to challenge the correctness thereof. In terms of the Award, the State of
Gujarat has a right to construct a dam upto the height of 65 ft. and at the same

- time, the oustees have a right to demand relief and resettlement as directed in the Award. We, therefore, do not propose to do with any contention which, in fact, seems to challenge the correctness of an issue decided by the Tribunal.
- There is merit in the contention of the respondents that there would be a positive impact on preservation of ecology as a result from the project. The SSP would be making positive contribution for preservation of environment in several ways. The project by taking water to drought-prone and arid parts of Gujarat and Rajasthan would effectively arrest ecological degradation which was returning to make these areas inhabitable due to salinity ingress, advancement of desert, groundwater depletion, fluoride and nitrite affected water and vanishing green cover. The ecology of water scarcity areas is under stress and transfer of Narmada water to these areas will lead to sustainable agriculture and spread of green cover. There will not be improvement of fodder availability which will reduce pressure on biodiversity and vegetation. The SSP by generating clean eco-friendly hydropower will save the air pollution which would otherwise take place by the generation power of similar capacity.

Environmental Issues

The four issues raised under this head by Shri Shanti Bhushan are as under:

- 1. Whether the execution of a large project, having diverse and far reaching environmental impact, without the proper study and understanding of its environmental impact and without proper planning of mitigative measures is a violation of fundamental right s of the affected people guaranteed under Article 21 of the Constitution of India?
- 2. Whether the diverse environmental impacts of the Sardar Sarovar Project have been properly studied and understood?
- 3. Whether any independent authority has examined the environmental costs and mitigative measures to be undertaken in order to decide whether the environmental costs are acceptable and mitigative measures practical?
- 4. Whether the environmental conditions imposed by the Ministry of Environment have been violated and if so, what is the legal effect of the violations?

The Hon'ble Court has dealt the above issues as given below:

• It is not possible, in view of the aforesaid state of affairs, for this Court to accept the contention of the petitioner that the environmental clearance of the project was given without application of mind. It is evident and in fact this was the grievance made by Shri Vaghela, that the environmental clearance of the project was unduly delayed. The Government was aware of the fact that number of studies and data had to be collected relating to environment. Keeping this in mind, a conscious decision was taken to grant environmental clearance and in order to ensure that

- environmental management plans are implemented *pari-passu* with engineering and other works, the Narmada Management Authority was directed to be constituted. This is also reflected from the letter dated 24th June, 1987 of Shri Mudgal giving formal clearance to the project.
- There is no reason whatsoever as to why independent experts should be required to examine the quality, accuracy, recommendations and implementation of the studies carried out. The Narmada Control Authority and the Environmental Subgroup in particular have the advantage of having with them the studies which had been carried out and there is no reason to believe that they would not be able to handle any problem, if and when, it arises or to doubt the correctness of the studies made."

The specific issues referred to in the judgement have been dealt with in the following manner:

Catchment Area Treatment

It was submitted by Sh. Shanti Bhushan that the catchment area treatment programme was not to be done pari-passu but was required to be completed before the impoundment. This contention was based on the terms of the letter dated 24th June, 1987 wherein conditional environmental clearance was granted, inter alia, on the condition that "the catchment area treatment programme and rehabilitation plans be drawn so as to be completed ahead of reservoir Filling". Admittedly, the impounding began in 1994 and the submission of Sh. Shanti Bhushan was that catchment area treatment programme had not been completed by them and, therefore, this very important condition had been grossly violated. Reference was also made to the Minutes of the Environmental Sub-group meetings to show that there had been slippage in catchment area treatment work.

The clearance of June, 1987 required the work to be done pan passu with the construction of the dams and the filling of the reservoir. The area wherein the rainfall water is collected and drained into the river or reservoir Is called catchment area and the catchment area treatment was essentially aimed at checking of soil erosion and minimising the silting In the reservoir within the immediate vicinity of the reservoir in the catchment area. respondents had proceeded on the basis that the requirement in the letter of June 1987 I June, 1987 that catchment area treatment programme and rehabilitation plans be drawn up and completed ahead of reservoir filling would imply that the work was to be done paripassu, as far as catchment area treatment programme is concerned, with the filling of reservoir. Even though the filling of the reservoir started in 1994, the impoundment Award was much less than the catchment area treatment which had been affected. status of compliance with respect to pari- passu conditions indicated that in the year 1999 the reservoir level was 88.0 meter, the impoundment area was 6881 ha (19%) and the area where catchment treatment had been carried out ;was .128230 hectares being 71.56% of the total work required to be done. The Minutes of the Environmental Sub-group as on 28th September 1999 stated that catchment area treatment works were nearing completion in the states of Gujarat and Maharashtra. Though, there was some slippage in Madhya Pradesh, however, overall works by and large were on schedule. This clearly showed

that the monitoring of the catchment treatment plan was being done by the Environmental Subgroup quite effectively.

Compensatory Afforestation

With regard to compensatory afforestation 'it was contended by Sh. Shanti Bhushanthat it was being carried out outside the project impact area. Further, it was submitted that the practice of using waste land or lesser quality land for compensatory afforestation means that the forest will be of lesser quality. Both of these together defeated the spirit of though compensatory afforestation. It was contended that the whole, compensatory afforestation programme was needed to be looked at by independent experts.

While granting approval in 1987 to the submergence of forest land and/or diversion thereof for the SSP, the Ministry of Environment & Forests had laid down a condition that for every hectare of forestland, submerged or diverted for construction of the project, there should compensatory, afforestation on one hectare of non-forestland plus reforestation on two hectare of degraded forest. According to the State of Gujarat, it had fully complied with the condition by raising afforestation in 4650 hectares of non-forest areas and 9300 hectares in degraded forest areas before 1995-96 against the impoundment area of 19%. The pari-passu achievement of afforestation in Gujarat was stated to be 99.62%.

If afforestation was taking place on waste land or lesser quality land, it did not necessarily follow, as was contended by the petitioners, that the forests would be of lesser quality or quantity.

Command Area Development

It was submitted on behalf of the petitioners that the command area development was an important aspect as the benefits of the project depended on this and if proper studies and plans were not done and not implemented, the very areas that were supposed to benefit will end up being rendered unfit for cultivation and the water logging and salinisation could refer vast areas of the command unproductive. It was also submitted that still there was no integrated command area environmental impact assessment. After referring to the status reports and studies regarding the command area development, it was submitted that there was need for some independent agency to examine the various studies, action plans and the experience and to see whether there was ground to believe that the proposed measures will work or not. It was contended that master plan for drainage and command area development was still not in place and even the full studies had not been done.

While refuting the aforesaid contentions. It was argued on behalf of learned counsel for the respondents that the SSP will provide irrigation water for a cultivable command area of 1.9 million hectares in Gujarat and 75,000 hectares in Rajasthan. The introduction of fresh water to the drought-prone areas of Gujarat will create obvious benefits for the farming communities. In order to safeguard these benefits, control and monitoring was suggested by the Secretary, Ministry of Environment & Forests and Chairman of the Environment Subgroup in the following areas from time to time:

- drainage, water logging and soil salinity;
- water quality;
- forest loss:
- potential impact on flora and fauna;
- effects on public health;
- socio-economic impacts.

Pursuant thereto fifty in-depth studies had been carried out by the State Governments of Gujarat and Rajasthan and some of the studies were still in progress. One of the main objectives of carrying out these studies was to prevent excessive use of ground water and water-logging.

There is no reason whatsoever as to why independent experts should be required to examine the quality, accuracy, recommendations and implementation of the studies carried out. The Narmada Control Authority and the Environmental Sub-group in particular have the advantage of having with them the studies which had been carried out and there is no reasons to believe that they would not be able to handle any problem, if and when, it arises or to doubt the correctness of the studies made.

Downstream

It was also contended on behalf of the petitioners that downstream impacts of the project would include not only destruction of downstream fisheries, one of the most important ones in Gujarat on which thousands of people are dependent but will also result in salt water ingress. The project, it was contended, will have grave impacts on the Narmada Estuary and unless the possible impacts were properly studied and made public and mitigation plans demonstrated with the require budget, once could not accept the claim that these matters were being looked into. The need to assess the problem was stated to be urgent as according to the petitioners rich fisheries downstream of the dam, including the famed Hilsa would be almost completely destroyed. The salinity ingress threatened the water supply and irrigation use of over 210 villages and towns and Bharuch city. All these would not only have serious economic and other impacts but would also directly destroy the livelihoods of at least 10000 fisher families.

Again all these contentions were based on the Morse Committee Report which the World Bank and the Union of India had already rejected. That apart, according to the respondents, in 1992 Sardar Sarovar Narmada Nigam Limited issued an approach paper on environmental impact assessment for the river reach downstream. This provided technical understanding of the likely hydrological changes and possible impact in relation thereto. It was further submitted by learned counsel for the respondents that the potential for environmental changes in the lower river and estuary had to be seen in the context of the long term development of the basin. The current stage was clearly beneficial. The three stages could be identified as follows:

- State 1 covers the period roughly from the completion of Sardar Sarovar Dam to the year 2015. Events occurring during this stage include (a) SSP Canal Command will have reached full development and requires diversion of some water, (b) the upstream demand will reach about 8 MAF and (c) the Narmada Sagar Dam will have been built and placed in operation.
- Stage 2 covers the period from 2015 and 2030 during which the demands upstream of SSP continue to grow and will reach about 12 MAF still below the volume of 18 MAF that Madhya Pradesh can take in a 75% year.
- Stage 3 covers the period upto and beyond full basic development.

The report given by M/s. H.R. Walling ford in March, 1993 in respect of the down stream impacts of Sardar Sarovar Dam observes, inter alia, as under:

"The overall conclusion of the team undertaking the assessment described in this report is that there are no down steam impacts whose magnitude and effect are such as to cause doubts to be cast over the wisdom of proceeding with the Sardar Sarovar Projects provided that appropriate monitoring and mitigation measurers are applied. Much of this work is already in progress under the auspices of the NPG, SSNNL and NCA. The recommendations in this report are intended to provide a synthesis of their work and suggestions as to whether it might be modified to enhance its usefulness."

The said M/s. H.R. Wallingford in the findings of 1995 stated as under :-

It is thought unlikely that any significant negative environmental impacts will occur over the next 30 years as a result of the project. Some possible adverse effects have been identified the main one being the effect of flood attenuation on Hilsa migration. These needs to be monitored and more studies undertaken to better understand the conditions which trigger spawning. Beneifcial impacts in this period include reduced flooding and more reliable dry season flows as well as an overall improvement of the health and well being of the people to the reliable domestic water supply, improved nutrition and enhanced economic activity."

The above report clearly demonstrates that the construction of dam would result into more regulated and perennial flow into the river with an overall beneficial impact. It is also evident that until all the dams are constructed upstream and the entire flow of river is harnessed, which is not likely in the foreseeable future, there is no question of adverse impact including the fishing activity and the petitioner's assertions in this regard are ill-conceived.

Archaeology

The area of submergence was sated to be rich in archaeological remains but it still remained to be studied. It was contended that there was danger of rich historical legacy being lost and even a small increase in the dam height would threaten to submerge many of the sites listed in the report of the Archaeological Survey of India. There were stated to be five

monuments which would be affected at the dam height of 90 meter or above and no work was stated to have commenced to protect any of the five monuments.

According to the State of Gujarat the Ancient Monuments and Archaeological Sites and Remains Act, 1958 charged the Central and/or State Department of Archaeology and responsibility for the protection of important cultural sites. Under the Act, sites were classified into three categories as follows:

Type 1: Monuments of national important which are protected by the Central Government. I r the title of "Archaeological Survey of Nineteen Villages in Gujarat submerged by Sardar Sarovar Reservoir, 1989."

In additional to baseline studies on archaeological aspects, work had been carried out on the anthropological heritage of Narmada Basin, including examination of evidence of ancient dwellings and cultural artifacts. The principal studies in this behalf are described below:

Anthropological Survey of India: Narmada Salvage Plan: The Narmada Salvage Plan contains detailed background data on palaeoanthropological, human ecological and other aspects of the Narmada Valley. By May, 1992, surface scanning of 17 sample villages coming under the submergence had been carried out and 424 specimens including ancient tools etc. had been collected.

Anthropological Survey of India: Peoples of India: This project entailed a complete survey of 33 tribes of India including those of Narmada Basin. The study covered all aspects of tribal culture in India and was published in 61 volumes in 1992.

Summary of current situation and progress, State of Gujarat Survey of villages in submergence zone Complete for all items in the State Identification of cultural sites Complete for all items in the State Collection of data and documentation of sites Complete Selection of appropriate sites Complete Action Plan Complete

It was further submitted on behalf of respondents that no Centrally or state protected cultural sites were located in the submergence area of the project. In Gujarat, the Department of Archaeology concluded that the temples of Shoolpaneshwar and Hampheswar were important monuments and should be moved to a higher level. Sites were selected for constructing new Shoolpaneshwar and Hampheshwar temples in consultation with temple trustees. Shoolpaneshwar had been relocated and reconstructed near Gora, about 15 Km downstream from the present location. Hampheshwar was also constructed at higher ground in consultation with the temple trustees and Pranpratistha was also planned on 22nd to 24th April, 2000 i.e. before the temple was submerged.

Flora & Fauna

In relation to flora and fauna studies, it was contended by the petitioners that the studies had finished only recently and the action plans were awaited in many cases. In the

meanwhile, extensive deforestation of the submergence zone had taken place, as also part of the area had not submerged, eve as the studies have been on. It was also contended that the impact on some of these Wild Ass Sanctuary in Kutch would be very severe.

The guidelines of the Ministry of Environment & Forests required that while seeking environmental clearance for the hydropower projects, surveys should be conducted so that the status of the flora and fauna present could be assessed. A condition of environmental clearance of 187 as far as it related to flora and fauna was that the Narmada Control Authority would ensure in-depth studies on flora and fauna needed for implementation of environmental safeguard measures. It is the case of the respondents that number of studies were carried out and reports submitted. It was observe that the submergence area and catchment area on the right bank of the proposed reservoir exhibited a highly degraded ecosystem which was in contract to the left bank area where there was fairly good forest cover which formed part of Shoolpaneshwar Wildlife Sanctuary. With regard to the study of fauna, the said report indicated that a well-balanced and viable ecosystem existed in the Shoolpaneshwar Sanctuary. Moreover, with the construction of dam, availability and voil moisture will increased and support varieties of plants and animals.

Health

It was also contended on behalf of petitioners that the whole project will have serious impacts on health, both around the submergence area and in the command. The preventive aspects had not been given attention. There was no linkage between the studies and work.

On behalf of State of Gujarat, it was contended that large number of studies had been carried out on the health of villagers including studies on water related diseases in SSP command area including the area downstream of the dam. The study of M.S. University in 1983 and other studies concluded that the most common diseases in the basin were Malaria, Scabies, Dysentery and Diarrhoea. Of these only a threat to malaria needed to be of concern. The study concluded that the incidence of hygiene related diseases other than Malaria could be reduced by better water availability. The Gujarat Work Plan covered villages within 10 KMs radius of the reservoir including re-settled population and made provision for the monitoring, survelance and control of Malaria. The principle features of the Gujarat Work Plan included establishment of a hospital at Kevadia near the dam site, strengthening of laboratory facility including establishment of mobile unit residual insecticidal spraying operations etc. This showed that the area of public health was in no way being neglected.

Monitoring Mechanism

The petitioner was also critical of the functioning of the Environmental Sub-group as it was contended that the claims of the studies and progress report were accepted at the face value and without verification. It was also contended that the Ministry of Environment & Forests had grossly abdicated its responsibility. This submission was based on the premise that clearance, which had been granted, had lapsed and the Ministry of Environment & Forests did not insist on the Ministry of Water Resources for its renewal and further more the Ministry of Environment & Forests had not taken any cognizance of the criticism about

environmental aspects contained in the Morse Committee Report. Lastly the Five Member Group in its first report was critical in many respects and pointed out studies which had remained incomplete but no cognizance was taken by the Ministry of Environment & Forests. The repeated abdication, it was submitted, of the responsibility by the Ministry of Environment & Forests indicated that it was not taking the whole issue with the seriousness it deserved.

On behalf of the State of Gujarat, it was contended that various alleged dangers relating to environment as shown by the petitioners were mostly based on the recommendations of the Morse Committee Report and Five Member Group. While the report of Morse Committee does not require our attention, the same not having been accepted either by the World Bank or the Government of India. Para 4.5.2. of the report of Five Member Group which relates to creation of the Environment Sub-group commends it's establishment, it's observation about its powers is as follows:

It must be noted that the Environmental Sub-group is not a body which merely observes and reports, but watchdog body which can recommend even the stoppage of work if it feels dissatisfied with the progress on the environment front. The recommendations of the Environmental Sub-group will have to be considered by the NCA, and if there is any difference of opinion at that level, it will have to be referred to the Review Committee, which has the Ministry of Water and Environment and Forests as a member. It seems doubtful whether any more effective mechanism could have been devised or made to work within the framework of our existing political and administrative structures, particularly in the context of a federal system. Secretary (Environment and Forests) has in fact, been given a special position in the NCA inasmuch as he can insist on matters being referred to the Review Committee and at the Review Committee the Ministry of Environment & Forests forcefully plead the environmental cause; he can also make the environmental point of view heard at the highest level. If in spite of all these arrangements, the environmental point of view fails to be heard adequately, and if project construction tends to take an over-riding precedence, that is a reflection of the relative political importance of these two points of view in our system. This can be remedied only in the long term through perusation and education, and not immediately through institutional arrangements which run counter to the system." (Emphasis supply). Apart from the fact that we are not convinced that construction of the dam will result in there being an adverse ecological impact there is no reason to conclude that the Environmental Sub-group is not functioning effectively. The group which is headed by the Secretary, Ministry of Environment & Forests is a high powered body whose work cannot be belittled merely on the basis of conjectures or surmises.

In the present case we are not concerned with the polluting industry which is being established. What is being constructed is a large dam. The dam is neither a nuclear

establishment nor a polluting industry. The construction of a dam undoubtedly would result in the change of environment but it will not be correct to presume that the construction of a large dam like the Sardar Sarovar will result in ecological disaster. Indian has an experience of over 40 years in the construction of dams. The experience does not show that construction of a large dam is not cost effective or leads to ecological or environmental degradation. On the contrary there has been ecological upgradation with the construction of large dams. What is the impact on environment with the construction of a dam is well-known in India.

At the time when the environmental clearance was granted by the Prime Minister whatever studies were available were taken into consideration. It was known that the construction of the dam would result in submergence and the consequent effect which the reservoir will have on the ecology of the surrounding area was also known. Various studies relating to environmental impact, some of which have been referred to earlier in this judgment, had been carried out. There are different facets of environment and if in respect of a few of them adequate data was not available it does not mean that the decision taken to grant environmental clearance was sin any way vitiated. The clearance required further studies to be undertaken and we are satisfied that this has been and is being done. Care for environment is an on going process and the system in place would ensure that ameliorative steps are taken to counter the adverse effect, if any, on the environment with the construction of the dam.

The notification under Section 3 of the Environment Protection Act cannot be regarded as having an retrospective effect. The said notification dated 27th January 1994, inter alia, provides as follows:-

"Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of Section 3 of the Environment (Projection) Act, 1986 (29 of 1986) read with clause (d) of sub-rule (3) of Rule 5 of the Environment (Projection) Rules, 1986, the Central Government hereby directs that on and from the date of publication of this notification in the Official Gazette expansion or modernization of any activity (if pollution load is to exceed the existing one) or a new project listed in Schedule I to this notification, shall not be undertaken in any part of India unless it has been accorded environmental clearance by the Central Government in accordance with the procedure hereinafter specified in this notification."

This notification is clearly prospective and inter alia, prohibits the undertaking of a new project listed in Schedule I without prior environmental clearance of the Central Government in accordance with the procedure now specified. In the present case clearance was given by the Central Government in 1987 and at that time no procedure was prescribed by any status, rule or regulation. The procedure now provided in 1994 for getting prior clearance cannot apply retrospectively to the project whose construction commenced nearly eight years prior thereto.

Conclusion

The facts enumerated hereinabove clearly indicate that the Central Government had taken a decision to construct the Dam as that was the only solution available to it for providing water to water scare areas. It was known at that time that people will be displaced and will have to be rehabilitated. There is no material to enable this Court to come to the conclusion that the decision was mala fide. A hard decision need not necessarily be a bad decision.

Further environment concern has not only to be of the area which is going to be submerged and its surrounding area. The impact on environment should be seen in relation to the project as a whole. While an area of land will submerge but the construction of the Dam will result in multifold improvement in the environment of the areas where the canal waters will reach. Apart from bringing drinking within easy reach the supply of water to Rajasthan will also help in checking the advancement of the Thar Desert. Human habitation will increase there which, in turn, will help in protecting the so far porous border with Pakistan.

While considering Gujarat's demand for water, the Government had reports that with the construction of a high dam on the river Narmada, water could not only be taken to the scarcity areas of Northern Gujarat, people all over India with the construction of the dams, the Government cannot be faulted with deciding to construct the high dam on the river Narmada with a view to provide water not only to the scarcity areas of Gujarat but also to the small areas of the State of Rajasthan where the shortage of water has been there since the time immemorial.

Loss of forest because of any activity is undoubtedly harmful. Without going into the question as to whether the loss of forest due to river valley project because of submergence is negligible, compared to deforestation due to other reasons like cutting of trees for fuel, it is true that large dams cause submergence leading to loss of forest areas. But it cannot be ignored and it is important to note that these large dams also cause conversion of waster land into agricultural land and making the area greener. Large dams can also become instruments in improving the environment, as has been the case in the Western Rajasthan, which transformed into a green area because of Indira Gandhi Canal, which draws water from Bhakhra Nangal Dam. This project not only allows the farmers to grow crops in deserts but also checks the spread of That desert in adjoining areas of Punjab and Haryana.

Environmental and ecological consideration must, of course, be given due consideration but with proper channellisation of developmental activities ecology and environment can be enhanced. For example, Periyar Dam Reservoir has become an elephant sanctuary with thick green forests all round while at the same time wiped out famines that used to haunt the district of Madurai in Tamil Nadu before its construction. Similarly Krishnarajasagar Dam which has turned the Mandya district which as once covered with shrub forests with wiled beasts into a prosperous one with green paddy and sugarcane fields all round.

So far a number of such river valley projects have been undertake in all parts of India. The petitioner has not been able to point out a single instance where the construction of a Dam gas, on the whole, had an adverse environmental impact. On the contrary the environment has improved. That being so there is no reason to suspect, with all the experience gained so far, that the position here will be any different and there will not be overall improvement and prosperity. It should not be forgotten that poverty is regarded as one of the causes of degradation of environment. With improved irrigation system the people will prosper. The construction of Bhakra Dam is a shining example for all to see how the backward area of erstwhile undivided Punjab has no become the granary of India with improved environment than what was there before the completion of the Bhakra Nangal project.

However The Hon'ble Court is concerned about environmental management and directed that:

Even though there has been substantial compliance with the conditions imposed under the environment clearance, the NCA and the Environment Sub-group will continue to monitor and ensure that all steps are taken not only to protect but to restore and improve the environment.



ANNEXURE - XXXIV - (9)

Sardar Sarovar Narmada Nigam Ltd.

Block No. 12, 1st Floor, New Sachivalaya Complex, Gandhinagar - 382 010. Phone : 23518, 23506. Fax : 02712 - 23049. E-mail : ssphq@guj.nic.in

K. C. Kapoor, IAS

Managing Director

& "\\"

MD/Env/2000**/**635 6th November, 2000

Dear, St. Suxust chandra

Kindly refer to the Agenda papers resting with NCA's letter No. Environment-3-(34)/2000/2106-2227 dated October 13, 2000 to be discussed in the 34th meeting of the Environment Sub-group scheduled to be held on 14th November, 2000.

As per the certain direction issued under para 3 and 4 of the judgement recently delivered by the Hon'ble Supreme Court of India, it is now mandatory to take environmental clearance from NCA at each stage of the construction of 5 meters of dam beyond 90 meters, permitted at present. Looking to an all-round progress made on pari-passu compliance of all the components stipulated under environmental clearance of MOE&F, GOI. The Govt. of Gujarat is now, therefore, deem it imperative at this juncture to request Narmada Control Authority to accord environmental clearance upto 110 meters height of the dam.

An explanatory note prepared on pari-passu compliance of environmental conditions is put herewith, to supplement Govt. of Gujarat's views to further permit construction of dam beyond 90 meters.

In view of the above it is requested to put this proposal as special agenda item in the forthcoming meeting of Environment Subgroup of NCA scheduled to be held on 14th Nov., 2000 with the kind consent of the chair.

With regards,

Yours sincerely,

(K.CNKapoor)

Shri Suresh Chandra, Executive Member (Environment) Narmada Control Authority, BG-113, Scheme 74- C, Vijaynagar. INDORE- 452010.

COMPLIANCE NOTE ON PARRI-PASSU CONDITIONALITIES UNDER ENVIRONMENTAL CLEARANCE OF THE SSP

The clearance to the SSP was attached with Environmental clearance accorded on 24th June, 1987. Accordingly following parameters were to be taken care of :

- i. Rehabilitation Master Plan.
- ii. Phased Catchment Area Treatment Scheme.
- iii. Compensatory Afforestation Plan.
- iv. Command Area Development.
- v. Survey of Flora And Fauna.
- vi. Carrying capacity of surrounding areas.
- vii. Seismicity, and
- viii. Health Aspects.
- > The NCA was given responsibility to ensure that the environmental safeguard measures are planned and implemented pari pasu with progress of work on project
- > The details survey and studies were to be completed.
- > Catchment area treatment were to be completed ahead of reservoir filling.

The functions of NCA were modified to ensure better co-ordination and implementation of environmental safeguard measures. This was also to ensure the faithful compliance condition attached by GOI while granting clearance to the project. During course of the project implementation several more issues like Archaeology and down stream impacts, fisheries were also identified.

The status of pari-pasu compliance of each of the component in brief is presented below.

1. Phased Catchment Area Treatment.

Surveys and studies have been undertaken to aid the development of a management plan for CAT in the SSP catchment includes.

- Report of Inter Developmental Committee on soil conservation and Afforestation (the Dewan Committee Report) 1985.
- ◆ Report on Prioritization of Sub-Watershed in Sub- catchment of Narmada Catchment, 1991 By AIS & LUSO, New Delhi.

In Gujarat, the entire catchment area was classified based on stock mapping survey by Forest Department and also by photo interpretation of satellite imageries obtained from ISRO with LISS-II censors. Accordingly, afforestation and SMC works were taken up by the Forest Department in the forest area and in non-forest area by Gujarat State Land Development Corporation.

GOG has taken up the entire Catchment area up stream of the SSP within Gujarat for treatment. GOG has already completed the treatment in 27204 ha. of forest areas and 1953 ha. of non-forest areas.

The year wise progress of CAT Works (F.A & N.F.A.) is as below.

(Area in Ha.)

			(Miea i	11 114.)
Year	GOG	GOM	GOMP	TOTAL
1990-91	5,426	0	0	5,426
1991-92	5,000	0	0	5,000
1992-93	6,350	960	8,800	16110
1993-94	6,286	6,836	7,212	20334
1994-95	5,898	9,228	4,857	19983
1995-96	35	4,739	17,021	21795
1996-97	162	450	14,482	15094
1997-98	0.	1,082	8,506	9,588
1998-99	0	0	10,636	10,636
1999-2000	0	0	4,426	4,426
Total	29,157	23,295	75,940	128,392

[* Source: Environment Management SSP & ISP (Status report), NCA - March, 2000]

Area under treatment

: 1,79,180 ha

Progress

: 1,28,392 ha

Percentage Work done

71.65 %

The status of compliance with respect to *pari-passu* conditions at various level is as follows:

Sr.	Year	Reservoir	Impoundment	Achievements*
No.		Level	(Total of Full reservoir)	
1	1994	59.3 m	2,531 ha	46870 ha
			(6.8%)	(26.16%)
2	1997	80.5 m	5,766 ha	1,03,330 ha
			(15.57%)	(57.66%)
3	1999	88.0 m	6,881 ha	1,28,230 ha
		(Present)	(19.00%)	(71.56%)
4	2000	110.0 m	11,500 ha	1.28.392 Ha
		(Proposed)	(27.38%)	(71.65%)

[* Source: Environment Management SSP & ISP (Status report), NCA - March, 2000]

From the above, it transpires that the percentage of treatment works completed in all states is more than that of the percentage of submergence by the reservoir.

2. Compensatory Afforestation:-

GOG has completed plantation works in 4650 ha. of non forest areas and 9300 ha. of degraded forest areas were replenished against submergence of 4523 ha. forest area in Gujarat. Area afforested in nonforest areas has already been declared as forest under section (4) FCA, 1980. The tree species are planted keeping in the view the agro climatic conditions along with ensuring utility from the point of view forage fuel wood, food, medicines minor forest produce etc.

The year wise progress of Compensatory Afforestation works is as below;

Total	13,9	950	192	281	8,73	6	41967
Sub Total	9,300	4,650	12,955	6,326			-
99-00	<u>-</u>	-		•	26	-	26
98-99	-	-	-	-	277*	-	277
97-98	-	-	- '	-	208*	-	208
96-97	-	-	-	-	-	-	-
95-96	Comp.	Comp.	Comp.	-	-	•	
94-95	1,516	843	-	2,894	1,189*	-	6442
93-94	2,500	460	20	1,156	2,215	-	6351
92-93	2,450	847	4,552	2,276	2,400	-	12525
91-92	2,834	350	8,383		1,200	373	13140
90-91	-	2,150	-	-	132	716	2998
	' F.A.	N.F.A.	F.A.	N.F.A.	F.A.	N.F.A.	(FA+NFA)
Year	GUJARAT		MAHARAS	HTRA	MADHYA PR	ADESH	TOTAL
						(Are	a in Ha.)

^{*} Area not classified

[* Source: Environment Management SSP & ISP (Status report), NCA - March, 2000]

Total (forest area and Non- forest area) Target Area to be Afforested: 42,158 ha Total (forest area and Non- forest area) Area Afforested: 41,967 ha Percentage Work done: 99.55 %

It transpires from the data given below that the percentage of compensatory afforestation works completed in all states is higher than that of percentage of submergence by the reservoir.

The status of compliance with respect to *pari-passu* conditions at various level is as follows:

Sr	Year	Reservoir	Impoundment	Achievements*
No.		Level	(Total of Full reservoir)	
1	1994	59.3 m	2,531 ha (6.8%)	35,014 ha (83.06%)
2	1997	80.5 m	5,766 ha (15.57%)	41,993 ha (99.62%)
3	1999	88.0 m	6,881 ha (19.00%)	41,967 ha (99.55%)
4	2000	110.0 m (Proposed)	11,500 ha (27.38%)	41,967 ha (99.55%)

[* Source: Environment Management SSP & ISP (Status report), NCA - March, 2000]

3. Command Area Development:

With a view to derive optimum benefits from the irrigation water, when canal would start flowing, the project report of SSP submitted to the planning commission envisages various steps, such as;

- 1. Construction of canals.
- 2. Construction of watercourses and field canals.
- 3. Land leveling
- 4. Land drainage.
- 5. Ground water studies and investigation of ground water resources.
- 6. Network of roads in the command area.
- 7. Marketing and warehousing facilities.
- 8. Establishment of research-cum-demonstration farms.
- 9. Co-operative and Establishment of credit societies for credit facilities to Agriculturists.
- 10. Arrangements for timely procurement of inputs like fertilizers, pesticides, improvised seeds etc.

The command area development plan would present comprehensive concept of complete land development and provision of infrastructure and inputs. and thereby, changing organisational arrangement to implement.

Various studies have been undertaken by the authorities, most of which are now completed. GOG has formed various High Level Expert Multidisciplinary Groups coordinating and monitoring various studies for the command area of SSP.

The studies undertaken a various aspects include.

- (i) Environmental Studies (Annexure I)
- (ii) Agricultural Studies (Annexure II)
- (iii) Technical Studies (Annexure III)
- (iv) Socio- Economics Studies (Annexure IV)

The list of studies, their important recommendations, the latest status of action plan and its implementation is annexed here with. All studies required to be carried out, are now almost complete well before the water flows to the fields. In fact, the process of transforming these studies into action plan is under progress.

The command area of SSP covers three Sanctuaries namely

- (i) Nalsarovar Bird Sanctuary.
- (ii) Velavadar (Black buck) National Park, and
- (iii) Wild Ass sanctuary, Dhrangadhra.

An action plan on Velavadar National Park has been completed. The action plan on other two sanctuaries are under preparation and expected to be finalized shortly. Similarly, action plan on Command Area Fisheries up to Mahi i.e. phase -I is ready based on M. S. University's Reports namely "EIA on Inland and Marine Fisheries relevant to the Command Area of SSP, Nov. 1994". Action Plan for Health is ready and discussed, and expected to be completed by Aug. 2000. Several data and informations are being utilized from various technical studies in preparing a comprehensive Integrated Command Area Development Plan. The process of integrating various studies is on and required action plans including those on flora and fauna would be drawn so that they get completed well ahead of flow of in the command area.

Thus it can be observed that required studies are almost completed and some of action plans are ready while remaining would be completed well ahead of implementation of irrigation system. It can be inferred that the pari-pasu clause is also being implemented in such of the matter.

4. Flora, Fauna, Wildlife and Carrying Capacity:

As per the guidelines of the MOEF, emphasis is put on the necessity of survey of flora and fauna present and assess that rare and endangered species identified, if present and appropriate conservation measure devised. Project authorities is committed to ensure in depth studies on flora and fauna needed for implementation of environmental safeguard measures. Accordingly, following important surveys and studies have been completed.

- Environmental Studies of 1983, prepared by M. S. University.
- ♦ Eco- environment and wildlife management studies in Sardar Sarovar by MS University, in 1992

- ♦ Workshop on Approaches to Integrated Wildlife Management in Gujarat : A Report by the SSNNL, October 1990.
- People's Involvement in Wildlife Management, by VIKSAT in 1991.
- This report looked at local people's use of forests and attitude towards wildlife in conjunction with the aims and objectives of the Shoolpaneshwar Sanctuary. It suggested several approaches for the development of the sanctuary including the proposal that the tribal will allow to remain within its confine and that they should be involved in its management.
- ♦ Sociological Survey of the Fishing Families of the Narmada River by CICFRI, 1991.
- Wildlife Management Studies in the Submergence and Catchment Area of Narmada Project: With Special Reference to Shoolpaneshwar Wildlife Sanctuary, by the SSNNL, May 1992.
- Eco-environmental and Wildlife Management Studies in the Sardar Sarovar area in Gujarat, October 1992, by MS University.
- The surveys had the aim of assessing the present status and composition of flora and fauna in the submergence area and environs and noting the presence of any rare or endangered species. More than 70 field trips spending more than 2000 staff days over a period of two and half years were used to collect data in accordance with a rigorous statistical regime.
- An approach paper on the EIA for the river reach down stream of Sardar Sarovar was issued by SSNNL in 1992 providing more detailed technical understanding of the likely hydrological changes and possible impact in relation thereto.
- Down stream Impacts of Sardar Sarovar Dam by M/s HR Wallingford in 1993 & 1995.
- The report clearly demonstrates that the construction of dam would result into more regulated and perennial flow into the river with an overall positive impact. It is also evident that until all the dam are constructed upstream and the entire flow of river is harnessed, which is not likely in the foreseeable future there is no question of adverse impact including fishing activity.
- ♦ EIA studies on Inland and Marine Fisheries Relevant to the Command Area of the Sardar Sarovar(Narmada) Project by MS University in Oct. 1995.

4.1 Wildlife:

Action Plan for development of Shoolpaneshwar sanctuary, which lies in the catchment area, was prepared by project authorities and submitted to Government for implementation. Some measures have already been initiated during the year 1998-1999.

The statement of activities carried out in the sanctuary is annexed as Annexure - V.

The action plan on Velavadar National Park has already been completed and the action plan on remaining sanctuaries i.e. Nalsarovar Birds Sanctuary and Wild Ass Sanctuary are under preparation.

Studies on flora, fauna in the command area have almost been completed And this would be transformed in to action plan very shortly.

4.2. Fisheries.

The project authorities have already completed the studies on fisheries namely.

- (i) The Bench Mark study on " Sardar Sarovar Narmada Project Studies on Ecology and Environment", and
- (ii) Environmental Impact Studies on Inland and Marine Fisheries relevant to the Command Area of SSP.

Subsequently, GOG has already completed its action plan in 1986 based on various bench mark studies which was again revised in 1994.

An action plan for development of fisheries in the command area phase-I has also been completed based on MSU study on Inland and Marine Fisheries in the command area.

In the down stream estuarine, H R Wallingford has already undertaken studies and reported that the construction of dam would result into more regulated and perennial flow in the river with an overall beneficial impact to it. No question of adverse impact on fisheries until all the dams are constructed upstream and the entire flow of river is harnessed.

An approach paper on EIA for the river reach down stream of Sardar Sarovar issued by SSNNL in 1992 provide more detailed technical understanding of the likely hydrological changes and possible impact in relation thereto. The project authorities have already taken up the implementation of various developmental activities such as :

- Seed stocking in the reservoir/ dykes. (So far 382.36 lacs fingerlings has been stocked.)
- ◆ Mangrove plantation programme in 110 ha have already been taken up in the down stream of the dam.
- Construction of rearing ponds.
- A draft plan for the creation of IFDB has been prepared by NCA. GOG has also proposed to form a Joint Stock Company representing equity participation of fisheries society / and institutional investors. The IFDB is expected to be set up and fully functioning prior to reservoir filling.
- In Gujarat reservoir bowl is already cleared of all vegetative growth well ahead of initial impoundment.

As can be seen from above that all surveys and studies required for assessing flora and fauna in the command, in the catchment as well as in the down stream of estuarine have almost been completed and action plans for the reservoir fisheries and command area regions are ready well ahead of reservoir filling as well as beginning of irrigation respectively. In fact the GOG has already initiated the implementation

four years back satisfying the pari-passu clause of the environmental clearance.

5. Seismicity.

The studies on Reservoir Induced Stability have already been completed by GSI, CWPRS, University of Roorkee and World Bank Consultants before the initial impoundment began. On the recommendation of Dam Review Panel, horizontal coefficient of 0.12g has been adopted in the design. Stress monitors has been installed in the main structure of dam. The depth of foundation of dam has been increased to 18 m below the lowest river bed level. The GOG has already identified nine locations for the installation of seismic monitoring stations to observe micro level as well as global earthquake activities through highly sophisticated instruments.

From the above it can be said that adequate monitoring system has been established to alarm against any sudden tremor.

6. **Health Aspects**

Waterborne diseases are serious in large rivers subject to large seasonal flood. Malaria is a serious waterborne disease. Number of studies have been carried out on present status of waterborne diseases from the area and of the health delivery systems such as;

- ◆ In 1985 the NICD carried out a survey of several Narmada submergence villages in Gujarat and M.P. The results and conclusions of the meeting on Schistosomiasis Research and Surveillance held at NICD on 22.11.1985.
- Narmada Programme- Schistosomiasis Back-to- office Report, 1986, assessment was carried out by Goodland, consultant to the world Bank, the NICD and WHO.
- The study on diseased profile in command area by Commissionerate of Health Medical Services and Medical Education, 1986 analised the disease profile in the command area and formed the basis of Gujarat State Work Plan on health as part of the study. The potential impact of the project on public health were considered and discussed with the Govt. Officiates. The conclusion from this consultation was used to assist in formulation of work plan.
- The studies on water related diseases in SSP command area includes the area in the down stream of the dam was commissioned by SCHMS in December 1995. The study included the cataloging existing facilities in the state, the collection of time series data on diseases, the identification of problem area and recommendation for additional facilities required. Based this study an revised Action Plan is being formulated and draft final report in under finalisation, which is expected to be completed by end of the September, 2000.

The Gujarat's Work Plan covers villages within 10 kms radius of the reservoir including resettled population and makes provision for the monitoring, surveillance and control of Malaria. The 1986 Plan has been revised. The principal features are:

- a. Establishment of a hospital at Kevadia near the dam site.
- b. Strengthening of laboratory facility including establishment of mobile unit.
- c. Provision for laboratory technicians in existing Public Health Centers.
- d. An urban malaria scheme for centers over 50000 (not currently covered)
- e. Strengthening of state level health organization to ensure monitoring of malaria, filarial, dengue and encephalitis.
- f. Strengthening of district level health organizations for monitoring or implementation and
- g. Residual insecticidal spraying operations.

The entire population of Gujarat will receive protection under the National Malaria Eradication Programme, the extended Urban Malaria Scheme, and the Project Specific Programme. The intensified malaria control programme is under way in several villages, implemented by the project. A 25 bed hospital for workers, with laboratory facilities, already functioning at Kevadia.

Health Measures at R&R Sites:

A special Medical Cell has been created at Vadodara under SSPA, to take care of PAFs residing in Rehabilitation colonies. The Cell comprises of;

- ◆ 20 mobile Medical Units, 61 Dispensaries and 2 mini ambulances
- ◆ The Cell is headed by Dy. Director (Health). He is assisted by physician, pediatrician and gynecologist and a pharmacist.
- ♦ 33 new dispensaries for PAFs are under construction
- Function of Medical Cell are as under;
 - To act as a supervisory staff mechanism regularly and reviewing the discharge of functions, duties and responsibilities of medical and paramedical personnel working in the medical cell.
 - To provide guidance to medical and paramedical personnel in regard to health and hygiene aspects of PAFs.
 - To co-ordinate with regional Dy. Director, Health, Chief district Health Officer, Civil Surgeon and Superintendent/ Dean of medical colleges.
 - To fix the time schedule for the visit of the mobile medical vans to various sites
 - To organize special diagnostic camps and to liasie with the district level officers for executing national program.
 - To take other preventive and curative measures.
- The Cell carried out following activities;
 - Provided nutritious food to School going children, pregnant and lactic women, old aged persons under various schemes.
 - Organised health survey camps and Medical check up camps.
 - Ensure safe drinking water supply
 - Provided regular pot chlorination through distribution of chlorine tablets

From the above, it can be seen that in Gujarat, required studies are completed, action plans are formulated and subsequently revised, to cater the needs. Several measures have been taken for surveillance and control of water borne diseases and malaria. The action plan for

command area is almost ready before water of Narmada flows to the fields, complying with the pari-passu conditionalities.

7. Archaeological Aspects

Department of Archaeology, GOG surveyed and cataloged the monuments and archaeological sites to consider, in nineteen villages of submergence zone in Gujarat under the title " Archaeological Survey of Nineteen Villages in Gujarat Submerged by Sardar Sarovar Reservoir, 1989"

Accordingly, no protected cultural sites are located in the submergence area of the project. In Gujarat, the Department of Archaeology concluded that the temples of Shoolpaneshwar and Hampheshwar were important monuments and should be moved to a higher level. Thus the required studies and action plans are ready prior to the initial impoundment. Both the temples have been relocated.

Sites have been selected for constructing new Shoolpaneshwar and Hampheshwar temples in consultation with temple Trustees. Shoolpaneshwar has been relocated and reconstructed near Gora, about 15 km downstream from the present location; and Hampheshwar is being constructed at higher ground in consultation with the temple trustees

It can be seen that on each of the aspect therefore, GOG has ensured that there is pari- passu compliance about the mitigative measures undertaken and that actions have been taken in right earnest in the matter.

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Annexure I

Env	ironmental Studies	**		Aunexure
Sr. No.	Name of study	Name of Agency	Date of completion	Remarks
1.	The Sardar Sarovar Narmada Project Studies on Ecology and Environment	M.S.University, Vadodara	1983	A comprehensive Bench Mark Study for environmental evaluation under SSP
2.	Eco-environment and Wildlife Management study in Sardar Sarovar	M.S.University, Vadodara	1992	Evaluation of flora and fauna of catchment and surrounding areas of SSP- Gujarat
3.	Wildlife management studies in the submergance and catchment area of Narmada Project with special reference to Shoolpaneshwar sanctuary.	SSNNL	1992	Evaluation of Wild fauna of catchment and Shoolpaneshwar sanctuary, its vegetational interlinks and management aspects.
4	Environmental Impact Assessment studies on Inland Marine Fisheries relevant to the Command Area of Sardar Sarovar (Narmada) Project.	M.S.University, Vadodara	1995	Based on recommendations of the study, fisheries development programme (an action plan) for Phase - I area has been prepared by the Commissioner of Fisheries.
5	Environmental Impact Assessment (EIA) studies on Water Related Diseases in Sardar Sarovar Project (SSP) Command Area including the area Down Stream of the SSP Dam.	Commissioner of Health, Medical Services, Medical Education, Govt. of Gujarat., Gandhinagar.	October- 1995	Based on recommendation of these studies, Commissioner of Health and Medical Services has prepared a revised action plan for health sector for SSP Command area.
6	Study on Flora and Fauna of The Command Area of Sardar Sarovar (Narmada) Project lying between the Narmada and Sabarmati Rivers (EIA Studies).	Sardar Patel University, Vallabh Vidyanagar.	November- 1995	Based on recommendations of this study, the flora and fauna management plan is to be prepared.
7	EIA on Downstream of Sardar Sarovar Dam upto Gulf of Cambay.	M/s H.R. Wallingford, U.K.	April- 1995	As per the M/s H.R.Willingford Report, there are no serious environmental impact on the down stream in initial

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stage of	25 years	of	project.
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8	Study on Flora and Fauna of the Sardar Sarovar (Narmada) Project lying in Saurashtra and Kachchh Area (EIA studies).	Saurashtra University, Rajkot.	January - 1996	Based on recommendation of this study the flora and fauna management plan is to be prepared.	
9	Study on flora fauna of the command area of SSP, Lying between Sabarmati and Rajasthan border (EIA studies).	Gujarat University, Ahmedabad	1998	Based on recommendations the flora and fauna management plan is to be prepared.	
10	Ecological study on Wild Ass Sanctuary and surrounding area using remote sensing technology for Environmental Impact Assessment	GEER Foundation Gandhinagar	1998	The recommendations and suggestions to be incorporated while finalizing final report.	58
11	Environmental Impact Assessment of Nal Sarovar bird Sanctuary	GEER Foundation Gandhinagar	1998	The recommendations and suggestions to be incorporated while finalizing final report	
12	Environmental Impact Assessment Velavadar Black Buck National Park	GEER Foundation Gandhinagar	1993	The recommendations and suggestions to be incorporated while finalizing final report	

Agricultural Studies.

Annexure -II.

Sr. No.	Name of study	Name of Agency	Date of completion	Remarks
1	Waste Land Development project for Command Area of Narmada canal (Region 11 & 12)	Gujarat State Rural Development Corporation Ltd., Gandhinagar.	1984	This study has been carried out for identifying suitable waste land development approaches for regions bordering the Rann of Kachchh.
2	Rate of Adoption of Improved Technology in Narmada Command and Rest of Gujarat State (Based on Analysis of crop Experiments Data)	Operation Research Group, Vadodara.	1985	The results of studies have been useful in projecting crop yields and improvement of agriculture in command area in different agroclimatic conditions from a technological prespective.
3	Land use and cropping pattern survey and mapping of Narmada Command Area Zone 4A & 4B.	Operation Research Group, Vadodara.	1986	This study was carried out for generating databased of Land use and crop pattern of region 4. This data has been utilised for developing irrigation strategies of Bara-tract area.
4	Cropping pattern and Water Demand.	Operation Research Group, Vadodara.	1987	This study has been carried out for estimating scientifically possible crop patterns in different agro- climatic conditions of the command area and related water requirements.
5	Study on presentation of a detailed integrated Command Area Development Plan for SSP.	Wamana Consultants Pvt. Ltd., Hydrabad.	May, 1994	Based on outcomes of the study a detailed integrated CAD plan of SSP to be prepared by SSNNL.
6	Study on Agro-pollution aspects of command.	M/s H.R. Wallingford, U.K.	February, 1996.	A review has been carried out by M/s Wallingford, U.K on agro-pollution aspects and a report prepared by the using ground data and various command area Studies.

Technical studies

Annexure -III

Sr. No.	Name of study	Name of Agency	Date of completion	Remarks
î	Pre-feasibility study for Low Level Canal	Jyoti Consultants Ltd., Vadodara.	1981	The Prefeasibility study was intended to examine feasibility for detailed consideration of the option of taking out a low Level Canal at FSL 150 ft by pumping from Nani Sanjroli Weir (Garudeshwar Weir) to be constructed downstream of SSP Dam. The idea was to avail of extra Water availability during stage I and II of basin development and serve initial area of the command mainly upto river Mahi thereby relieving the main canal at RL 300 ft for conserveyance beyond. The proposal envisaged pumping from the Nani Sanjroli pool with FRL 85 ft to FSL of LLC at 150 ft and also generation of extra power from FRL 455 ft to FRL 150 ft The net energy balance was positive and favorable. This was a planning option, which was found alternative at the pre-feasibility stage. Later on the Govt. of Gujarat dropped the idea mainly from initial capital outlay consideration, uncertainties with stage development and other practical aspects.
2	Mathematical Modeling of Ground Water for system single layer model Narmada Mahi - Doab	Operation Research Group, Vadodara	1982	This was a preliminary Ground water mathematical modeling study, which dealt with recharges due to rainfall and due to irrigation over time in the command area upto Mahi with varying level of pumping. Thereafter detailed study has been taken up. The study provided initial insights.
3	Pre-feasibility Level Drainage Study of Narmada Mahi - Doab of SSP Command.	Core Consultants Ltd., Ahmedabad.	1982	This study has been carried out for assessing the drainage requirements of the Command area upto Mahi and accordingly of the command is planned broadly.
4	Marginal cost study on two typical Distributories and two typical Branches.	Dr. C.R.Shah, Vadodara.	1983	The result of these studies were utilised for providing a basis for distributory system planning and sizing of the system of SSP.
5	Study on water demand for Non-Agricultural use from Narmada project.	Gujarat Qwater Supply and Sewerage Board, Gandhinagar.	1983	This study has been carried out for planning domestic and industrial use of water, Based on this, further planning is being done by GWSSB.
6	Mathematical modeling of Ground Water System - Narmada Mahi- Doab.	Operation Research Group, Vadodara	1985	These detailed modeling studies dealt with recharges due to rainfall and due to irrigation inputs of varying levels and rise of Ground water overtime with varying levels of pumping. Based on these results, the ground water development in command area is visulised in planning of the SSP.

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7	Additional work of Mathematical Modeling of Ground Water System single Layer Model- Narmada Mahi Doab.	Operation Research Group, Vadodara	1985	These detailed modeling studies dealt with recharges due rainfall and due to irrigation inputs of varying levels and rise of Ground water overtime with varying levels of pumping. Based on these results, the ground water development in command area is visulised in planning of the SSP.
8	Computer Aided Planning of	Indian Institute of	1986	This was basic study for facilitating a computer aided planning
9	Conveyance and Delivery Net work. Survey and Investigation work of Ground Water Resources in Narmada Mahi Doab.	Management, Ahmedabad. Gujarat Water Resources Development Corporation Ltd., Gandhinagar.	1987	of conveyance and delivery network of SSP. This study was carried out for determination of hydrogeological and hydrological parameters of the aquifers. A network of piezometers with Automatic Water level Recorded has been established at an average density of one per 100 km2 to observe water levels. The monitoring of water levels is has become a continuous process.
10	Inter_Regional water Allocation and Determination of Branch Canal Capacity.	Operation Research Group, Vadodara	1989	This studies have been carried out for estimating scientifically possible crop patterns in different agro-climatic condition of the command area and related water requirements.
11	Extended study on Inter Regional water Canal Capacity.	Operation Research Group, Vadodara	1989	This studies have been carried out for estimating scientifically possible crop patterns in different agro-climatic condition of the command area and related water requirements.
12	Consultancy Work for Control, Telemetry and Communication Net- work Narmada Canal System for SSP.	Gujarat Communication and Electronics Ltd., Vadodara.	1991	This study has been carried out for broadly working out control telemetry and communication net work on Narmada Canal system. The detailed planning is now on hand with the SSNNL.
13	Techno-Economic Study for utilising Village Tanks as Borrow Area for construction of Canal Net - work.	Operation Research Group, Vadodara.	1992	The factor governing techno economic feasibility for utilising village tanks as borrow area for construction of canal has been established by this study. The village tanks are being utilised as area in construction of canal network based on outcomes of the study.
14	Mathematical modeling of Ground Water System for SSP Command between Rivers Shedhi and Sabarmati.	Consultancy Engineering Services, New Delhi.	1993	These modeling studies dealt with recharge due to rainfall and due to irrigation inputs of varying levels and rise of ground water overtime with varying levels of pumping as for other areas. Based on these studies M/s Willingford, U.K. has suggested parameters for a composite ground water model for whole command area of SSP the calibration of this model is an on going process, which is taken up in NPG.

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15	Mathematical modeling of Ground Water System for SSP Command between Rivers Sabarmati and Banas.yond Banas upto Rajasthan Border.	Operation Research Group, Vadodara.	1993	- do -
16	Mathematical modeling of Ground Water System for SSP Command beyond Banas upto Rajasthan Border.	Dalal Constructions, Ahmedabad.	1993	- do -
17	Pre- feasibility Level Drainage Study for SSP Command Beyond river Mahi.	Consultancy Engineering Services, New Delhi.	1993	This study has been carried out for assessing the drainage requirements of the command area and accordingly the drainage of command area is being planned by the SSNNL, Gandhinagar.
18	Review of Ground Water Drainage study.	M/s H.R. Wallingford, U.K.	Feb. 1996	A review of the Ground Water Modeling Studies carried out by NPG has been taken by M/s H.R. Wallingford, U.K. The report is further being refined by NPG adding further available data.

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Socio - Economic Studies.

Annexure IV

Sr. No.	Name of study	Name of Agency	Date of comple tion	Remarks
1	Some Aspects of Role of Panchayats and Institutional Arrangements for Canal Irrigation in Two Talukas of Ahmedabad District.	Institute of Cultural and Urban Anthgropology, Ahmedabad.	1992	This was a socio-economic study. The results have been utilized to establish data base for the project while formulating planning framework of SSP.
2	A study of settlement pattern (6 talukas in the Narmada Command Area of Mahesana District of Gujarat).	Department of Geography Gujarat University, Ahmedabad.	1982	This study was carried out with a view to establish a database in regards to settlement patterns in the command area. The data has been utilized in planning the frame work of SSP.
3	Regionalisation of narmada Command	Operation Research Group, Vadodara.	1982	The command area is characterised by a wide diversity of agro-climatic and socio economic features. Based on these features the command area is divided in 13 identified agro-climatic regions. These regions from the basis for agricultural water planning of SSP.
4	Socio-Economic Bench Mark survey of 62 talukas (sub-districts) of Narmada Command Area.	Fourteen Different Agencies including Universities, Research Institutions etc.	1982- 83	The socio-economic bench mark surveys were undertaken to generate basic information to help assess the socio-economic potentials and problems of the various regions in the command. The results were utilised in planning frame work of SSP. These surveys

5	Population projection and	Operation Research Group,	1983	have generated a profile of agriculture and other socio-economic characteristics of different regions of command area and have become the basis of agricultural plans, water allocation exercises and evaluation of socio benefits of the project. The study enabled establishing insights into likely social
3	Migration study for Narmada Command area.	Vadodara.	1303	and demographic changes in the command area.
6	Consumer expenditure, Assets and Indebtedness of Rural Households of the Command Area of Sardar Sarovar (Narmada) Projects, 1982.	Directorate of Economics and Statistics, Gandhinagar.	1983	This was a socio-economic study which provided socio-economic perspective of rural households in the command area.
7	Growth of agro- processing Industries in Phase - I of the Sardar Sarovar Project.	Gujarat Industrial and Technical consultancy organization Ltd., Ahmedabad.	1990	This study has been carried out to assess the likely growth of agro processing industries in Phase - I area on the basis of related ground parameters.
8	Area Development Strategies for selected Regions Adjacent to Narmada Main Canal (Vadodara, Surendranagar and Banaskantha District	Operation Research Group, Vadodara.	1992	This study has been carried out visualise possible area development strategies for selected regions adjacent to NMC.
9	Studies in water Rates Policy in 3 parts. (i) Pricing of public utilities survey of Literature.	Department of economics, South Gujarat University, Surat. Department of economics, Sardar Patel University,	1992 1992 1992	The Financial Committee Constituted by GOG for SSP has utilized the outcomes of these studies and suggested various means of resource mobilisation. The study has provided useful insights for determining water rates.

	(ii) Financial working of Irrigation projects- A Case of four projects in Gujarat.	Vallabh Vidyanagar. Department of economics, Sardar Patel University, Vallabh Vidyanagar.		- do - - do -
	(iii) Some Policy issue for canal water			
	Rates in Gujarat			
10	Economic dimensions of the Sardar Sarovar Projects.	Sardar Patel Institute of Economic and Social Research, Ahmedabad.	1995	This study has been carried out to re-establish economic viability of SSP based on revised costs at 1991-1992 level. The project is economically viable.

Annexure V

Statement Showing the activities carried out for improvement of habitat in

Shoolpaneshwar Sanctuary, during the year 1999-2000.

Sr. No.		Work component	Physicai Progress	Financial Progress
I	Mana	gement of Sanctuary and National Park.		
	1	Construction of Gazler tank	1 No.	66114
	2	Digging of Tube-well	1 No.	54655
	3	Digging of Trench / trench around boundry	13896	309943
	4	Compensation	16 Case	38000
	Deve	opment of Jesor, Ratanmahal, Dumkhal		
	sloth	sanctuary		
		-	•	
	5	SMC Work	2 NO.	105967
	6	Advance works for plantation	62 ha.	125115
	7	Advance works for plantation 1999-2000	35 ha.	126558
	8	Current year plantation	35 ha.	78150
	9	One year old plantation	62 ha.	18505
	10	Two year plantation	16 ha.	40349
	11 Removal of unwanted species		N.A.	
	12	Nala banding	2346 C.M.	133749
	13	Check dam	1 No.	132999
	14	Construction of ponds	2 No.	133358
	15	Deation of water hols	10 No.	117772
	16	Fodder feacilities	18 ha.	127997
	17	Hand-pump	1 No.	44800
	18	Supply of water during dry season	1 No.	108059
	19	Fire-line	N.A.	999766
	20	Stone wall fencing	17540 RM.	131851
	21	Watch tower	5 No.	59735
	22	Degration of new road	15 Km.	