

NARMADA CONTROL AUTHORITY

Environment Sub Group

Agenda and Minutes of Meetings

PART I

*1st to 13th Meeting of the Environment Sub-
Group (ESG)*

1987 to 1992

Introduction

These six volumes contain the proceedings of the meetings of the Narmada Control Authority's Environment Sub-Group (ESG), from the 1st meeting (December 1987) to the 51st meeting (August 2019). I have not been notified of any further meetings.

According to the minutes, I seem to have started attending the ESG meetings from August 1989 (6th meeting), first as a representative of the NGO *Development Alternatives*, but soon after in my own capacity. The official composition, as reproduced by the Narmada Control Authority in their publication *Sardar Sarovar Project: Environment Management*, October 2000, NCA, Indore, Annexures, is reproduced at page 13 of the Annexure enclosed.

Apart from a list of members, the above table also contains the terms of reference of the ESG, as envisaged by the NCA and approved by the MoEF, as a part of the conditions for giving environmental clearance to the Sardar Sarovar and Narmada (Indira) Sagar projects, in 1987 (clearance letter at annexure, pp 1-2).

A summary of the conditions laid down by the MoEF while granting environmental clearance, is reproduced below (Annexure, pp 8-12).

Around the same time (October 2000) the Supreme Court of India, while disposing a petition by the *Narmada Bachao Andolan* (Save the Narmada movement) passed the following orders (relevant portions quoted below):

Supreme Court of India
Narmada Bachao Andolan vs Union Of India And Others on 18 October, 2000
Author: Kirpal
Bench: B. N. Kirpal, Dr. A. Anand
PETITIONER:
NARMADA BACHAO ANDOLAN

Vs.

RESPONDENT:
UNION OF INDIA AND OTHERS

DATE OF JUDGMENT: 18/10/2000

BENCH: B. N. KIRPAL , DR. A. S. ANAND

DIRECTIONS While issuing directions and disposing of this case, two conditions have to be kept in mind, (i) the completion of project at the earliest and (ii) ensuring compliance with conditions on which clearance of the project was given including completion of relief and rehabilitation work and taking of ameliorative and 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, we issue the following directions.

1)

2)

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, environment 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) ...

6) 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.

7-10...

(Source: <https://indiankanoon.org/doc/1938608/>)

These orders of the Supreme Court significantly enhanced the role of the ESG and also gave it additional judicial clout. However, the ESG structure implied that it was finally up to the chairman (the secretary of the Ministry of Environment and Forests) to exercise the authority.

Interestingly, the ESG ran in a manner similar to most other government committees, where decisions were finally taken by the chairperson with or without the agreement of the members – majority or minority. On the face of it this was very unfair, but in actual fact it was an advantage as far as the ESG was concerned, for the membership comprised mostly of government servants, who were obliged to toe the official line. Even among the “expert” or non-official members, of which there were only three, there were some who preferred toeing the government line. Therefore, the only way of getting a decision that was unpopular was to convince the chairperson that it was the right thing to do. Fortunately, over the years there were some chairpersons who were fair minded, but unfortunately many others whose sole aim was to please their bosses.

Despite all our efforts, and the efforts of my colleague Rubina Mondal, We could not deliver a flawless reproduction, and the agenda for the 11th meeting is missing (it seems there was no formal agenda for the 1st and 2nd meetings). Also, given below, is a list of pages that are difficult or impossible to read, either because they were badly scanned or because the originals were themselves illegible. Unfortunately, we do not have copies of more legible versions. However, if any one has access to either electronic or hard copies of 11th meeting agenda or any of the pages listed below, please pass it on to us and we will add/replace them and try and make this collection complete.

List of illegible or poorly legible pages in the six volumes

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Yours sincerely,

Shekhar Singh

May, 2021

ANNEXURE

ENVIRONMENTAL CLEARANCE (24.6.87)

GOVT. OF INDIA, MINISTRY OF ENVIRONMENT & FORESTS.
NEW DELHI

No. 3-87/80-IA

Dated 24 June, 1987

OFFICE MEMORANDUM

Subject : Approval of Narmada Sagar Project, Madhya Pradesh and Sardar Sarovar Project, Gujarat from environmental angle.

The Narmada Sagar Project, Madhya Pradesh and Sardar Sarovar Project, Gujarat have been referred to this Department for environmental clearance.

2. On the basis of examination of details of these projects by the Environmental Appraisal Committee for River Valley Projects and discussions with the Central and State authorities the following details were sought from the project authorities:

- (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 area.
- (vii) Seismicity; and
- (viii) Health Aspects.

3. Field surveys are yet to be completed. The first set of Information has been made available and complete details have been assured to be furnished by 1989.

4. 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 in its pace of implementation part passu with the progress of work on the project.

5. After taking into account all relevant facts the Narmada Sagar Project, Madhya Pradesh and the Sardar Sarovar Project, Gujarat are hereby accorded environmental clearance subject to the following conditions :

contd....2/

- i. The Narmada Control Authority (NCA) will ensure that environmental safeguard measures are planned and implemented pari passu with progress of work on projects.
- ii. The detailed surveys/studies assured will be carried out as per the schedule proposed and details made available to the Department for assessment.
- iii. The Catchment Area Treatment programme and the Rehabilitation plans be so drawn as to be completed ahead of reservoir filling.
- iv. The Department should be kept informed of progress on various works periodically.

6. Approval under Forest (Conservation) Act, 1980 for diversion of forest land will be obtained separately. No work should be initiated on forest area prior to this approval.

7. Approval from environmental and forestry angles for any other Irrigation, power or development projects in the Narmada Basin should be obtained separately.

Sd/-
(S. MAUDGAL)
Director (IA)

The Secretary,
Ministry of Water Resources,
New Delhi.

FOREST CLEARANCE (8.9.87)

GOVT. OF INDIA, MINISTRY OF ENVIRONMENT & FORESTS.
NEW DELHI

No. 3-87/80-IA

Dated 8TH September, 1987

To,

1. The Secretary,
Agriculture Forest and
Cooperative Department,
Govt. of Gujarat,
Sachivalaya, Gandhinagar.
2. The Secretary,
Forest Deptt.,
Govt. of M.P.,
Bhopal.
3. The Secretary,
Revenue & Forest Department,
Govt. of Maharashtra,
Mantralaya, Bombay.

Sub: Diversion of 13385.4S ha (6488.54 ha in Maharashtra 4165.91 ha in Gujarat and 2731.00 ha in Madhya Pradesh) of Forest land in Dhule, Bharuch and Khargone district respectively for Sardar Sarovar Project.

Sir.

1. I am directed to refer to your letter Nos. (1) FLD-1282-78159-V-1 dated 17.2.83 (Gujarat) (2) 5/58/83/10/3 dated 31.8.84 (Madhya Pradesh) and (3) FLD. 1080/111531-11-F3 dated 8.9.83 (Maharashtra) on the above mentioned subject seeking prior approval of the Central Government under Section 2 of the Forest (Cons) Act. 1980 and to say that the proposal has been considered by the Advisory Committee constituted by the Central Government under Section 3 of the Forest (Cons) Act. 1980.

2. After careful consideration of the proposal, the Central Government hereby conveys its approval for diversion of 13385.45 ha of forest land for Sardar Sarovar Project as per details given below :

S.No.	State	Forest land to be diverted (ha)
1.	Gujarat	4165.91
2.	Madhya Pradesh	2731.00
3.	Maharashtra	6488.54

contd.../2

3. This approval is strictly subject to the following conditions :

- i) Legal status of the land will remain unchanged.
- ii) The full details of the non-forest lands for retaining compensatory afforestation with complete details viz. Khasara No, village etc. will be reported by the State Government before 30.9.87.
- iii) The non-forest areas available for rehabilitation of all the oustees will be reported by the State Governments or a proposal to the satisfaction of Govt. of India In this regard will be furnished by the State Governments before 30.11.87.
- iv) No work on the project In forest area will be commenced until and unless condition under (ii) & (iii) above are fulfilled.
- v) Since the project Involves violation and also most of the non-forest areas for compensatory afforestation are away from the project area. the State Govts. will raised compensatory afforestation In double the degraded forest lands also In the project Impact areas In addition to the afforestation on equivalent non-forest land. A scheme for this will be submitted by 30.11.87.
- vi) The State Governments will prepare by 30.11.87 a plan for the treatment of catchment areas failing which the Central Government will appoint a team for this purpose at the cost of the project for this purpose.
- vii) No Forest land will be utilised for the rehabilitation of oustees.
- viii) Tree felling will be permitted In submergence area only up to 4 M below FRL.
- ix) Tree planting will be done on either side of the canals, roads, forest area of the reservoir and In the wasteland/vacant land under the control of the Irrigation Department.
- x) Water will be supplied free of cost to the Forest Department for raising nursery and for irrigating forestry plantations In the command area.
- xi) In order that the construction labour & staff while working on the project In the forest area may not allow destruction to the forest area for meeting their fuel wood needed, the user agency will establish fuels depots and will provide suitable alternative domestic fuel such as fuel wood, coal, kerosene oil etc to them free of cost or at cost deducted from their salary and wages.

Yours faithfully,

Sd/

(R.S. Bisht)

Under Secretary to the Govt. of India.

INVESTMENT CLEARANCES (5.10.88)

GOVERNMENT OF INDIA, PLANNING COMMISSION
New Delhi

No. 2(194)/88-I&CAD.

October 5, 1988

To

The Secretary,
Planning Department,
Government of Gujarat,
Gandhinagar.

I am directed to convey that the Sardar Sarovar Project, estimated to cost Rs. 6406.04 Crores (Rupees six thousand four hundred six crores and four lakhs) as per the salient features vide Annexure-I enclosed herewith, has been considered acceptable for Investment subject to the conditions as laid down below:

- (i) The State shall comply with the conditions as laid down in the O.M.No.3-87/80-IA dated 24.6.1987 and 8-372/83-FC dated 8.9.1987 issued by the Ministry of Environment and Forest while according the environmental clearance and the approval for diversion of forest lands for this project respectively (copies enclosed).
- (ii) Looking to the size and Importance of this project, the State Government will give sufficient priority to this project in the Eighth Plan by ensuring adequate funding to match with the construction schedule as indicated in the concurrence of State Planning and Finance Department vide Government of Gujarat in Narmada Development Department's letter No. NPP/1084/GOI-4/Pat.V/J dated 3.10.1988. The state will also complete other on going projects at advance stage in time to ensure that there is no difficulty in funding the peak requirements of Sardar Sarovar Project.
- (iii) A programme of drainage and ground water balance studies has been completed for Mahi Narmada-Doab. Such a programme must be completed for the areas beyond the Mahi. The Bhal, Saurashtra, Kutch, Sami-Harij and other areas require this as a pre-condition. The State should submit to Planning Commission a detailed programme of studies, with milestones of achievements, duly vetted through Central Water Commission for monitoring the same by Planning Commission.

Contd...2/

- (iv) The State should take suitable advance measures, as may be necessary, to ensure that annual revenue to be accrued from this project covers at least annual operation and maintenance charges including depreciation charges by setting the water rates suitably.
 - (v) The State should set up a special group of experts to study the siltation aspect in the main canals under all operating conditions since such siltation, if it occurs, is likely to pose a serious problem during the actual operation of this project and may require a huge expenditure for desilting as well as result in serious operational difficulties.
 - (vi) State should draw up a detailed time schedule for completion within five years the investigation, detailed survey, planning and working out the detailed cost estimates for micro level network system for the balance area of the total command of this project.
 - (vii) Past experience of Irrigation projects have revealed that main and branch canals are completed upto the end but, in absence of micro-level networks to take irrigation water upto outlet, corresponding Irrigation benefits do not start accruing. In spite of huge financial investment made, to avoid this, the State should draw up an implementation schedule, segmentwise, for completion of canal network, in such a way that a segment of the canal network, taken up from head reaches, is completed in all respects so as to make the irrigation waters available, for the designed potential of that segment, upto the outlet in that particular segment.
2. This project may be executed as per the approved outlay from year to year.

Yours faithfully,

Sd/

(**B.N. NAVALAWALA**)

Deputy Adviser (I&CAD)

for Secretary, Planning Commission

Copy to :

- 1) Secretary to Chief Minister,
Government of Gujarat, Gandhinagar.
- 2) Chairman, Sardar Sarovar Narmada Nigam Ltd.,
Gandhinagar.

contd.../3

- 3) Secretary, Narmada Development Department / Finance Department,
Government of Gujarat, Gandhinagar.
- 4) Secretary, Irrigation Department, Government of Maharashtra / Madhya
Pradesh / Rajasthan, Bombay/Bhopal/Jaipur.
- 5) Ministry of Water Resources, Shram Shakti Bhawan, New Delhi.
Secretary
Commissioner (PP)
Financial Adviser
Commissioner (Project) / Commissioner (India) / Commissioner (Floods),
Joint Commissioner (P)
Deputy Secretary
Budget Section.
- 6) Secretary, Ministry of Environment & Forests,
Paryavaran Bhawan, C.G.O. Complex, Lodi Road, New Delhi.
- 7) Central Water Commission, Sewa Bhawan, R.K. Puram, New Delhi
Chairman
Member (P&P)
Chief Engineer (PAO)
Director (PAO)
- 8) Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New
Delhi.
- 9) Ministry of Finance, Department of Expenditure (Plan Finance Division)
North Block, New Delhi
(Joint Secretary (PF/Director (PF)
- 10) Executive Member, Narmada Control Authority, Palika Bhawan, Sector-
13, R.K. Puram, New Delhi.
- 11) Planning Commission
PS to Deputy Chairman
Secretary / Special Secretary
Adviser (I&CAD)/(P&E) / (Agri)
Joint Secretary (SP)
Library
Information Officer
All Officers of I&CAD Division
Guard File

DIRECTION FROM SECRETARY, MOE&F (04-02-1988)

GOVT. OF INDIA, MINISTRY OF ENVIRONMENT & FORESTS

Copy of D.O. letter No.3/87/80/HCT/Env.5/IA dated February 4, 1988 from Shri T.N. Seshan, Secretary to the Govt. of India, Ministry of Environment and Forests, Paryavaran Bhawan, Lodi Road, New Delhi addressed to Shri Naresh Chandra, Secretary to the Govt. of India, Ministry of Water Resources, New Delhi.

You may kindly recall that in the last meeting of the NCA, it was considered desirable that to facilitate basic environmental data collection and preparation of needed Action Plans 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.

1] 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, socio-economic profile of affected population, inter-linkages with outer population, special characteristics, flora and fauna – endangered, rare, habitat sufficiency, seismic status, geological features, ground water status, geomorphological aspects.

FREE DRAINING CATCHMENT AREA

Land use, extent of degradation, erodability, precipitation pattern, cloud bursts, land slides, biotic pressures, siltation load, other existing and proposed activities.

CATCHMENT AREA TREATMENT PLAN

- 1) Criteria adopted for identifying degraded and vulnerable areas;
- 2) Map showing critically degraded area requiring engineering and biological treatment on the basis of a recent field survey;
- 3) Details of the engineering and biological measures proposed to be carried out as a time bound programme;
- 4) Arrangements made to mobilize :
 - # Technical manpower to carry out the soil conservation and rehabilitation schemes;
 - # Planning material either through creation of special nursery or through purchases from Forest Department etc.
- 5) Geomorphological studies of the reservoir periphery.

2] COMPENSATORY AFFORESTATION

- 1) Map of the areas identified for afforestation;
- 2) Land capability survey of the identified areas;
- 3) Availability of surface and ground waters;
- 4) Species identified and the nursery creation programmes;
- 5) Phased Action Plan for compensatory afforestation;
- 6) Public participation details;
- 7) Details of after-care and monitoring.

3] REHABILITATION AND MASTER PLAN

- 1) enumeration of affected population including those whose land is 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;
- 5) Details of the occupational training programme proposed for the oustees;
- 6) Measures needed to make the identified land fit for agriculture and rehabilitation along with a phased Action Plan.

4] 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 availability-surface and ground; natural drainage pattern, induced drainage, yield, permeability, precipitation distribution, salinity and alkalinity problems, soil profile, land capability.

HUMAN MANAGEMENT

Cropping pattern, rationale and controlled water use; training for skills upgradation; package of irrigation water, seeds, fertilisers, insecticides, pesticides with controls; surface and subsurface drainage.

COMMAND AREA DEVELOPMENT PLAN

- 1) Land capability survey of the area which are proposed to be brought under irrigation along with the soil profiles;
- 2) Identification of the areas prone for water logging and salinity;
- 3) Details of the drainage works proposed in the command and the norms based on which these details have been planned;
- 4) On-farm 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 pattern;
- 6) Steps proposed to prevent contamination of ground and surface water due to fertilisers, pesticides, runoff.

5] FLORA AND FAUNA

FLORA

Rare and endangered species, gene-pool reserve.

FAUNA

Rare and endangered species, migratory species, migration route, breeding habitat, sanctuary, national park.

Accordingly, the rehabilitation of Flora and Fauna Action Plans would cover the following :

- 1) Survey of flora and fauna in the region going to be affected
- 2) Gene-pool, if any, likely to be affected;
- 3) Details of wildlife habitats in the region;

- 4) Measures proposed to rehabilitate endangered species of flora and fauna, if any;
- 5) Assessment of the carrying capacity of the neighbouring areas wherein the wildlife would disperse if the scheme is implemented;
- 6) Plan for rehabilitation of endangered Flora and Fauna.

6] HEALTH ASPECTS

- 1) present status of the water-borne disease in the areas;
- 2) Present status of the health delivery system;
- 3) Screening arrangements proposed for the work force;
- 4) Preventive measures proposed to control the incidence of water-borne diseases;
- 5) Reinforcement proposed to the existing health delivery system.

7] MONUMENTS AND CULTURAL ASPECTS

- 1) Cataloging of monuments and sites considered important from religious, historical and cultural angles;
- 2) Plan for rehabilitation of monuments wherever necessary

ENVIRONMENT SUB-GROUP

1.	Secretary to the Govt. of India, Ministry of Environment & Forests	Chairman	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.
2.	Executive Member, NCA	Member		
3.	Vice-Chairman, NVDA GOMP	Member		
4.	Secretary (Env.), GOM	Member		
5.	Secretary (R&R), Narmada Development Depts. GOG	Member	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
6.	Secretary, Env. Deptt. GOR	Member		
7.	Commissioner (PP), MOWR	Member		
8.	Dy. Director General, ICAR	Member		
9.	Dy. Inspector General, MOE&F	Member		
10.	Director, Wildlife Institute, Dehradun	Member		
11.	Dr. S. Ramaseshan, Professor, Indian Institute of Technology, Kanpur	Member	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.
12.	Director General, Anthropological Survey of India	Member		
13.	Dr. Shekhar Singh, Faculty Member, IIPA, New Delhi	Member	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.
14.	Dr. R.K. Katti, Professor (Retd.), Indian Institute of Technology, Mumbai.	Member		
15.	Director General, Archaeological Survey of India	Member	v)	To assess the necessary organisation with management capability being set up for adequate implementation of environmental safeguard measures.
16.	Director General, ICMR	Member		
17.	Expert of Flora	Member		
18.	Member (E&R), NCA	Member Secretary	vi)	To undertake all measures necessary to assist Narmada Control Authority in the planning and implementation of environmental safeguard measures.

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NARMADA CONTROL AUTHORITY

Environment Sub Group

1st meeting

8th December 1987

Minutes

M-1

नर्मदा नियन्त्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

Flat No. 118, ~~XXXXXX~~
Palika Bhavan,
Sector-XIII, R. K. Puram
New Delhi-110066

No. D-34(1)/87/1283

Dated 8.12.1987

To:

All Members/Invitees of Environment Sub-group of NCA.
(As per list attached).

Subject:- Summary Record of the first meeting of the Environment
Sub-group of NCA held on 27.11.1987.

Sir,

Please find enclosed herewith a copy of the Summary Record of the above meeting for information and necessary action.

The second meeting of the Sub-group is now proposed to be held on 5th January, 1988 in the Conference Room, 4th floor, Paryavaran Bhawan, CGO Complex Phase II, Lodhi Road, New Delhi at 10.00 AM.

State Members are requested to prepare material for circulation and also despatch any hand-outs to the Members of the Sub-group well in time. They may also kindly indicate their requirements of audio visual equipment etc. to Dr. S.C. Maudgal, Director (Env't.), Ministry of Environment and Forests.

You are requested to kindly make it convenient to attend the meeting.

Yours faithfully,

Y.V. Dharma Rao
c/c (Y.V. Dharma Rao)
Secretary, NCA and
Member-Secretary of
Environment Sub-group of NCA.

Encl: As above.

7/12/87

CV
8/12

SUMMARY RECORD OF DISCUSSIONS HELD IN THE FIRST MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA - HELD ON 27.11.1987 AT 1.00 HOURS IN THE CONFERENCE ROOM, PARYAVARAN BHAWAN, FOURTH FLOOR, CGO COMPLEX PHASE II, NEW DELHI-110003.

1. The Chairman welcomed the Members of the Sub-group. The list of participants is enclosed vide Annex-1.

1.1 The Chairman enquired about the representative from the Ministry of Water Resources and it was indicated that Shri A.K. Venkatesha, Superintending Engineer (WM) is participating from the Ministry of Water Resources. It was also indicated that at the time of the meeting intimation was not available regarding the representative from Indian Council of Agricultural Research (ICAR). However, subsequently on 27.11.1987 a letter had been received from ICAR intimating that Dr.I.P. Abrol, Deputy Director General (SAE), will be representing that Organisation. As regards the experts coopted as Members, it was indicated that no response had been received in the case of Expert on Flora and Fauna i.e. Shri H.Y. Mohan Ram and also in respect of Archaeology Dr. V.S. Wakenker. In respect of agriculture Shri K.G. Tejwani was not available in New Delhi. As regards Environmentalists, Dr. Ashok Khosla has given consent and Dr.P.K. Katti attended the meeting.

1.2 Chairman desired that a letter addressed to Dr. A.S. Paintal, Director General, Indian Council of Medical Research (ICMR) may be put up to him so that an expert on Health aspects is available to this Sub-group.

1.3 Chairman also indicated that proper agenda should be framed for the meeting and circulated atleast 7 days in advance. In this connection, he desired that NCA Secretariat may create adequate capacity

and infrastructure for servicing the Sub-group meetings. Chairman was informed that one officer at Deputy Director level had recently been inducted (Shri O.P. Saxena) who would be fully available for servicing the Sub-group. There were also proposals to recruit a Specialist (Hydrology) in NCA which were held up for want of finalisation of recruitment rules. These are put up for consideration by the Authority and approval thereof in the ensuing NCA meeting at Bhopal.

2. Summary Record of Nodal Officer's meeting circulated earlier was then discussed and approved subject to the insertion of a foot note as below:

"The terms of reference of the Environment Sub-group have excluded the rehabilitation aspect of Project Affected Persons (PAFs) as a separate Sub-group to consider the Rehabilitation and Resettlement (R&R) Programme for the basin projects has been constituted under the Chairmanship of Secretary, Ministry of Welfare, Government of India. However, the Environment Sub-group would inter-face with the Rehabilitation Sub-group as and when required or called for, wherever the Environmental Safe Guard Measures have linkages with Rehabilitation Measures."

Regarding composition of the Sub-group, Chairman indicated that both Dr. Ashok Khosla and Dr. P.K. Katti would also be included as Environmental Experts .

3. Thereafter, 'the over view environmental impact report' prepared by the World Bank was discussed but the Chairman opined that this document need not form the basis of our studies and evaluation of the environmental impact but may be used to the extent it is relevant. Shri R.S. Khanna indicated that the document as presented by Mr. Don W. Levenhagen contained some distortions in respect of seismicity studies and rehabilitation

aspects. These matters were discussed by the World Bank Expert with

Government of Madhya Pradesh and Government of Gujarat and it was agreed that the report would be suitably modified some time in January, 1988. It is only thereafter that copies of the report would become suitable for circulation amongst the participants of the Environment Sub-group of NCA.

3.1 Dr. K.S. Singh indicated that fossil finds in the Narmada basin were making very important contribution for understanding the evolution of early man in the sub-continent and it was necessary to ensure that the fossils (surface finds) in the submergence areas are located and salvaged. The Geological Survey of India were contemplating the necessary action. Factual status of the proposed work could be obtained from GSI and any support they might need should be considered. He also indicated that Director General, Archaeological Survey of India could be considered by name for nomination as expert in case Dr. V.S. Wakenker was not available for participation in the Sub-group.

Dr. K.S. Singh also indicated that base line documentation by way of canvassing/enumerators was a very important detail in respect of Project Affected Persons (PAPs). It was indicated to him that at the time of organising the Monitoring and Evaluation (M&E) effort, methodology for such activity was discussed at length within the Social Science agencies such as the Centre for Social Studies, Surat, Tata Institute of Social Sciences, Bombay, National Centre for Human Settlements and Environment, Bhopal. Dr. B.D. Sharma, Commissioner for Scheduled Castes and Scheduled Tribes also gave his valuable views and help in formulating both the formats and also instruction manuals etc. Thus appropriate information on the subject of

base line documentation was considered as part of the R&R programme work.

3.2 At this stage, representatives of Govt. of Gujarat (GOG) indicated that there was a problem in funding of the afforestation programme. Chairman wanted that this could be discussed separately. However, he indicated that there could be no bar in creating a separate fund which was non-lapsable for continuing their afforestation measures.

4. Chairman expressed an opinion that the construction work on the project was picking up and there was need for proceeding ahead with the needed environmental safeguard measures. No delays in respect of outlining the safeguard measures and their action plans could be allowed to creep in. He wanted that States should be ready with answers to the basic questions like what was the present state of the studies on the various environmental concerns indicated in the sanction letters and what would be needed to see that in the concerned areas the environment was not allowed to deteriorate and what were the areas of deterioration that need to be safeguarded? For the purpose of knowing the above, he wanted that the States should be ready and make presentations to the Sub-group so that the Sub-group Members including Experts would get acquainted with the safeguard measures & activities.

4.1 Discussions then centred on how to plan the presentations by the State Governments. The initial view was that the soil and water related concerns could be presented in the beginning followed by the concerns relating to flora, fauna including wild life habitats. The third set could deal with irrigated and unirrigated area concerns. The fourth set could be a presentation on the health, social, cultural impacts. Second suggestion was that classification could be on the basis of:

- a) abiotic impacts;
- b) biotic impacts;
- c) human relationships; and
- d) historic, cultural and other impacts.

The State Governments indicated that this type of presentations could be organised by them by second week of February, 1988. The possibilities of reducing this time span were discussed as it was necessary that the Sub-group could start work on finalising the action plans etc. Chairman indicated that practical methods for ensuring degradation not to take place and implementing environmental safeguards pari-passu with construction work as envisaged at the time of clearance of the projects, should be achieved.

Chairman also desired that in order to make matters clear to the participants, a copy of the clearance letters in respect of Narmada Sagar and Sardar Sarovar Projects should be made available to all the participants. He also desired that at the time of clearance, Department of Environment prepared a note setting out its own appreciation of the environmental aspects and this note also should be circulated to the participants. Chairman also indicated that there were 8 items of environmental concern listed in the environment clearance and some of these concerns such as afforestation, rehabilitation and resettlement and catchment treatment also figured in the clearance given in respect of Forest (Conservation) Act, 1980. Chairman wanted that presentation should take place before the next meeting of the Authority and both Govt. of Gujarat and Govt. of Madhya Pradesh agreed to make presentations in respect of catchment treatment, afforestation, flora and fauna studies, wild life habitat on 10.12.1987*. The meeting was fixed for 10.00 AM on

that date and the forenoon could be for presentation by Government of Gujarat, and the afternoon could be for presentation by Govt. of Madhya Pradesh. Both the State Governments were requested to circulate material in respect of their presentation well in advance to the Members of the Sub-group.

5. After the confirmation of the Summary Record of the first meeting, the meeting could then proceed ahead with the presentations. No separate agenda would therefore be circulated for the second meeting of the Environment Sub-group proposed to be held on 10.12.1987* at 10.00 AM in the Conference Room, 4th floor, Paryavaran Bhawan, CGO Complex Phase II, New Delhi-110003. Advance intimation for making available slide or other projectors, screen etc. may kindly be sent to Dr.S.C.Maudgal, Director, Ministry of Environment and Forests, Department of Environment, Paryavaran Bhawan, CGO Complex Phase II, Lodhi Road, New Delhi-110003.

* The date of the meeting has been subsequently changed to 5.1.1988 with the same venue and time.

ANNEX-1

LIST OF PARTICIPANTS OF THE FIRST MEETING OF THE ENVIRONMENT SUB-GROUP OF NARMADA CONTROL AUTHORITY HELD ON 27TH NOVEMBER, 1987 AT PARYAVARAN BHAWAN, CGO COMPLEX PHASE II, NEW DELHI-110003.

MEMBERS

1. Shri T.N. Seshan, Secretary to the Govt. of India, Ministry of Environment and Forests.
2. Shri R.S. Khanna, Vice-Chairman, Narmada Valley Development Authority, Govt. of Madhya Pradesh.
3. Shri T.V. Krishnamurthy, Secretary (Rehabilitation), Narmada Development Department, Govt. of Gujarat.
4. Shri K.G. Sankhe, Chief Engineer & Joint Secretary, Irrigation Department, Govt. of Maharashtra.
5. Shri A.K. Venkatesha, Superintending Engineer (WM), Ministry of Water Resources, Govt. of India.
6. Dr. K.S. Singh, Director General, Anthropological Survey of India, Govt. of India.
7. Dr. R.K. Katti, Head, CSRE, Professor (Civil), I.I.T., Bombay.

INVITEES

8. Shri K. Madhavan, Executive Member. NCA.
9. Dr. A.C. Ray, Additional Secretary, Ministry of Environment and Forests, Govt. of India.
10. Shri I.M. Shah, Secretary (Narmada), Narmada Development Department, Govt. of Gujarat.
11. Shri T.N. Maharishi, Chief Conservator of Forests, Naarmada Valley Development Authority, Govt. of Madhya Pradesh.
12. Shri Y.V. Dharma Rao, Secretary, NCA.
13. Dr.S.C. Maudgal, Director (Envr.), Ministry of Environment and Forests, Govt. of India.
14. Shri Suresh Chandra, Deputy Director (Civil), NCA.
15. Shri O.P. Saxena, Deputy Director (Envr.), NCA.
16. Shri A.V. Gururaja Rao, Executive Engineer, Narmada Planning Group, Govt. of Gujarat.

Members

1. Shri T.N. Seshan, Secretary to the Government of India, Ministry of Environment and Forests, Department of Environment, 4th floor, Paryavaran Bhawan, CGO Complex Phase II, Lodhi Road, New Delhi-110003
2. Shri R.S. Khanna, Vice-Chairman, Narmada Valley Development Authority, Govt. of Madhya Pradesh, Narmada Bhawan, Tulsinagar, Bhopal-462003.
3. Shri T.V. Krishnamurtay, Secretary (Rehabilitation), Narmada Development Department, Govt. of Gujarat, Block No.9, 8th floor, New Sacnivalaya Complex, Gandhinagar-382010.
4. Shri P. Abraham, Secretary (Environment), Government of Maharashtra, Mantralaya, Bombay-400032.
5. Shri Tej Kumar, Secretary (Revenue), Govt. of Rajasthan, Secretariat, Jaipur-302005.
6. Shri A.K. Venkatesha, Superintending Engineer (WM), Ministry of Water Resources, Govt. of India, Shramshakti Bhawan, Rafi Marg, New Delhi-110001.
7. Dr. I.P. Abrol, Deputy Director General, Soil Agronomy & Engineering, Indian Council of Agricultural Research, Krisni Bhawan, Dr. Rajendra Prasad Road, New Delhi-110001.
8. Dr. C.T.S. Nair, Director, Kerala Forest Research Institute, Peechi, Trichur-650653 (Kerala).
9. Shri H.S. Panwar, Director, Wild Life Institute of India, New Forest, Dehradun-248006 (Uttar Pradesh).
10. Dr. S. Ramasesnan, Professor, Department of Civil Engineering, Indian Institute of Technology, Kanpur-208016.
11. Prof. H.Y. Mchan Ram, Department of Botany, University of Delhi, Delhi-110007.
12. Dr. V.S. Wakenkar, Director, Bhartiya Kala Mandir, Ujjain-456001. (Madhya Pradesh).
13. Dr. K.S. Singh, Director General, Anthropological Survey of India, Government of India, West Block No.2, Wing No.6, 1st floor, R.K.Puram, New Delhi-110066.
14. Dr. Ashok Khosla, Prresident, Development Alternatives, 22, Claf Palme Marg, Vasant Vihar, New Delhi-110057.

15. Dr. R.K.Katti, Professor of Civil Engineering, Indian Institute of Technology, Powai, Bombay-400076.
6. Shri Y.V. Dharma Rao, Secretary, Narmada Control Authority, 118, Palika Bhawan, R.K.Puram, New Delhi-110066.

Invitees

17. Shri K. Madhavan, Executive Member, Narmada Control Authority, 211, Palika Bhawan, R.K.Puram, New Delhi-110066.
18. Shri T.N. Maharishi, Chief Conservator of Forests, Narmada Valley Development Authority, Govt. of Madhya Pradesh, Narmada Bhawan, Tulsinagar, Bhopal-462003.
19. Shri I.M. Shan, Secretary (Narmada), Narmada Development Department, Govt. of Gujarat, Block No.9, 6th floor, New Sachivalaya Complex, Gandhinagar-382010.
20. Shri K.G. Sankhe, Chief Engineer and Joint Secretary (Irrigation), Government of Maharashtra, Mantralaya, Bombay-400032.
21. Shri Rajendra Jain, Commissioner and Secretary (Irrigation), Govt. of Rajasthan, Secretariat, Jaipur-302005.
22. Dr. A.C. Ray, Additional Secretary to the Govt. of India, Ministry of Environment and Forests, Department of Environment, Govt. of India, Paryavaran Bhawan, CGO Complex Phase-II, Lodhi Road, New Delhi-110003.
23. Dr.S.C. Maudgal, Director, Ministry of Environment and Forests, Department of Environment, Govt. of India, Paryavaran Bhawan, CGO Complex Phase II, Lodhi Road, New Delhi-110003.

NARMADA CONTROL AUTHORITY

Environment Sub Group

2nd meeting

5th January 1988

Minutes

SUMMARY RECORD OF DISCUSSIONS OF THE SECOND MEETING OF THE ENVIRONMENT SUB-GROUP OF NCA HELD ON 5.1.1988 AT 10.00 AM IN THE CONFERENCE ROOM, PARYAVARAN BHAWAN, CGO COMPLEX PHASE II, LODHI ROAD, NEW DELHI-110003.

Shri T.N. Seshan, Secretary to the Government of India, Ministry of Environment and Forests (Department of Environment) and Chairman of the Environment Sub-group welcomed the Members and Invitees to the Second Meeting of the Sub-group. It was noticed that representatives from Maharashtra were not present in the meeting. The Chairman directed the Member-Secretary of the Sub-group to make a specific request so that Maharashtra could participate in all the Sub-group meetings. Similar was the situation with Rajasthan. The list of Members and Invitees, who attended the meeting, is enclosed vide Annex-1.

Discussions on the minutes of the first meeting that were circulated, was taken up first. It was intimated that no comments had been received from any of the participants. The minutes of the first meeting were confirmed.

According to the circulated minutes, material for presentation was to be made available to the participants during the current meeting. Accordingly, material brought by the representatives of Govt. of Gujarat (GOG) and Govt. of Madhya Pradesh (GOMP) was made available to the participants. A list of the material i.e. the handouts that were made available is enclosed vide Annex-2. (Either due to absence during this meeting or otherwise, if the Members or Invitees require copies of the handouts, this could be supplied to them by the NCA Secretariat on request). Expert Members and others might call for the material pertaining

to the discipline in which they were interested.

Shri I.M. Shah, Secretary (Narmada), Narmada Development Department (NDD), GOG opened the presentations on behalf of GOG. The circulated material by GOG summarised the present position in respect of Compensatory Afforestation Programme, Catchment Treatment Programme in forest areas and non-forest areas, Development of Dumkhal sanctuary, and Fisheries Development Programme. There was a separate note on Health Aspects. The material was read out by Shri Shah.

In reaction to the presentation by GOG, a point was made that they had quoted a total area of 11,399 sq.kms. of the basin as lying in Gujarat State. Subsequently, the area falling in Gujarat was mentioned as 42,300 ha of which 18,000 ha was reported under agriculture and as non-forest area. 19,386 ha was forest area of the watershed and identified for catchment treatment. Elsewhere in the notes presented by GOG, it was stated that 60,300 ha (603 sq.kms.) was the total area draining into Sardar Sarovar Project and lying in Gujarat that would need attention for catchment treatment. Chairman mentioned that the area needing catchment treatment was getting decreased from time to time. Also the methodology for prioritisation of the areas for catchment treatment had not been dealt with in the presentation paper. Chairman felt that the position with regard to catchment Area Treatment in Gujarat has not been brought out with required clarity and precision. Detailed action plan showing priorities should be prepared. The effort in this regard was not adequate and required to be geared up as the conditions of the clearance of the Sardar Sarovar Project stipulated that the environmental safeguard measures including catchment treatment should be expeditiously evolved and proceeded with in consonance

with the construction of the Project.

Shri R.S.Khanna, Vice-Chairman, Narmada Valley Development Authority (NVDA), GOMP intimated that the intervening catchment area draining into Sardar Sarovar Project and lying in Madhya Pradesh had also to be treated. He wanted that the catchment treatment plans of Sardar Sarovar Project could include such areas as were lying in Madhya Pradesh and Maharashtra. The total area for the catchment treatment action plans being considered for Sardar Sarovar Project could be such total areas. Such areas appears to have not been taken into consideration in the presentation of Government of Gujarat.

Shri Ashok Khosla of Development Alternatives pointed out that it was very important to have an adequate data base, and an acceptable methodology for drawing up the action plan. On the matter of criteria for evolving areas for priority treatment he indicated that much literature was available and relevant/appropriate criteria needed to be identified.

Dr. Panwar of the Wild Life Institute wanted a realistic approach in identifying the area to be treated on priority basis. He also wanted that there should be a methodology for afforestation.

In respect of compensatory afforestation, it was indicated that the classification of forest into the various types of degraded forest was based on number of trees available per ha, i.e., areas having over 6000 plants per ha, areas having between 6000 to 4000 plants per ha and areas having less than 4000 plants per ha. The catchment treatment requirements indicated by Gujarat were based on practices evolved in the forest department of Gujarat. It was indicated that where the canopy cover was over 6000 trees per ha and above, no plantation was envisaged. Only

fencing was considered necessary. When the canopy cover was between 4000 and 6000 per ha water bunding and grading was envisaged. On a quarry regarding the stock estimates, it was mentioned that these were based on the working plan maps that were upgraded by reconnaissance surveys. It emerged that the reliability of the information in respect of forest cover needed to be firmed up. Aspects such as planning forestation village-wise, identifying acceptable plantations, leaving common grazing grounds along with afforestation were also touched upon during discussions. Extent and manner of local participation was also not reflected in the action plan.

Both the catchment treatment plans and also the afforestation plans in Gujarat, needed further technical inputs. GOG representatives indicated that during the next meeting they would come up with answers and clarifications on the points raised and provide the necessary figures and detailed information etc.

It was also indicated that there were many other matters such as fisheries, water-logging in the proposed command areas, reservoir rim surveys that needed the attention of the GOG. Study reports and necessary information about their status could be presented in the forth-coming meetings.

Chairman then requested the representatives of GOMP to proceed with their presentations.

The first item that was taken up was the Reservoir Induced Seismicity (RIS) near Narmada Sagar Dam. The presentation was made by Shri S.K. Mokhashi, Additional Director, Central Water and Power Research Station (CW&PRS) as CW&PRS were entrusted with the job of evolving instrumentation etc. necessary for seismic surveillance. Shri Mokhashi explained that 140

years of record existing on the seismicity of the area was studied. There were six sizeable earthquakes recorded in the vicinity of these dams. The largest earthquake recorded was of magnitude 6.5 on the Reichter scale.

which included an international Consultant of repute on seismicity. There was agreement on the co-efficient adopted between the Design engineers of Central Water Commission and the World Bank. Snri Mokhashi explained that the measures being taken up were for observing the seismicity in the area prior to the construction of the dam and subsequently. This was planned to be achieved by positioning suitable seismographs at suitable/evolved locations. It was indicated by him that as per international practice, the requirement was for having adequate data to conclude whether there was any increased Reservoir Induced Seismicity, after impoundments. He also indicated that present indications were that RIS resulted in an increase of activity but not intensity.

Members enquired whether the stability of slopes on the reservoir rim in the case of Narmada Sagar Dam and also Sardar Sarovar Dam was studied and whether any report existed. It was indicated that the geology of the catchment was studied by officers from the Geological Survey of India and reports were available giving the nature of formations and slopes that exist around the reservoir rim. It might be necessary to look at the stability situation, when reservoir draw down took place. Such studies/reports could be placed before this sub-group. These studies could perhaps be done by the Project Authorities, in addition to the task entrusted to CW&PRS.

The status paper on catchment treatment in respect of catchment area draining into Narmada Sagar (Indira Sagar) was presented by Dr.G.S. Kaushal, Joint Director (Agriculture), NVDA. He mentioned that nearly 26% of the net freely draining area of the reservoir would need priority treatment. The treatment envisaged engineering and biological measures. Dr. Kaushal also explained at length the land use survey that was being carried out by All India Soil and Land Use Survey Organisation. The surveys were aimed at classifying the soils and land use, which information could be used for assessing soil loss and sediment contribution. Prioritisation of areas thereafter for treatment could be done. However, the methodology on which basis this was being done was not clear. Dr. Kaushal stated that as the soil surveys get finalised by the All India Soil and Land Use Survey Organisation, a presentation could probably be given by that organisation to either this Sub-group or some of the Members, who would be interested in the details thereof.

It was also indicated that the Space Application Centre (SAC), Ahmedabad had taken up the work of land use mapping by using landsat imageries. Units for various maps had been identified and it was expected that soil maps would be available by February, 1988. These compact maps would however be with a larger representative fraction and could give overall picture.

It was also indicated that the State Government had proposals for 3 pilot projects. These were on the recommendations of the Dewan committee, which examined the catchment treatment for Narmada basin. The Committee's recommendation was to identify 3 areas in sub-catchments of 8000 - 10000 ha each so that treatment could be carried out in such pilot projects and

further analysed in detail. The pilot schemes were identified by GOMP in the catchment of tributaries of Narmada, namely, Ghorapachar, Man and Datuni. It was also mentioned that work on pilot scheme in Datuni catchment would commence in January, 1988. It was indicated that a Technical Advisory Committee in respect of catchment area treatment was being constituted by the GOMP with experts drawn from the Central, State agencies and Non-Governmental experts to scrutinise proposals and evolve the requirements for monitoring and evaluation of the pilot projects etc.

The flora study was entrusted by GOMP to Botanical Survey of India (BSI). Shri O.P. Mishra, Scientist, BSI presented a status report on the studies carried out in the Narmada valley. The studies were started in December, 1985 and 60 to 70% of the work in the Narmada Sagar Project area had been completed.

During discussions it emerged that survey of the areas that would come under submergence could receive priority so that flora that was not found elsewhere could be identified and such flora could be given priority in plantations in the areas that would not come under submergence. Some of the Members felt that these studies alone were not sufficient. Zoning of the whole area was necessary. Methodology and action plans for transportation of rare species and time span for such action needed also to be fixed. Shri R.S. Khanna, Vice-Chairman, NVDA wanted that the terms of reference could be amplified and agencies who could implement action plans could be identified.

The public health aspect was presented by Shri M.S. Bedi, Chief Engineer (Environment), NVDA. He indicated that malaria appeared to be the single most important hazard and needed to be tackled. It was also

indicated that water-borne diseases such as Guinea worm infestation, Gastro-enteritis, Goitre (water related) were prevalent in the 10 districts of the Valley. Members indicated that it was necessary to have effective measures for screening of the diseases/carriers. Some of the Members wanted that studies related to the mosquito breeding vis-a-vis operation of reservoir could be carried out. They wanted that World Health Organisation Report, 1982 be referred to for identifying the scope of the studies.

Shri T.N. Maharishi, Chief Conservator of Forests, NVDA presented the studies in respect of Wild Life habitats near Narmada Sagar (Indira Sagar) Project. He explained that on the right bank of the river even after submergence, contiguous forests would continue to exist. Thus wild life could emerge out of the submergence area and take shelter in the adjoining forests.

In respect of the forests existing on the left bank of Narmada river after submergence, forest would be left in patches surrounded by agricultural lands. Wild life in that zone would face threat of movement restriction and exposure to man. Measures appeared necessary to conduct surveys of available wild life and evolve plans to transfer them to areas designated as preserves. He intimated that the Indian Wild Life Institute was identified by GOMP for entrusting with the task of such survey of wild life. GOMP was also making long term arrangement on its own for undertaking the survey if the proposal for Wild Life Institute did not materialise.

Madhya Pradesh had prepared an Action Plan in respect of afforestation in the degraded and denuded forest areas as per the direction/guidelines of

the Department of Forests, Ministry of Environment and Forests. This plan was submitted in November, 1987. This plan took into view the stipulation in the forest clearance letter for Narmada Sagar Project, that forestation could be completed in a time frame of 5 years. Shri Maharishi indicated that complete compensatory afforestation in 5 years might not be practicable considering the magnitude of the task.

He indicated that Clause (III) of the forest clearance letter was understood by GOMP to mean forestation of twice the affected area in degraded forest. Vice-Chairman, NVDA indicated that no violation of the Forest Act was made by the project authorities excepting over about 75 ha. Any penalty for violating the Forest Act needed to be limited to the quantum of the land on which violation had taken place.

Shri Y.G. Jadhav, I.G. (Forests) clarified that at the present moment their interpretation of violation of Forest Act was different. He also clarified that in respect of time span required for compensatory afforestation, this could be about 10 years out of which initial 5 years could be used for development of pastures and other fodder plants alongwith compensatory afforestation. Forestation could continue beyond the initial five years upto about 10 years. He, however, indicated that this time frame was needed to be put up to Government for approval.

Shri Jadhav also indicated that in all compensatory forestation proper thought should be given for leaving some common grazing lands near villages, where afforestation was envisaged. It was also necessary that in the forestry programme adequate provision be made initially for development of pastures and fodders for the live stock. He indicated that forests were under attack for fodder and fuel wood and provision for growing fodder

should exist in the compensatory afforestation plan so that the pressure on the forests got lessened.

After prolonged and fruitful discussion, the meeting was adjourned with a vote of thanks to the Chair.

ANNEX-1

List of participants of the Second Meeting of the Environment Sub-group of NCA held on 5.1.1988 at Paryavaran Bhawan, CGO Complex Phase II, Lodhi Road, New Delhi-110003.

1. Shri T.N. Seshan, Secretary to the Government of India, Ministry of Environment and Forests.
2. Shri T.V. Krishnamurthy, Secretary (Rehabilitation), Narmada Development Department, Govt. of Gujarat.
3. Shri R.S. Khanna, Vice-Chairman, Narmada Valley Development Authority, Govt. of Madhya Pradesh.
4. Shri A.K. Venkatesha, Superintending Engineer (WM), Ministry of Water Resources, Govt. of India.
5. Shri H.S. Panwar, Director, Wild Life Institute of India, Dehradun.
6. Dr. S. Ramaseshan, Professor, Department of Civil Engineering, Indian Institute of Technology, Kanpur.
7. Shri Ashok Khosla, President, Development Alternatives, New Delhi.
8. Dr. I.P. Abrol, Deputy Director General, Soil Agronomy and Engineering, Indian Council of Agricultural Research Institute, New Delhi.
9. Shri Y.V. Dharma Rao, Secretary, Narmada Control Authority.
10. Shri R. Sridhar, Environment Systems, Development Alternatives, New Delhi.
11. Shri K. Madhavan, Executive Member, Narmada Control Authority,
12. Shri I.M. Shah, Secretary (Narmada), Narmada Development Department, Govt. of Gujarat.
13. Shri G. Subba Rao, Secretary (Finance) & Financial Adviser (SSP), Narmada Development Department, Govt. of Gujarat.
14. Shri C.R. Samajpati, Secretary (Forests and Environment), Govt. of Gujarat.
15. Shri H.A. Vaishnav, Chief Conservator of Forests and Wild Life, Govt. of Gujarat.
16. Shri T.N. Maharishi, Chief Conservator of Forests, Narmada Valley Development Authority, Govt. of Madhya Pradesh.
17. Shri S.M. Saxena, Additional Chief Conservator of Forests, Narmada Valley Development Authority, Govt. of Madhya Pradesh.

18. Shri S. Seshadri, Member (Engineering), Narmada Valley Development Authority, Govt. of Madhya Pradesh.
19. Shri M.S. Billore, Member (Planning), Narmada Valley Development Authority, Govt. of Madhya Pradesh.
20. Shri Vijay Singh, Member (Rehabilitation), Narmada Valley Development Authority, Govt. of Madhya Pradesh.
21. Shri M.S. Bedi, Chief Engineer (Environment), Narmada Valley Development Authority, Govt. of Madhya Pradesh.
22. Shri Y.G. Jadhav, I.G., Department of Forest, Govt. of India.
23. Shri S.L. Mokhashi, Additional Director, CW&PRS, Pune.
24. Dr. S.C. Maudgal, Director, Ministry of Environment and Forests, Department of Environment, Govt. of India.
25. Dr. A.C. Ray, Additional Secretary, Ministry of Environment and Forests, Department of Environment, Govt. of India.
26. Dr. G.S. Kaushal, Joint Director (Agriculture), Narmada Valley Development Authority, Govt. of Madhya Pradesh.
27. Shri J.N. Sharma, Director (Rehabilitation), Narmada Valley Development Authority, Govt. of Madhya Pradesh.
28. Shri J.G. Padle, Reserarch Officer, CW&PRS, Pune.
29. Shri O.P. Mishra, Scientist, Botonical Survey of India, Allahabad.
30. Shri R.S. Upadhyaya, A.C., NMNH.
31. Shri O.P. Saxena, Dy. Director (E), Narmada Control Authority.
32. Shri Suresh Chandra, Dy. Director (C), Narmada Control Authority.
33. Shri R.K. Behre, Executive Engineer, NVDA, Govt. of Madhya Pradesh.
34. Shri H.V. Konaejkar, A.R.O, Govt. of Madhya Pradesh.
35. Shri S.K. Srivastava, Assistant Engineer, NVDA, Govt of Madhya Pradesh.

ANNEX-2.

LIST OF PRESENTATION MATERIAL CIRCULATED BY THE STATES

GOVERNMENT OF GUJARAT

1. Material for presentation to Environment Sub-group of NCA in the second meeting to be held on 5.1.1988 at New Delhi.
2. Work Plan on Health Aspects.

GOVERNMENT OF MADHYA PRADESH

1. A note on the Seismic Surveillance of the Narmada Sagar Complex Project Areas of Madhya Pradesh - Present Status.
2. Status paper on catchment treatment of Indira Sagar Project (Narmada Sagar Project).
3. (a) Policy of the State Government for rehabilitation of displaced persons for Narmada Projects (November, 1987).
(b) A Summary of Rehabilitation and Resettlement Plan of 12 villages of Phase-I submergence of Narmada Sagar Project.
4. Supplementary position paper on Public Health.
5. Flora, Fauna and Wild Life.
6. Compensatory Afforestation.

FOR OFFICIAL USE



NARMADA CONTROL AUTHORITY

Agenda Notes for Third Meeting of Environment Sub-Group of NCA

**Venue : Conference Room
4th Floor
Paryavaran Bhavan
CGO Complex, Phase II
Lodi Road, New Delhi**

Date : 19th July, 1988

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BACKGROUND INFORMATION

Narmada Sagar Project in Madhya Pradesh and Sardar Sarovar Project in Gujarat were given environmental clearance subject to certain stipulations. The environmental concerns as listed in the clearance letter are as under:

1. Rehabilitation Master Plan
2. Phased Catchment Area Treatment Scheme
3. Compensatory Afforestation Plan
4. Command Area Development
5. Survey of Flora and Fauna
6. Carrying Capacity of Surrounding Areas
7. Seismicity; and
8. Health Aspects.

Narmada Control Authority had been expanded and renotified so that it could monitor and direct implementation of environmental safeguard measures as reflected in appropriate action plans in consonance with implementation of projects. Sub-group on Environment in the NCA had been constituted under the Chairmanship of Secretary to the Govt. of India, Ministry of Environment and Forests in a State Nodal Officers meeting held on 31.10.1987.

The environment Sub-group of Narmada Control Authority since then had two meetings. In the last meeting of Environment Sub-group held on 5.1.1988, Govt. of Madhya Pradesh and Govt. of Gujarat made presentations in respect of status of formulation of action plans for Catchment Treatment, Compensatory Afforestation etc. As the Chairman of the Environment Sub-group of NCA wanted greater attention to be given the Action plan aspects were also discussed in the 26th and 27th NCA meetings.

NCA Secretariat further circulated guidelines received from Secretary to the Govt. of India, Ministry of Environment and Forests to the Governments of Madhya Pradesh, Maharashtra, Gujarat and Rajasthan. A copy of NCA's letter is placed at Annex-III(1). These guidelines indicated the data requirements for preparation of the Action Plans in a realistic manner.

In addition to such guidelines, it was considered necessary that technical expert inputs be provided in each area of concern to come up with appropriate Action Plans by the operating State Departments. In this area there appeared a need to provide such inputs to achieve a stage where Action Plans duly accepted by Department of Environment could be available and duly approved outlays and targets were listed for the NCA to monitor and pursue during their phased implementation in the Basin as a whole.

Item No. III-1(1): CONFIRMATION OF THE MINUTES OF THE SECOND MEETING
OF ENVIRONMENT SUB-GROUP OF NCA

Minutes of the second meeting of Environment Sub-group of NCA were circulated to all Members/Invitees.

Central Water and Power Research Station (CW&PRS), Pune had requested the following substitution in the statement on page 5, lines 3 to 5:

"For engineering designs, the earthquake magnitude considered is 6.5 on Richter scale on which the seismic factor of 0.20 is based. This earthquake magnitude is some-what higher than the largest earthquake magnitude of 6.25 known to have occurred in this region".

No other comments have been received from any other Member. As such the Sub-group is requested to confirm the circulated minutes of the 2nd meeting of Environment Sub-group with above modification.

Item No. III-2(2): REHABILITATION MASTER PLAN

A separate Sub-group to consider the Rehabilitation and Resettlement (R&R) Programme for the Narmada basin projects had been constituted under the Chairmanship of Secretary to the Govt. of India, Ministry of Welfare which had held 4 meetings so far.

Thus, Rehabilitation and Resettlement in respect of Sardar Sarovar Project oustees etc. remained outside the consideration of Members of the Environment Sub-group. However, present status of R&R was reflected in the minutes of the 28th meeting of NCA. Modalities of interface between R&R Sub-group and the Environment Sub-group may be considered.

This is for information.

Item No. III-3(3): PHASED CATCHMENT AREA TREATMENT SCHEME

A status paper on catchment treatment draining into Narmada Sagar was presented by the representatives of Madhya Pradesh during 2nd meeting of Environment Sub-group held on 5.1.1988. It was indicated that soil /land use survey maps would be available by February, 1988, and the report on land use surveys would be available by June, 1988. The position as indicated in the 28th meeting of NCA was that GOMP would be able to organise a presentation in that context.

Govt. of Gujarat had indicated that actual progress in respect of catchment area treatment was 528 ha upto March, 1988 and that soil and moisture conservation works and afforestation have progressed in Gujarat. Another area of 1330 ha was to be treated by fencing and nala-bunding works. The progress details conveyed are given in Annex III(2).

Govt. of Maharashtra in their note, copy placed at Annex III(3) had made reference to the Inter-State Departmental Committee under the Chairmanship of Shri M.L. Dewan and its report. Copies of actual plan proposed by GOM were, however, not with the NCA Secretariat and perhaps, the basis of formulation of action plan would need further technical inputs.

Ministry of Environment and Forests in its guidelines had suggested that catchment area treatment should cover both submergence periphery as well as free draining catchment and envisaged composite plans for both NSP and SSP covering the basin across the State boundaries. While land use survey mapping was a primary requirement and a necessity for prioritisation of areas needing treatment, collection of needed documentation, identifying outlays, obtaining administrative and expenditure sanctions, etc. is also a pre-requisite before implementation of the Action Plans can be taken up

There is need for obtaining Action Plan documents for NSP areas from GOMP and similarly, a coordinated plan for areas of SSP from GOG.

Specific action by the concerned States in this context was to be placed before the Sub-group. It was in that context of pursuing such project formulation that induction of consultants was proposed.

Members might like to discuss the suggestions/proposals.

Item No. III-4(4) : COMPENSATORY AFFORESTATION

Ministry of Environment and Forests, Govt. of India conveyed its conditional approval for diversion of 13385.45 ha of land for Sardar Sarovar Project and 41111.97 ha of forest land for Narmada Sagar Project vide its letters dated 8th September, 1987 and 7th October, 1987 respectively. Copies of these letters are placed at Annex III(4) and Annex III (5).

In respect of Narmada Sagar Project, GOMP had been maintaining that details of land for compensatory afforestation were prepared with (khasra number etc., village name) and were furnished to the Department of Environment. in their original proposal of November 1987. This proposal contained part non-forest areas to be brought under afforestation, and rest areas were identified from existing degraded forest and included in the proposals for afforestation. Such proposals remained under scrutiny of Ministry of Environment and Forests since November, 1987. GOMP maintained that the only issue remaining to be attended to in the conditions stipulated at the clearance time was a certification of non-availability of non-forest land, in justification of proposals for afforestation of degraded forests as part of Compensatory Afforestation plan.

There were also aspects like the time span for afforestation, that was stipulated at the time of clearance at 5 years. GOMP later on pointed out that 5 years would not be practicable. Perhaps, this could be extended upto 10 years as suggested by the NVDA Authorities in the 2nd meeting of Environment Sub-group in January, 1988. There were other details such as the need for pasture development initially and then going for plantation of identified species later on. The requirement of identified non-forest or other lands not encroaching on common pasture lands of villages, the development of nurseries, the management of plantation for sustained growth initially and subsequently were discussed but whether these aspects have been clearly brought out in the action plans or not is not clear.

The available correspondence in the matter from Ministry of Environment and Forests rests with a D.O. letter from Ministry of Environment and Forests placed at Annex III (6). GOMP, however, wanted specific suggestions on how the documentation of action plans could be speeded up and this matter had not yet been sorted out.

In respect of SSP, GOG vide their letter dated 13.5.1988, copy of which is placed at Annex III (7) had indicated that the low density forests would be upgraded over an area of 12,729 ha in the vicinity of reservoir and in forest areas. They had indicated that they had covered an area of 500 ha. Further targets had also been indicated in a letter copy of which is placed at Annex III (2).

GOM had been requested to send copies of actual action plan in respect of Compensatory Afforestation, in its territory in respect of SSP submergence.

GOMP indicated that for Compensatory Afforestation in M.P. in respect of SSP submergence, it had sent its action plans to GOG and was awaiting reaction of GOG.

Thus, comprehensive action plan for Compensatory Afforestation for SSP together in the three States , appears not to have been finalised and GOG needs to take an active role in its formulation.

Members might like to discuss and Ministry of Environment and Forests may give specific advice in the matter.

Item No. III-5(5): COMMAND AREA DEVELOPMENT

A command area development programme was proposed in case of Narmada Sagar Project to be undertaken in 3 phases to cover the net cultivable command. The preliminary plans for drainage works, field channels and on farm development were stated to have been evolved on the basis of pilot survey of the command areas. The project authorities had proposed that the on farm development works would be detailed and implemented over a period of 30 years starting from 1990-91.

The command area development for SSP was to be taken up region-wise for which 14 regions had been identified. Development of ground water had also been included based on physical characteristics of each region. The command in SSP was to extend over 17.6 lakh ha in Gujarat and 0.75 lakh ha in Rajasthan with possibility of development during the ensuing 17 years.

At the present time, CAD activity and plans come under the purview of Ministry of Water Resources and Department of Agriculture, who had examined the project documents. There was need and scope for phased detailing of command area development and atleast, the details of the area getting under command in the next 5 years should be firmed up and presented highlighting the safeguards for arresting water-logging, soil salinity and water-borne diseases etc.

GOMP and GOG might like to present a status position and their programmes of action.

Item No. III-6(6): SURVEY OF FLORA AND FAUNA

During the 28th meeting of NCA, it was intimated that the task of study of flora in the NSP submergence area was entrusted to the Botanical Survey of India, but that studies were not completed and probably Botanical Survey of India had left the study. The position needs to be sorted out with the good offices of Ministry of Environment and Forests between GOMP and Botanical Survey of India.

As regards fauna studies in NSP submergence areas, GOMP reflected that Zoological Survey of India completed its work. If the finalised report is with GOMP, that could be made available to Ministry of Environment and Forests and to NCA Secretariat.

GOG in the above NCA meeting had come up with a proposal to entrust flora and fauna study to the Deptt. of Botany, M.S. University, Vadodara. The terms of reference, as also proposal from the University indicating its approach are placed at Annex III(8). It would be necessary for the Sub-group and the Expert Members to make suggestions and clear the proposals after due deliberation.

GOM had in its note circulated in the 28th meeting of NCA come out with an action plan on flora and fauna studies. The note is placed at Annex III (3).

In the matter of Archaeological monuments, fossil finds, GOMP indicated that the State Department as also Archaeological Survey of India, Govt. of India were conducting studies and listing out affected monuments, artifacts, fossil sites. GOMP had to come out with a report on the salvage action necessary and relevant action plans in that context to ensure that salvage takes place before submergence commences. Co-ordinated action by State experts in areas of SSP submergence in Maharashtra and Gujarat would also be necessary, but is not yet available.

Members might like to discuss and advise.

Item No. III-7(7): CARRYING CAPACITY OF SURROUNDING AREAS

The State Governments were to present information collected and the studies taken up about the carrying capacity of the neighbouring areas wherein wild-life from submergence area would disperse. Study was necessary to assess the impacts of mass wild-life transfer as submergence of Narmada Sagar was separating chunks of reserve forests.

GOMP had, as per the conditions of clearance, to constitute a Wild Life Board. This was done recently. It was explained that the delay was due to the late expression of inability on the part of Indian Wildlife Institute, Dehra Dun in taking up the functions envisaged. Govt. of Madhya Pradesh might like to make available relevant orders setting up the Board and the Terms of Reference.

In respect of wildlife, Govt. of Gujarat indicated that Shoolpaneshwar Sanctuary was being provided with required works such as rubble wall fencing, check dam etc. The details of progress are in Annex III(2).

GOG, had, however, included the above area of study in the work proposed to be entrusted to M.S.University, Vadodara. Further, areas affected in Maharastra and Madhya Pradesh due to SSP submergence were also included in the study.

Members might like to discuss.

Item No.III-8(8): SEISMICITY AND RIM STABILITY OF RESERVOIR

GOMP had earlier made presentation to the Environment Sub-Group regarding the Instrumentation that would be set up for recording the seismic-activity in the basin near the proposed reservoirs.

GOG intimated that after 3 years of effort it had been able to obtain the instruments that would be necessary for positioning around the rim of reservoir for recording Seismic- activity.

Representative of GOMP might like to make available the studies in respect of reservoir rim stability of NSP as these were separately got completed. GOG might like to indicate the status of study on the rim stability in respect of SSP.

Members might like to discuss.

Item No. III-9(9): HEALTH ASPECTS

GOMP representative in an earlier meeting indicted that malaria appeared to be the single most serious hazard to be tackled. Water borne diseases such as guineaworm infestation, gastro-enteritis, goitre (water related) were prevalent in the 10 districts of the valley. Stress was given to carry out studies related to the mosquito breeding vis-a-vis operation of reservoirs. Such study if done is required to be placed before the sub-group.

Director of Public Health, GOMP was separately identifying the extent of augmentation of infrastructural and health delivery system and also the safeguard measures necessary. GOMP might elucidate further.

GOG representative indicated that appropriate measures were already being taken up for arresting the water borne diseases in the colony and near the dam site. These may be elaborated.

GOM representative may like to place action plan in respect of Health aspects - covering the present status of water borne diseases, preventive measures proposed to control the incidence of water borne diseases in its territory likely to be affected by SSP.

From a review of information received from States it emerged that comprehensive plan of action is not yet documented.

Members might like to discuss.

Item No. III-10(10): FISHERY DEVELOPMENT IN SSP RESERVOIR

GOG in the 28th meeting of NCA had circulated a draft agenda and proposals for setting up an Inter-state Organisation for management of Fisheries Development in SSP. This placed at Annex III(9).

Members may like to discuss and advise.

ANY OTHER ITEM

DATE AND VENUE OF NEXT MEETING

ANNEXES VOLUME

Annex No.	Agenda Item in which referred to	Page No.
Annex III (1)	Background information	1 - 6
Annex III (2)	Item Nos. III-3(3), III-4(4) & III-7(7)	7 - 13
Annex III (3)	Item Nos. III-3(3), III-6(6)	14 - 20
Annex III (4)	Item No. III-4(4)	21 - 23
Annex III (5)	Item No. III-4(4)	24 - 26
Annex III (6)	Item No. III-4(4)	27
Annex III (7)	Item No. III-4(4)	28 - 29
Annex III (8)	Item No. III-6(6)	30 - 49
Annex III (9)	Item No. III-10(10)	50 - 56

Gram : 'NARMCONTROL'

ANNEX III-(1)

नर्मदा नियन्त्रण प्राधिकरण

NARMADA CONTROL AUTHORITY

Flat No. 118, Annex Block
Palika Bhavan,
Sector-XIII, R. K. Puram
New Delhi-110066

No. D-34(3)/88/153

Dated..17.12.1988..19

To:

Shri K.C.S. Acharya
Chief Secretary to the
Govt. of Madhya Pradesh
Vallabh Bhawan
Bhopal-462006.

Shri R.V. Chandramouli
Chief Secretary to the
Govt. of Gujarat
New Sachivalaya Complex
Gandhinagar-382010.

Shri K.G. Paranjpe
Chief Secretary to the
Govt. of Maharashtra
Mantralaya
Bombay-400 032.

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.

.....

Sir,

Please find enclosed herewith a copy of D.O. letter along with its enclosures received from the Secretary to the Govt. of India, Ministry of Environment and Forests addressed to the Secretary to the Govt. of India, Ministry of Water Resources. The D.O. letter alongwith its enclosures of the Ministry of Environment and Forests gives details regarding data collection and preparation of needed action plans in respect of Narmada projects. The frame work is to be evolved uniformly by all the four States so that Action Plans are prepared expeditiously.

It is requested that follow-up action by concerned Departments for the preparation of Action Plans may kindly be taken up. A time frame by which time action plans are expected to be ready may also be intimated to the NCA Secretariat.

Yours faithfully,

sd/-

(Y.V. Dharma Rao)
Secretary
Tel: 676078

Encl: as above

Copy alongwith a copy of enclosures forwarded for information and necessary action to:

GOVERNMENT OF MADHYA PRADESH

1. Shri R.S. Khanna, Vice-Chairman, Narmada Valley Development Authority, Narmada Bhawan, Tulsinagar, Bhopal-462 003.
2. Shri S. Sehnuri, Member(Engineering), Narmada Valley Development Department, Narmada Bhawan, Tulsinagar, Bhopal-462003.
3. Shri Vijay Singh, Member(Rehabilitation), Narmada Valley Development Department, Narmada Bhawan, Tulsinagar, Bhopal-462 003.
4. Shri T.N. Maharishi, Chief Conservator of Forests, Narmada Valley Development Department, Narmada Bhawan, Tulsinagar, Bhopal-462 003.

GOVERNMENT OF GUJARAT

5. Shri I.M. Shah, Secretary(Narmada), Narmada Development Department, Block No.8, 6th floor, New Sachivalaya Complex, Gandhinagar-382 010.
6. Shri P.A. Raj, Additional Chief Secretary, Narmada Development Department, New Sachivalaya Complex, Gandhinagar-382 010.
7. Shri T.V. Krishnamurthy, Secretary(Rehabilitation), Narmada Development Department, Block No.9, 8th floor, New Sachivalaya Complex, Gandhinagar-382 010.
8. Shri H.A. Vaishnav, Chief Conservator of Forests & Wild Life, Government of Gujarat, C/o Shri I.M. Shah, Narmada Development Department, New Sachivalaya Complex, Gandhinagar-382 010.

GOVERNMENT OF MAHARASHTRA

9. Shri V. Kanganathan, Secretary(Relief & Rehabilitation), Revenue and Forests Department, Government of Maharashtra, Mantralaya, Bombay-400 032
10. Shri P.Abraham, Secretary(Environement), Govt. of Maharashtra, Mantralaya, Bombay-400 032.
11. Shri D.L. Garud, Commissioner(CADA) and Secretary(Irrigation), Mantralaya, Bombay-400 032.
12. Shri K.C. Sankhe, Chief Engineer(WR) and Joint Secretary, Govt. of Maharashtra, Mantralaya, Bombay-400 032.

GOVERNMENT OF RAJASTHAN

13. Shri Rajendra Jain, Commissioner and Secretary(Irrigation), Govt. of Rajasthan, Secretariat, Jaipur-302 005.
14. Shri G.C. Kanjelia, Chief Engineer(Irrigation), Govt. of Rajasthan, Sindhia Bhawan, Jaipur-302 005.
15. Shri D.S. Meena, Secretary, Forest & Environment, Government of Rajasthan, Secretariat, Jaipur-302 005.

Copy also forwarded for information to:

Shri 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 Complex, Phase 11, Lodi Road, New Delhi-110003.

Copy of D.O. letter No. 5/87/90/HOI/Env.5/IX dated February 4, 1988 from Shri T.N. Seshan, Secretary to the Govt. of India, Ministry of Environment and Forests, Paryavaran Bhawan, Lodhi Road, New Delhi addressed to Shri Naresh Chandra, Secretary to the Govt. of India, Ministry of Water Resources, New Delhi.

.....

You may kindly recall that in the last meeting of the NCA, it was considered desirable that to facilitate basic environmental data collection and preparation of needed Action Plans 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

1. 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, socio-economic profile of affected 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 degradation, erodability, precipitation pattern, cloud bursts, land slides, biotic pressures, siltation load, other existing and proposed activities.

CATCHMENT AREA TREATMENT PLAN

1. Criteria adopted for identifying degraded and vulnerable areas;
2. Map showing critically degraded area requiring engineering and biological treatment on the basis of a recent field survey;
3. Details of the engineering and biological measures proposed to be carried out as a time bound programme;
4. Arrangements made to mobilise:
 - Technical manpower to carry out the soil conservation and rehabilitation schemes;
 - Planting material either through creation of special nurseries or through purchases from Forest Department etc.
5. Geomorphological studies of the reservoir periphery.

2. COMPENSATORY AFFORESTATION

1. Map of the areas identified for afforestation;
2. Land capability survey of the identified areas;
3. Availability of surface and ground waters;
4. Species identified and the nursery creation programmes;
5. Phased Action Plan for compensatory afforestation;
6. Public participation details;
7. Details of after-care and monitoring.

:- 2 :-

3. REHABILITATION AND MASTER PLAN

1. Enumeration of affected population including those whose land is 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;
5. 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.

4. 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 availability-surface and ground; natural drainage pattern, induced drainage, yield, permeability, precipitation distribution, salinity and alkalinity problems, soil profile, land capability.

HUMAN MANAGEMENT

Cropping pattern, rationale and controlled water use; training for skills upgradation; package of irrigation water, seeds, fertilisers, insecticides, pesticides with controls; surface and subsurface drainage.

Command Area Development Plan should cover the following:

COMMAND AREA DEVELOPMENT PLAN

1. Land capability survey of the area which are proposed to be brought under irrigation along with the soil profiles;
2. Identification of the areas prone for water logging and salinity;
3. Details of the drainage works proposed in the command and the norms based on which these details have been planned;
4. On-farm 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;
6. Steps proposed to prevent contamination of ground and surface water due to fertilisers, pesticides, runoff.

5. FLORA AND FAUNA

FLORA

Rare and endangered species, gene-pool reserve.

FAUNA

Rare and endangered species, migratory species, migration route, breeding habitat, sanctuary, national park.

Accordingly, the rehabilitation of Flora and Fauna Action Plans would cover the following:

1. Survey of flora and fauna in the region going to be affected due to implementation of the scheme;
2. Gene-pool, if any, likely to be affected;
3. Details of wildlife habitats in the region;
4. Measures proposed to rehabilitate endangered species of flora and fauna, if any;
5. Assessment of the carrying capacity of the neighbouring areas wherein the wildlife would disperse if the scheme is implemented
6. Plan for rehabilitation of endangered Flora and Fauna.

6. HEALTH ASPECTS

1. Present status of the water-borne disease in the area;
2. Present status of the health delivery system;
3. Screening arrangements proposed for the work force;
4. Preventive measures proposed to control the incidence of water-borne diseases;
5. Reinforcement proposed of the existing health delivery system.

7. MONUMENTS AND CULTURAL ASPECTS

1. Cataloging of monuments and sites considered important from religious, historical and cultural angles;
2. Plan for rehabilitation of monuments wherever necessary.

Subj: Requirement of funds for various components under Sardar Sarovar Project

No. : WLP/FYP/6750/24/A/805-10 of 1988/89
Vadodara, dated 10 May, 1988

To

Kum. Binduben B. Gamit
Deputy Secretary to the Government
Forest & Environment Department
Sachivalaya, Gandhinagar.

The following afforestation programmes are being undertaken in the State in terms of clearance obtained for the Sardar Sarovar Project from the Government of India under the Forest Conservation Act:-

- (1) Compensatory plantation in 4650 ha. in Kutch District.
- (2) Treatment in catchment areas.
- (3) Afforestation in the vicinity of the Sardar Sarovar Project
- (4) Proposal for additional works in Shoolpaneshwar Sanctuary.

The initial works on all the above components have already been started from the year 1987-88 and advance works have been carried out under each of these components during the last financial year. An amount of Rs. 26.05 lakh was obtained from the Narmada Development Department for carrying out the advance works during the year 1987/88. The areas wherein advance works have been carried out will have to be planted up during the current year and advance works for the year 1989/90 will also have to be carried out during the current financial year. The requirement of funds for each of the components is indicated herein below. The total requirement for the various components during the current year would be Rs.331.27 lakh. I would request you to move the N.D.D. for release of funds as required and also for the sanction of staff required for the purpose which has already been indicated in the project submitted for each of the component as a part of the work plan for clearance of the Sardar Sarovar Project.

(1) Compensatory afforestation in Kutch District:

Out of the total area of 4650 ha. to be planted up in the Kutch District, advance works have already been carried out in 500 ha. for which an amount of Rs. 10.00 lakh has been released by the N.D.D. during the year 1987/88. This area will be planted up during the current year. In addition, an area of 2050 ha. is to be planted during the year 1989/90 for which we will have to carry out advance works during the current financial year. In the project submitted in this regard as a part of the work plan, the staff pattern has already been indicated earlier. According to this, the full component of staff will be required during the year as this will be the first year in which the works will start in full swing. The details of expenditure required for carrying out compensatory plantation during the current year is indicated below:-

	Rs. in lakh
(i) First year operations including planting, weeding in 500 ha.	19.38
(ii) Advance works in 2050 ha.	56.50
(iii) Capital cost of buildings, water sources, etc.	11.63
(iv) Equipment and vehicles	4.62
(v) Operating cost	2.60
(vi) Staff expenditure	15.58
Total:	Rs. <u>110.31</u> lakhs

The details of staff requirements as already indicated in the project are given in Annexure I. It is requested that the NDD may be moved to release the amount of Rs.110.31 lakh and also to accord approval for the sanction of staff required as shown above.

(2) Treatment in catchment areas:-

As part of the work plan submitted to the N.D.D. an area of 19386 ha. of catchment area in Gujarat has been proposed to be afforested with three treatments namely:-

Treatment (a) Soil and moisture conservation works and afforestation with 2000 plants per ha.

Treatment (b) Soil and moisture conservation works and afforestation with 400 plants per ha.

Treatment (c) Fencing and nala bunding works only.

Treatment (a) and (b) require advance works, accordingly advance works in these components have been carried out as under :-

Treatment (a)	250 ha.
Treatment (b)	278 ha.
	<u>528 ha.</u>

An amount of Rs. 14.05 lakh was received during the year 1987/88 from N.D.D. for carrying out the above works. During the current year, the areas in treatment (a) and (b) wherein advance works for planting have been carried out would have to be afforested and nala bunding and fencing works are to be carried out in 1330 ha. under treatment (c). In addition advance works would have to be carried out for the plantation treatments (a) and (b) as indicated below:-

Treatment (a)	2000 ha.
Treatment (b)	1050 ha.
Total :	<u>3050 ha.</u>

For the above works requirement of funds is indicated hereunder:

Treatment (a)	(i) Plantation in 250 ha. @ 2000 plants per ha.	Rs. 4.72 lakh
	(ii) Advance work for 1989/90 plantations (2000 ha.)	Rs. 68.48 lakh

Treatment (b)	(i)	Plantation in 278 ha. (@ 400 plants per ha.)	Rs. 1.07 lakh
	(ii)	Advance works for 1989/90 plantation (1050 ha.)	Rs. 23.69 "
Treatment (c)		Current works for 1330 ha.	Rs. 13.30 "
		Sub Total:	<u>Rs. 111.31</u> "

The details of staff requirement are shown in Annexure II.

Staff requirement	Rs. 13.22 lakh
Equipment and vehicles	Rs. 3.00 "
Operating cost	Rs. 3.30 "
Sub Total:	<u>Rs. 19.52</u> "
Total:	<u>Rs. 130.83 lakh</u>

In this project the requirement of staff has already been indicated in the project prepared and submitted as part of the work plan. It is requested that the N.D.D. may kindly be moved to release the funds amounting to Rs. 130.83 lakhs in favour of this department and also to accord approval for the sanction of the staff required.

(3) Afforestation in the vicinity of Sardar Sarovar Project:

In the project submitted to Government under this office No. LND/D/641/Pt.III/24/A/976 dated 15/7/1987, it has been proposed to afforest an area of 110 ha. of rainfed plantations and 125 ha. by raising irrigated plantation. During the year 1987/88 advance works for this component have been carried out as under:-

- (1) Rainfed plantations - 30 hectares
- (2) Irrigated plantations - 5 hectares

The above areas will have to be planted up during the current year i.e. 1988/89 monsoon. The requirement of funds for this area is as under :-

(1)	Rainfed plantation:-		
	(i)	First year operation including planting in 30 hectares.	Rs. 0.57 lakh
	(ii)	Advance works in 40 ha. (for 1989/90 plantations).	Rs. 1.57 "
(2)	Irrigated plantations :-		
	(i)	First year operations including planting of 5 hectares.	Rs. 0.41 "
	(ii)	Advance works in 30 ha. for 1989/90 plantations.	Rs. 1.46 "
(3)	Tubewells	...	Rs. 4.50 "
(4)	Staff requirement	Total	<u>Rs. 1.10</u> " <u>Rs. 9.52</u> "

It is requested that the N.D.D. may be moved to release the amount of Rs. 9.62 lakh and also to accord approval for the sanction of staff required as given in Annexure III.

(4) Additional works in Shoolpaneshwar Sanctuary:-

During the year 1988/89 the following works are proposed to be undertaken as per the project submitted to Government under this office No.LND/D/641/Pt.III/24/A/1002 of 28/7/1987.

- | | | |
|-----|--|----------------------|
| (1) | Rubble wall fencing around the Sanctuary (25 Km.) | Rs. 6.25 lakh |
| (2) | Habitat improvement, firelines etc. (15 Km.) | Rs. 0.15 lakh |
| (3) | Construction of check dams (5Nos) | Rs. 2.75 lakh |
| | | <u>Rs. 9.15 lakh</u> |

Under this component an amount of Rs. 2.00 lakh was received from the N.D.D. during the year 1987/88. No staff requirement has been proposed in this component as the works will be carried out through the local existing staff. It is therefore requested that the N.D.D. may be moved to release the amount of Rs. 9.15 lakh as shown above.

The planting operations in all the above components would have to be carried out with the onset of monsoon during the current year. It is therefore requested that N.D.D. may be moved to release the funds immediately and also to accord sanction to the staff as detailed in various components.

In addition to the above four components the G.O.I., while clearing the project under the Forest Conservation Act, have also laid down the condition that an additional area equal to double the area going under submergence should be afforested from among the degraded forest areas in the State. Consequent to this provision a project for afforestation of 9300 ha. of degraded forest areas in the State to be afforested in five years has been submitted to Government under this office No. LND/D/641/Pt.III/A/2241 dated 15/1/1988. The advance works on this project would have to be initiated this year to take up the plantations in 1800 ha. in the year 1989/90. Advance works for 70% of the targeted area will have to be carried out this year for which an amount of Rs. 71.36 lakh would be required. It is requested that the N.D.D. may be moved to release this amount as also accord approval for the staff proposed in the project.

Sd/-
(H.A. Vaishnav)
Chief Conservator of Forests(WL)
Gujarat State.

copy f.w.cs. to CCF (D&M) GS Vadodara
copy to C.Fs. PPME, Vadodara & Surat.

Annexure - ICompensatory Plantations

<u>Category</u>	<u>Number</u>
Dy. Conservator of Forests	1
Range Forest Officer	6
Foresters	20
Guards	67
Head Clerk	1
Accountant	10
Clerk	2
Messenger	2
Watchman	1
Jeep Driver	1
Statistical Assistant	1
Typist	2
Steno	1
Tractor Driver	2
Tractor cleaner	2
Surveyor	1

--X--

Annexure 11

Treatment of catchment areas

<u>Sr. No.</u>	<u>Category</u>	<u>Number</u>
1.	Dy. Conservator of Forests	1
2.	Assistant Conservator of Forests	1
3.	Range Forest Officers	9
4.	Foresters	27
5.	Guards (including Ord. Guards)	93
6.	Head Clerk	1
7.	Steno	1
8.	Accountants	12
9.	Clerks	2
10.	Peons	3
11.	Jeep driver	1
12.	Tractor driver	1
13.	Tractor cleaner	1
14.	Watchman	1
15.	Statistical Assistant	1
16.	Typist	2
17.	Surveyor	1

-x-

Annexure III

Afforestation in the vicinity
of Sardar Sarovar Project.

--X--

<u>Sr. No.</u>	<u>Category</u>	<u>Number</u>
1.	Range Forest Officer	1
2.	Foresters	2
3.	Guards	3

--X--

ANNEX III-(3)

LETTER

No.RPA.3188/61464-R-5,
Revenue and Forests Department,
Mantralaya, Bombay- 400 032.

Dated: 2.6.88

To,

The Secretary,
Narmada Control Authority,
Palika Bhavan, Sector XIII,
R.K.Puram, NEW DELHI : 110066.

Subject:-Environmental action viz-a-viz
clearance of Sardar Sarovar Project.

Sir,

I am directed to refer to your letter
No.3-34(3)/88/153, dated 17th February 1988 on the
above subject and to state that this State has already
prepared the following reports and has sent their
copies to Narmada Control Authority.

1. Catchment area treatment plan,
 2. Compensatory afforestation.
 3. Health aspects.
 4. Fisheries Plan
2. Action plan in respect of preparation of
environmental works plan for flora and fauna is now
enclosed (in 5 copies)

Yours faithfully,


(Section Officer)

Revenue and Forests Department.

Enclosure:-Copies of report.

NOTENote on Sardar Sarovar Project - Preparation of
environmental works plan for Forest and Wild Life.Introduction :

Inter State Sardar Sarovar Project is being commissioned near Navagam dam in Gujarat State on the Narmada River. Forest and other areas of Gujarat, Maharashtra and Madhya Pradesh will be submerged under reservoir. The details of forest and other areas being submerged from Maharashtra are as under :-

Sr. No.	Name of Tahsil.	Geographical Area (Ha)	Forest Area (Ha)	Agricultural Lands (Ha)	Other areas (Ha)
1.	Akrani	5184.86	5124.40	60.46	-
2.	Akkalkuwa	2540.60	1364.14	436.83	739.63
Total.		7725.46	6488.54	497.29	739.63

The proposals for diversion of the above mentioned forest land for non-forest purpose have already been submitted by the Government of Maharashtra to the Government of India for their approval into 2 phases.

Catchment Development Plan :

Inter State Departmental Committee under the Chairmanship of Dr. M. L. Dewan was constituted by the Government of India to go into the details of the development of catchment of Sardar Sarovar Project and one more project namely Narmada Sagar on Narmada River. The Committee submitted its report to the Government of India and suggested various measures of development of catchment area.

Compensatory Plantations :

One of the conditions laid down for the diversion of forest, land, for the non-forest purpose under the Forest Conservation Act, 1980 is to raise the compensatory plantations on equivalent non-forest land. The forest department has taken over possession of 6489.87 Ha. of revenue waste land from Akrani tahsil for this purpose and a detailed project for the compensatory plantation has been prepared.

General environment (Site, Climate settlement) :

Out of 7725.46 Ha of anticipated submergence area, major portion is under forest and rest is under agriculture and other use. The details are given as below :-

Sr. No.	Name of Tahsil.	No. of villages	Geographical Area(Ha)	Forest Area(Ha)	Agricultural Area(Ha)	Grazing Area(Ha)	Settlement Area(Ha)	Other Area(Ha)
1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Akrani	24	5184.86	5124.40	60.46	-	-	2184.26
2.	Akkalkuwa	12	2540.60	1364.14	436.83	-	-	739.63
		36	7725.46	6488.54	497.29	-	-	2913.89

The following features exist within 20 Kms. of the proposed site, No. of villages within 20 Kms. of the submergence area and their population.

1) Human settlement specify population.	District	Total No. of villages.	Total population (1981) census.
	Dhule	117	38631

The crops cultivated in the area are mainly Jawar, Paddy, hill millets, Kapasi, Jwar, Udid, Mug, Barti etc.

Cattle graze in the forest area only. There is no separate grazing land.

There is no national park or forest sanctuary in this area.

The list of nala/streams/rivers is as under :-

<u>Rivers</u>	<u>Streams</u>
1) Irkal	1) Amboda
2) Uda	2) Chinchpani
3) Deoganda	3) Phalai
4) Pandevi	4) Ambar
	5) Lendhi
	6) Kuhumba
	7) Dhawali
	8) Sukhada
	9) Khad
	10) Nalibar
	11) Kujabar
	12) Muyabar
	13) Pandevi
	14) Bendapita
	15) Mongidara
	16) Bhivanya
	17) Sisahibar
	18) Mograbari
	19) Gaman
	20) Himaribar
	21) Baman
	22) Bedkatar
	23) Danel
	24) Ambarbar
	25) Mandara
	26) Mukhadi
	27) Pochari
	28) Mulyabar

There are two artificial lakes on Toranmal plateau situated about 15 Kms. from submergence area. There is no estuary.

Archealogical/Historical Cultural/Scenic sites/
Scientific Institutions/Hospitals/Sancturries/
Religious importances,

Ancient Surpaneshwar Temple of Lord Shiva is situated just on the bank of Narmada River near Manibeli village 1 kms. from the dam site. This temple will be submerged in the dam.

Within 20 kms. of the submergence area in Akranl Tahsil of Dhule District, Toranmal Platou is being developed as hill station. On this plateau 15 forest rest houses are

located. Along the periphery of the platou 5 view points have been developed. Two artificial lakes have also been created which add beauty to the area. This is being developed as Tourist spot being of scenic and climatic importance. Fortunately there are no industries in this area.

Types of flora and fauna, especially, Wildlife, endangered species, found in this area are as under :-

1) Flora

(a) Tree species.

- | | |
|--------------------------------|---|
| 1) Teak | <i>Toctona grandis.</i> |
| 2) Sadala | <i>Terminallia Tomentosa</i> |
| 3) Dhawada | <i>Amogeissus latifolia</i> |
| 4) Tiwas | <i>Ougeinia cojeinensis</i> |
| 5) Kalam | <i>Mitraygyna Nerviflora</i> |
| 6) Haldu | <i>Adina cordifolia</i> |
| 7) Khair | <i>Acacia catechu</i> |
| 8) Sisam | <i>Dalbergia latifolia</i> |
| 9) Angan | <i>Hardwickia binata</i> |
| 10) Bija | <i>Pterocarpus marsupium</i> |
| 11) Kudi | <i>Wrightia tinctoria</i> |
| 12) Salai | <i>Bosewellia Serratta</i> |
| 13) Bamboo
(Kasti) | <i>Bambusa arundinacea</i> |
| 14) Bamboo
(Manvel) | <i>Dendrocalomus etrictus</i> |
| 15) Al | <i>Morinda tinctoria rocks</i> |
| 16) Amba | <i>Mangifera indica linn</i> |
| 17) Apta | <i>Bauhinia racemosalamk</i> |
| 18) Asana | <i>Bridelia retusa spreng</i> |
| 19) Amla Or
Awali. | <i>Emblica officinalis gaert</i> |
| 20) Bel | <i>Aegle marmelos corr.</i> |
| 21) Bahawa | <i>Cassia fistula linn</i> |
| 22) Bhutkes | <i>Elacodendron ilaucum pere</i> |
| 23) Bor | <i>Zizyphus mauritiana lamk</i> |
| 24) Dhudhikuda | <i>Holarrhena antidysenterica</i>
(BR) wall. |
| 25) Ghatbor | <i>Zizyphus xylopyra willd</i> |
| 26) Hed(Haladu)
(Haladuwan) | <i>Adina cordifolia hook-f</i> |
| 27) Hivar | <i>Acacia leueophlaea willd</i> |
| 28) Kada | <i>Steraulia urens Roxb</i> |
| 29) Kakad | <i>Garuga pinnata Roxb</i> |
| 30) Kala siras | <i>Albizzia odoratissima Benth</i> |
| 31) Karanja | <i>Pongamia pinnata(Linn)plerro</i> |
| 32) Modai
(Mohim) | <i>Lannea coromandelica(Hor.)</i>
<i>Merra</i> |
| 33) Mahuwa Or
(Mhowra) | <i>Madhucindica Gmel</i> |
| 34) Nimb
(Neem) | <i>Azadirachta indica juss</i> |
| 35) Dalas | <i>Butea monosperma(Lamk)Taub</i> |
| 36) Pangara | <i>Erythrina indica lam</i> |
| 37) Phasi | <i>Dalber ,ia paniculata roxb</i> |

-5-

The tract was fairly rich in both spall as well as big game in the past. However, because of various factors like large scale hunting and poaching and destruction of habitat by illicit felling and encroachment for cultivation by the local tribals, the wildlife has almost vanished from the tract.

Nevertheless, very rarely the wild life like Black bear, Panther, Bear, Nilgai, Wild cat, Jackals, Wild bore can be seen in the tract usually away from human habitat. The submergence of forest area is not going to disturb the wildlife existing in the adjoining tract. On the contrary the reservoir will develop water habitat and hence will attract more wild life in the tract.

...

No. B-372/83-FC
 Government of India
 Ministry of Environment & Forests
 Parvathan Bhavan, C.G.O. Complex,
 Lodh Road, New Delhi-110003.

Dated 8th September, 1983

To

1. The Secretary,
 Agriculture Forest and
 Cooperative Department,
 Govt. of Gujarat,
 Sachivalaya, Gandhinagar,

2. The Secretary,
 Forest Deptt.,
 Govt. of M.P.,
 Bhopal,

3. The Secretary,
 Revenue & Forest Deptt.,
 Govt. of Maharashtra,
 Mantralaya, Bombay,

Subj: Diversion of 13385.45 ha. (6488.54 ha. in Maharashtra
 4165.91 ha. in Gujarat and 2731.00 ha. in Madhya Pradesh)
 of forest land in Dhule, Bhurach and Kharqona districts
 respectively for Sardar Sarovar Project.

Sir,

I am directed to refer to your letter No. JFLD-1282-
 78159-V-1 dated 17.2.83 (Gujarat) 205/58/83/10/3 dated 31.8.84
 (Madhya Pradesh) and JFLD.1000/111531-11-FC dated 8.9.83
 (Maharashtra) on the above mentioned subject seeking prior
 approval of the Central Government under Section 2 of the
 Forest (Cons) Act, 1980 and to say that the proposal has been
 considered by the Advisory Committee constituted by the
 Central Government under Section 3 of the Forest (Cons) Act,
 1980,

2. After careful consideration of the proposal, the Central
 Government hereby conveys its approval for diversion of
 13385.45 ha. of forest land for Sardar Sarovar Project as per
 details given below:-

S.No.	State	Forest land to be diverted (ha.)
1.	Gujarat	4165.91
2.	Madhya Pradesh	2731.00
3.	Maharashtra	6488.54

3. This approval is strictly subject to the following

conditional -

- i) Legal status of the land will remain unchanged.
- ii) The full details of the non-forest lands for raising compensatory afforestation with complete details viz. Khasara No, Villages etc. will be reported by the State Government before 30.9.87.
- iii) The non-forest areas available for rehabilitation of all the districts will be reported by the State Governments or a proposal to the satisfaction of Govt. of India in this regard will be furnished by the State Governments before 30.11.87.
- iv) No work on the project in forest area will be commenced until and unless condition under (ii) & (iii) above are fulfilled.
- v) Since the project involves violation and also most of the non-forest areas for compensatory afforestation are away from the project area, the State Govts. will raise compensatory afforestation in double the degraded forest lands also in the project impact areas in addition to the afforestation on equivalent non-forest land. A scheme for this will be submitted by 30.11.87.
- vi) The State Governments will prepare by 30.11.87 a plan for the treatment of catchment areas relating which the Central Government will appoint a team for this purpose at the cost of the project for this purpose.
- vii) No forest land will be utilized for the rehabilitation of districts.
- viii) Tree felling will be permitted in submergency areas only up to 4 M below FRL.
- ix) Tree planting will be done on either side of the canals, roads, forest area of the reservoir and in the wasteland/vacant lands under the control of the Irrigation Department.
- x) Water will be supplied free of cost to the Forest Department for raising nursery and for irrigating forestry plantations in the command area.
- xi) In order that the construction labour & staff while working on the project in the forest area may not cause destruction to the forest area for meeting their fuelwood needs, the user agency will establish fuelwood depots and will provide suitable alternative domestic fuel such as fuelwood, coal, kerosene oil etc. to them free of cost or at cost deducted from their salary and wages.

Yours faithfully,

(R.S. Bhat)

Under Secretary to the Govt. of India.

-3-

Copy to:-

- 1, Chief Conservator of Forests, Govt. of Maharashtra, Pune,
- 2, Chief Conservator of Forests, Govt. of Gujarat, Vadodra,
- 3, Chief Conservator of Forests, Govt. of M.P., Bhopal,
- 4, F.No. B-97/83-FC
- 5, F.No. B-421/84-FC
- 6, Forest File,

(R.S. Bhatt)

Under Secretary to the Govt. of India,

No.B-546/84-PC
 Government of India
 Ministry of Environment and Forest,
 (Department of Environment, Forests and Wildlife)

.....

Paryavaran Bhavan, CGO, Complex,
 Lodi Road, New Delhi, 110003.

Dated the 7th Oct. 1987.

To

The Secretary,
 Forest Department,
 Government of Madhya Pradesh,
Bhopal.

Subject:- Diversion of 41111.97 hectares of forest land in Khandwa, Dewas and Hoshangabad districts for the Narmada Sagar Multipurpose Project.

Sir,

I am directed to refer to your letter No.5/111/84/10/3 dated 15.10.1984 on the above mentioned subject seeking prior approval of Central Government under Section 2 of the Forest (Conservation) Act, 1980.

2. After careful consideration of the proposal, the Central Government hereby conveys its approval to diversion of 41,111.97 hectares of forest land in Khandwa, Dewas and Hoshangabad districts for the Narmada Sagar Multi-purpose Project as under:-

Item No.	Purpose	Area (ha)
(1)	Submergence	40,332.00
(2)	Power House	50.00
(3)	Saddle Dam	37.26
(4)	Road	70.73
(5)	Colony, approach road, etc.	621.90 (already utilised before 1980)
Total:		41,111.97

The approval is subject to the following conditions;

1) The State Government of Madhya Pradesh will intimate by 31st December, 1987, the complete details of equivalent non-forest land identified for compensatory plantation, preferably in project impact area.

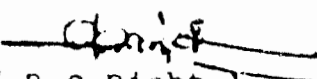
- ii) The work of compensatory afforestation will be completed in five years' time. Depending upon the availability and selection of suitable area in the non-forest/forest land, a detailed scheme will be prepared by the State Government showing year-wise targets and expenditure, keeping in view the cost escalation on account of inflation. The project will release the amount for these annual plantation programme as per the scheme in the beginning of each financial year in the non voted fund to the Forest Department of the State Government. The State Government would ensure that these amounts would be in addition to the normal forestry budget.
- iii) 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 Government 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.
- iv) The areas will be surveyed, demarcated and declared protected forests and placed under the control of the Forest Department for compensatory afforestation at the cost of the project. Areas not found suitable will be substituted by suitable areas.
- v) The State Government will also intimate details of the non-forest land identified for rehabilitation of the oustees and draw up by 15th December 1987 a rehabilitation plan to the satisfaction of the Government of India.
- vi) No work on the project in forest area will commence unless conditions (i) & (v) above are fulfilled.
- vii) Under item (2) of paragraph 2 above only 50 hectares should be utilised for construction of the power house only. The proposed colony in the Power House area should be accommodated in the area of 621.98 hectares already utilised under item (5).
- viii) Sand quarry should be located in the submergence area. Therefore, the area of 72.50 hectares for sand quarries and 41.15 hectares for approach road for sand quarries is not being permitted for non-forest use.
- ix) For conservation and management of wildlife, a committee will be constituted by the State Government by 15th December, 1987 which will include a representative from the Government of India. The Committee will suggest the necessary steps to be taken and draw up a plan which will be implemented at the cost of the project.
- x) Forest clearance will be done only upto 4 M below FRL.
- xi) A plan for the treatment of the catchment area will be prepared by 15th December, 1987 and implemented at the cost of the project.
- xii) Tree planting will also be done on either side of canal,

- 3 -

road and foreshore of the reservoir and in the wasteland/
vacant lands under the control of the Irrigation Department
in the command area.

- xiii) Water should be supplied free of cost to the Forest
Department for raising nursery and irrigated forest
plantations in the command area.
- xiv) In order that the construction labour and staff while
working on the project in the forest area may not cause
destruction of forests for meeting their fuelwood needs, the
Project Authorities will establish fuelwood depots, and will
provide the fuelwood free of cost to the labourers.
- xv) Satisfactory fulfilment of the above conditions will
be a deciding factor for the future proposals of the State
Government for diversion of forest land under Forest
(Conservation) Act, 1980

Yours faithfully,


(R.S. Bisht)

Under Secretary to the Government of India.

ANNEX III-(6)



पर्यावरण एवं वन मंत्रालय
पर्यावरण भवन
पी. ओ. ओ. कॉम्प्लेक्स
लोदी रोड
नई दिल्ली-110003

सचिव, भारत सरकार
SECRETARY
Government of India

Telo : 360721
Telox : W-66185 DOE IN
Gram : 'PARYAVARAN'
Ministry of Environment and Forests
Paryavaran Bhawan
C.G.O. Complex
Lodi Road
New Delhi-110003

1052/88
5/11/88

D.O.No.8-646/84-FC
April 4, 1988.

Dear Shri Singh Deo,

Please refer to the letter No.F5/111/84/10/3 dated 18th November, 1987 from the Special Secretary (Forests), Madhya Pradesh regarding the compensatory afforestation and rehabilitation plan of the Narmada Sagar Project.

2. The State Government has proposed 10,142.99 ha. of non-forest land and 70,802 ha. of forest land for raising compensatory afforestation. As per the condition No.(i) of our letter dated 7.10.87, equivalent non-forest land has to be identified for compensatory afforestation. The State Government may kindly identify 4111.97 ha. of non-forest land for this purpose anywhere in the State. In the alternative a certificate of non-availability of non-forest land for this purpose may be issued in accordance with the guidelines issued by this Department.

3. The compensatory afforestation work carried out must be certified by the State Forest Department.

4. Regarding rehabilitation of oustees, it is said that a total of 40,000 ha. of land will be required. Out of this, 33,801 ha. of land has been identified as available from voluntary sales and 7,000 ha. of Government land will also be available. The complete details (Khasra No. etc.) of the land said to be available are requested to be furnished at also needs to be considered whether the lands so identified can be taken in possession by the State Government immediately, as these land may not be available after sometime.

With regards,

Yours sincerely,

(T.N. Seshan)

Shri M.S. Singh Deo,
Chief Secretary,
Govt. of Madhya Pradesh,
Bhopal.

Copy to Shri Pooch, Chandra, Secretary, Ministry of Water Resources,
Government of India, New Delhi.

ANNEX III-(7)

I. M. SHAH,
Secretary (Narmada)

D.O.NO.NPG/GST/Area/178/867
Phone 20374(O)/22334(R)
NARMADA DEVELOPMENT
GOVERNMENT OF GUJARAT
Sachivalaya, Gandhinagar
-382010

dated 13.5.1988

Dear Shri Dharma Rao,

One of the conditions stipulated by Government of India while conveying the approval for diverting 1385.45 ha. of Forest Land collectively in the States of Gujarat, Maharashtra and Madhya Pradesh for Sardar Sarovar Project vide letter No.8-372/83-FC dated 8.9.87 of the Ministry of Environment and Forest, Government of India, is as under.

"Condition No.5. Since the project involves violation and also most of the non-forest areas for compensatory afforestation are away from the project area, the State Governments will raise compensatory afforestation in double the degraded forest lands also in the project impact areas in addition to the afforestation on equivalent non-forest land. A scheme for this will be submitted by 30.11.1987".

You are aware that in the Work Plan that has been prepared for the catchment treatment measures in the vicinity of the reservoir, the existing low density forest will be upgraded over an area of 12729 ha. as under.

- | | |
|--|----------|
| i) Afforestation with 2000 plants per hectare in forest area with tree cover density less than 0.4 | 9251 ha |
| ii) Afforestation with 400 plants per hectare in forest area with tree cover density between 0.4 and 0.6 | 4478 ha. |

Total: 12729 ha.

Besides this, in an area of 6657 ha. of forest in catchment area having tree cover density more than 0.6 other conservation measures have also been planned.

- 2 -

The Forest & Environment Department, Government of Gujarat has also commenced stock mapping of 7786 ha. of the remaining forest area in the catchment and the extent of low tree cover density will be worked out and measures to upgrade the forest cover will be undertaken in this area also.

This area of 12729 ha. of low density forest land in the catchment area which is proposed to be added with more afforestation is more than double the area of 4523 ha. forest area in Gujarat State diverted for Sardar Sarovar Project. This is also in addition to the area of 4650 ha. of non-forest land over which compensatory afforestation is being raised. Hence, the plan for upgrading 12729 ha. of low density forest in the catchment area of the project is considered as adequate compliance of condition No.5 referred to the first paragraph.

The Ministry of Environment and Forests, Government of India, may kindly be informed by N.C.A. accordingly.

With kind regards,

Yours Sincerely,

Sd/-

(I. M. SHAH)

Shri Y.V. Dharma Rao,
Secretary,
Narmada Control Authority,
Room No.118, 7th Floor,
Palika Bhawan, Sector-XII,
R.K. Puram, NEW DELHI-110 022.

Copy forwarded with compliments for information to:

Shri S.C. Huddgal, Director(EA), Ministry of Environment & Forest, Paryavaran Bhawan, CGO Complex, Near Jawaharlal Nehru Stadium, Lodi Colony, New Delhi-110 003.

Shri R.S. Bisht, Under Secretary to Govt. of India Ministry of Environment & Forest, Paryavaran Bhawan, CGO Complex, Near Jawaharlal Nehru Stadium, Lodi Colony, New Delhi-110 003.

Shri Javed Unadkhary, Secretary, Forest & Environment Department, Block No.14, New Sachivalaya, Gandhinagar.

(I. M. Shah)

Govt. of Gujarat

Draft Agenda Note for the consideration of Namada Control Authority:

...

Item: Terms of Reference for the detailed environmental ~~studies~~ studies (flora and fauna studies) proposed to be carried out in the Catchment area of Sardar Sarovar Project.

...

One of the conditions stipulated by the Ministry of Environment and Forests, while giving clearance for Sardar Sarovar Project from the environmental angle, related to the commissioning of detailed studies relating to flora and fauna in the catchment area and plans for their conservation.

In this context, Govt. of Gujarat has approached the Department of Botany, M.S.University of Baroda for carrying out the study. Certain suggestions have also been received from the Ministry of Environment and Forests, Govt. of India (through the Namada Control Authority) about the parameters to be considered for the study.

These aspects have been discussed in detail with the Professors of the Dept. of Botany, M.S.University of Baroda and a comprehensive

proposal has been received. The detailed Terms of Reference for the study have also been drawn up. Copy of the proposal received from the M.S. University and the draft Terms of Reference are attached as Annex-1 and 2. Both these may be considered by the Authority, so that GOG may commence the study after the ensuing monsoon.

ECOLOGICAL AND ENVIRONMENTAL STUDIES ON NARMADA - IN DEPTH STUDIES

I. BIOLOGICAL RESOURCES INVENTORY

AND

ECO-ENHANCEMENT STUDIES ON SARDAR SAROVAR SUBMERGENCE IN GUJARAT

PROF. A.R. MEHTA

PROJECT DIRECTOR & CO-ORDINATOR

PROF. S.D. SALNIS

PROJECT DIRECTOR

DEPARTMENT OF BOTANY

THE M.S. UNIVERSITY OF BARODA

BARODA.

ECOLOGICAL AND ENVIRONMENTAL STUDIES ON NARMADA - IN DEPTH STUDIES

I. BIOLOGICAL RESOURCES INVENTORY

AND

ECO-ENHANCEMENT STUDIES ON SARLAR SAROVAR SUBMERGENCE IN GUJARAT

PREAMBLE

A growing nation's hunger for power seems insatiable. Equally insatiable is the physical hunger for growing population. Dams, because they supply cheap hydro-electric power and waters for irrigating fields are the obvious solution. They have proved efficient over a large number of years. As a result there are well over sixty thousand dams of all sizes in the world to-day and every year hundreds of new ones are added to this impressive number.

In spite of this fact, even an announcement of a large multi-purpose river project in the country has evoked strong reactions from the protagonists and the antagonists of the dam. In such controversies, the rational approach is generally lost which should comprise a proper impact analysis of the project in terms of tangible and intangible gains and losses. Only after such an environmental-economic-assessment of the project and exploration of all its probable alternatives that any large-scale human action be planned.

The multipurpose Narmada project is no exception to this rule. It has been in the planning stage for nearly 25 years now and has faced storms and inclement weathers till its sanction by the Central Government, only recently. Even then the controversies do not seem to have settled down.

The Narmada Planning group of the Government of Gujarat assigned the job of evaluating the impact of the Narmada Project - both upstream and downstream of the river - on a number of biological and inter-connected physical parameters to the M.S. University of Baroda. A study group, consisting mainly of indigenous expertise, was formed to look into the ecology and environment of the Narmada river system particularly in view of the fact that the running river ecosystem was to be converted into a lake model, thousands of tribals had to be evacuated and submergence of large tracts of forests was inevitable.

The research group started its work in February and submitted its report in July, 1982. Obviously it was meant to be a short-term bench-mark study.

The Objectives of the Study were:

- (1) to collect data on various parameters of the ecosystem on scientific lines in order to properly assess the present status;
- 2) compile information on the past status of the same parameters from official records and documents in order to assess the quality and quantity of change, if any;
- (3) utilise these data to assess the trend of changes likely to be set in due to a major biotic intervention in the form of dam and huge mass of water on the physical conditions and biota in the immediate environs of the Havanam dam both upstream and downstream;
- (4) suggest remedial measures which are tried elsewhere under similar situation or which have emanated from discussions during the study;

- (5) suggest measures to mitigate the negative impacts of the proposed action;
- (6) suggest methods of enhancing the positive impacts, if any, of the proposed action.
- (7) make a scientific, objective and impartial assessment of negative and positive impacts in the form of an impact analysis statement to justify the proposed action plan or to suggest possible alternatives.

The project had a narrow data base on which futuristic predictions were based. In this task the group had to fall back on the referral system of data collection from the consultants and experts. It has also to base its assessments on the experience gained by them or the consultants at other river projects in the vicinity. The methodology was considered adequate and scientifically satisfying in view of the time constraints put by the sponsors of the study on the research groups.

In spite of the time constraint, the project was successfully completed. The following constitute highlights of the observations made:

- (1) Increase in Agricultural and Industrial production leading to the improvement of the socio-economic status of the people;
- (2) Moderation of heavy floods and reduction in their frequency;
- (3) Improvement of the forest due to increased availability of water;

- (4) Boost in fish production in the upstream area though, the fish production in the downstream will have a set back due to the reduction of flow.
- (5) The area around the Sarovar can be developed into a tourist centre, wild life and bird sanctuaries.

However, attention was also drawn, among many other things, to the following aspects which need constant monitoring and in depth study;

- (1) submergence of a large area
- (2) displacement of people and cattle
- (3) loss of forest and wild life
- (4) increase in sea ingress
- (5) reduction in fish production especially of Hilsa etc.

Now that the project is a reality, a dream-come-true for the State of Gujarat, it is necessary that all the negative impacts pointed out by the study group in their short-term report be taken up for more detailed investigations, broaden the data base to facilitate more accurate predictions and suggest mitigative measures to alleviate the sufferings of the human and other biological inmates. It is also essential to accentuate the positive impacts in order to derive maximum benefits from this eco-disturbance. It is high time that we look upon such developmental activities as opportunities to blend a harmonious and mutually beneficial relationship between man and his natural environment.

2. PROJECT DETAILS

The site of the Dam proposed to be constructed across Narmada is located at Navagam. The dam will be a concrete gravity one including spillways both in the riverbed and on the banks. The height of the dam will be 155 meters from the deepest foundation. It will be 1200 meters in length. The axis of the dam runs north-south. The FRL of the dam has been fixed as 139 meters by the Narmada Water Dispute Tribunal. Besides Sardar Sarovar, 4 dykes will be constructed to form inter-connected ponds, the main canal off-taking from the last of series. The Sardar Sarovar will be like an expanded river. It will be 214 Km long and on an average less than 2 km wide (Maximum width 16 KM). The main canal and its branches could command a gross area of 3.4 million hectares and cultural command area of 2.1 million hectares in different regions.

The project is also proposed to have two power houses having a total installed capacity of 1450 MW.

The proposed dam at Navagam would involve submergence 370 sq.kms of land upstream of the dam in Gujarat with a gross storage capacity of 7.7 MAF.

From a regional or a national angle, it is a very ambitious and a costly project with obvious advantages of appreciable increases in food production due to availability of water for the parched lands in the far off corners of the State. Its power generation is to benefit all the riparian States. Only a cautious and judicious use of this water resource will enhance the positive impacts.

What really should be of great concern to us are the direct negative impacts of this human action such as submergence of forest displacement of tribals, microclimatic changes, loss of wild-life habitat, loss of many endemic plant and animal species of potential economic importance, water flow changes, sea-ingress and increased salinity in the downstream, loss of fishery in terms of quality and quantity, changing fishery patterns in the upstream. Over and above the said direct negative impacts, a number of indirect negative impacts could stem from poor management of the project. These will include soil and land erosion in the catchment and reservoir periphery, spread of obnoxious and ubiquitous aquatic weeds and their harbouring of a number of vectors of human diseases, the changing patterns of the health profile of the riparian population etc. All the negative impacts, direct or indirect thus demand constant monitoring and control to make the multi-purpose project a real success in terms of the quality of human life. It is to be looked upon as an opportunity to enhance the entire river ecosystem, which is under great stress due to biotic pressures even when the dam is nowhere in sight.

The present proposal for an in-depth study of some of the aspects of the river ecosystem marks the beginning of a series of such critical probes. The approach will always be positive and rational. The work will be carried out by the Botany Department in collaboration of the Zoology Department of The M.S. University of Baroda.

The work plan of the present proposal will include studies on;

I. Biological Resources Inventory

SURVEY OF FLORA AND FAUNA IN THE REGION likely to be affected by the implementation of scheme will be carried out with a view to preparing a detailed catalogue of all plant and animal species (with particular reference to wildlife both plants and animals and their habitats). Collection, preservation and photographic documentation following standard taxonomic procedures will be tried. A museum of "Vanishing Bio-resources and their rehabilitation" provides the motivation for this work. Identification of food chains and studies on the seasonal changes in the food preferences and adaptive changes in the dietary habits will facilitate prediction of faunal changes due to submergence due to creation of a large reservoir. Identification of various linkages between insects - birds-bats and the tree population in terms of pollination and seed dispersal mechanisms will be crucial in projecting future afforestation plans and the sustenance of the forest ecosystem. Investigations on specific (both positive and negative) plant-animal interaction. It is envisaged that studies on insect pests of endemic plants as well as species of birds dependant on specific plants for nesting/foraging, will help planning afforestation strategies. For items 2-4, visual observations, binocular study, long distance photography constitute essential methodology. Phytochemical screening of the major floral elements of the area of submergence for sources of pharmaceutical and industri-

ally important compounds to be done following usual chemical procedures in the phytochemistry laboratory of the Botany department. The study will help assessing the plant wealth loss quite adequately

MEASURES FOR THE REHABILITATION OF RARE AND ENDANGERED PLANT OR ANIMAL SPECIES, if any, will receive particular attention from the point of view of their rehabilitation on alternative sites, conservation and successful survival. Introduction in botanical garden/animal house and breeding in captivity as also in vitro (tissue culture) cultivation will be practised. Gene-pool particularly with reference to locally grown varieties of crop plants as also those of wild relatives of grasses and legumes will be urgently attended to. Their rehabilitation under controlled conditions will be attempted.

7. All the aquatic weeds will be studied and more particularly the Pistia and water-hyacinth especially with reference to their potential threat to the reservoir and canal system. Various studies dealing with their growth requirements and reproductive processes will be undertaken. This will help the comparative assessment of the various mechanical, chemical and biological methods of control of these obnoxious aquatic weeds. However, emphasis will be laid on the biological method of weed control for obvious reasons.

II. ECOLOGICAL ENHANCEMENT AND DEVELOPMENT OF NEOECOSYSTEM

- (a) Land use pattern in the 1st submergence villages will be

critically studied. A proper pattern will be worked out for the lake periphery and catchment area.

- b) Phytosociological studies will be conducted in the adjoining richer forests to gain insight into frequency, dominance, and density of plant species. Importance value indices of major plant species will be calculated. Such studies will help in determining the existing carrying capacity of forest with a view to assessing impacts of mass wild life transfers in the event of scheme implementation.
- (c) Studies will be directed towards the reservoir periphery with respect to problems of soil and land erosion. In addition to various civil engineering measures, a few biological measures will be tried. Biological measures will be adapted for the protection/improvement of the health of catchment area as recommended by the Diwan Committees. A number of tree species and grasses be particularly tried on an experimental basis to assess their potential in soil conservation and land stabilisation provided by the specified vegetal cover.
- (d) A number of fast-growing, indigenous tree legumes will be particularly tried for the betterment of the entire reservoir peripheral region. The area selected for compensatory afforestation will be as per the guidelines laid down by the Ministry of Environment. Results obtained during various studies on this riparian eco-system will help to evolve agroforestry patterns congenial in every way to the neoecosystem. Adjacent areas will also be worked out to assess the potentialities of this area.

- (e) Artificial islands with suitable tree cover, in the submerged areas would naturally attract a number of large, colonialy nesting birds in course of time, and may logically become an excellent sanctuary. Birds such as Painted Storks, Ibises, Spoonbills, Herons and Egrets breed in mixed heronries. Such a breeding colony would also attract predatory species of birds and mammals, thus enriching the faunal component of the altered ecosystem.

This natural process might take several years; but can be hastened, aided and abetted by the use of experimental agroas wherein captured, pinioned birds maintained in enclosed shallow water system would attract over-flying birds during migratory as well as foraging flights. Recent studies on foraging and roosting behaviour of large birds have shown that presence of feeding birds below stimulate overflying flocks to land, since the former are indicators of food availability and productivity of the ecosystem. It should be recalled here that such experiments have produced excellent results in Delhi Zoological Park.

- (f) Further ecological and economic enhancements of the ecosystem is possible by slight human manipulation. Development of apiary as an additional revenue source and also for facilitating pollination processes in tree population is a case in point. Introduction of Bombyx mori utilising the natural and man-managed populations of Mahuda and the introduction of mulberry may also be tried for eco-enhancement.

- (g) Improvement in the carrying capacity of the newly developed forest ecosystem would facilitate creation of a regulated wild-life sanctuary in the area.

The study group will require recent aerial photographs of the submergence area to initiate and effectively handle the various research components envisaged under the holistic project involving all the existing biota. The Narmada Planning Group is requested to make these aerial photographs available right at the commencement of the project.

A vehicle constantly at the disposal of the Study group will go a long way in assuring effective functioning of the Project.

JOB ASSIGNMENTS

1. DR. G. PRADIPASHEAN -
 1. Aquatic weed studies
 2. Meteorology and soil analysis
 3. Afforestation plans
 1. Field trip every month.
2. DR. S.J. BEDI -
 1. Forest ecological studies
 2. Actual and potential productivity study
 3. Eco-enhancement study particularly soil protection
 1. Field trip every month.
3. PROF. R.P. BHATT -
 1. Floristic studies of various plant groups
 2. Proper documentation including material preservation and herbarium
 3. 1. Field trip every month.
4. DR. Y.K. NAIK -
 1. Identification, classification and possible census of Amphibians, reptiles and mammals.
 2. Food chain in the above and food analysis (stomach-content identification) in various seasons.
 3. Study of above animals and their place in the ecosystem.
 - 1 Field trip every month.
5. DR. G.K. MENON -
 1. Identification and inventory of bird fauna.
 2. Birds in the food-chain, and nesting-feeding association with plant communities, identification of pollinators and seed dispersing species in the ecosystem.
 - 1 Field trip every month.
6. DR. N. RADHAKRISHNAN -
 1. Identification of insects and arthropods in general.
 2. Pest and beneficial species of the above to be identified and their role in ecology assessed.
 - 1 Field trip every month.

(study of fish fauna will be tackled jointly).

7. PROF. S.D. SABNIS - 1. To supervise and issue day to day instructions to both the groups.
2. To lead field trips once in 2 months.
3. Preparation of 6 monthly and final reports jointly with the Project Director-Co-ordinator.
8. PROF. A.R. MEHTA - 1. To plan general strategies for the research project.
2. To coordinate activities of both the groups, and discuss progress every month.
3. Lead field trip's once in every 2 months.
4. Preparation of 6 monthly and final reports.

The entire research team will occasionally visit various sites in Gujarat for comparative assessment of ecological impacts for more accurate futuristic predictions and proper ecosystem enhancement at the Sardar Sarovar site.

Annex-2

Terms of Reference for the detailed environmental Studies proposed to be carried out through the Dept. of Botany, M.S.University, Vadodara.

A. BIOLOGICAL RESOURCES INVENTORY:

1. To carry out a survey of flora and fauna in the region likely to be affected by submergence (in Gujarat) on account of implementation of Sardar Sarovar Project. This will include a detailed catalogue of all vegetations and animal species with particular emphasis on wild life and their habitats. This will also include collection, ^{or data} preservation and documentation/ following standard procedures. Creation of a museum of endangered bio-resources and their rehabilitation will be one of the end objectives.
2. To identify food chains, seasonal variations in food preferences and adaptability to changes in food habits, to facilitate prediction of changes that may be caused on account of submergence due to the creation of a large reservoir.
3. Identification of vital linkages between insects, birds and vegetation in terms of pollination and seed dispersal mechanism which will be crucial for projecting afforestation plans and sustenance of forest ecosystem.

4. To study the various aspects of plants, animal interaction (both positive & negative) in the biosphere.
5. To carryout studies on insect pests of endemic plants as well as the species of birds dependent on certain plants for nesting and foraging. This will help in planning conservation strategies.
6. To carry out phytochemical screening of major elements of flora to identify sources of medicinally and industrially important varieties.
7. To suggest adequate measures for the rehabilitation of rare and endangered plant and animal species, if any, to ensure their conservation and successful survival.
8. To identify genepools, if any, affected by the implementation of the project and to suggest measures for proper rehabilitation under control condition. In this respect attention will be paid particularly with reference to locally grown varieties of crop plants as also the relatives of wild grasses and legumes.
9. To study the potential threat to the reservoir and canal system by different varieties of aquatic weeds, more particularly *Salvinia* and water hyacinth.

To study the reproductive process and growth requirements of aquatic weeds in order to make a comparative assessment of mechanical, chemical and biological measures of control of these obnoxious aquatic weeds, emphasis being laid on biological control measures.

B. ECOLOGICAL ENHANCEMENT AND DEVELOPMENT OF NEO-ECOSYSTEM:

1. To critically study the landuse pattern of the villages going under submergence.
2. To conduct phytosociological studies in the adjoining forests to gain ^{insight} ~~insite~~ in-to frequency, dominance and density of plant species and to assign importance value indices of major plant species. This should be done for determining the carrying capacity of forests in the neighbourhood with a view to ~~xxxxxxx~~ ^{or} assessing the impact of the inevitable transfer of wild life following the project implementation.
3. To study the measures needed for the betterment of reservoir periphery with the introduction of indigenous trees species.
4. To study the potential of artificial islands that may be created within the reservoir for attracting a large number of colonially nesting birds in course of time and to suggest measures needed for

developing these islands as bird sanctuaries.

This will also include studies on foraging and roosting behaviour of birds species, identifying the presence of birds flocks on the islands to stimulate overflying flocks of bird to land and nest on the islands.

5. To suggest ecological and economic enhancement of the ecosystem by proper management techniques To study the potential for development of apiaries as source of revenue for the people affected by submergence.
6. To suggest measures for popularising Mulberry and Mahua plantations to improve the sources of income for the people affected by the submergence.

C. GENERAL:

1. To carry out all other studies in accordance with the proposal, which may not have been specifically mentioned above.

Govt. of Gujarat

Draft Agenda note for the consideration of Narmada Control Authority :

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Item : Proposal of Govt. of Gujarat for setting up an Inter-State Organisation for Management of Fisheries Development in Sardar Sarovar Project.

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The reservoir that will be formed after the implementation of Sardar Sarovar Project by the Govt. of Gujarat, will cover areas lying in three states namely Gujarat, Maharashtra and Madhya Pradesh. As a part of the environmental safeguards measures, Govt. of Gujarat is implementing a Work Plan for development of fisheries in the reservoir.

In view of the inter-state expanse of the reservoir, Govt. of Gujarat desires that the management of Fisheries Development in the reservoir may be looked after by an independent organisation. For this purpose, initial thought has been given for constituting an Inter-State Fisheries Development Authority. A copy of the draft constitution of the proposed Narmada Inter-State Fisheries Development Authority is attached as Annex-1.

Since the issues involved are not confined to merely developmental activities, the proposed organisation will be a statutory Authority with promotional and regulatory functions the consent of the parties

Gujarat, Maharashtra and Madhya Pradesh and also that of the Govt. of India would be needed before the Authority can be set up. It is with this objective in view that the Govt. of Gujarat has brought the matter before the Narmada Control Authority for the consideration of the Govt. of India, Govt. of Madhya Pradesh, Maharashtra and Gujarat. The draft statute will be finalised after a consensus is reached in this forum.

The development of fisheries is being looked after by an Inter-state Board in Tungabhadra Reservoir. Govt. of Gujarat has got in touch with the concerned State Govt. as also the Commissioner of Fisheries, Govt. of India, to obtain relevant and useful details of the Inter-state Board for Tungabhadra Reservoir, so that the draft constitution for the Narmada Inter-State Fisheries Development Authority could be refined having regard to the experience in Tungabhadra project. Their response is awaited.

ANNEX :- 1.

R
 DRAFT PROPOSAL FOR CONSTITUTING THE NARMADA INTERSTATE
 FISHERIES DEVELOPMENT AUTHORITY (NIFDA) FOR MANAGING THE
NARMADA PROJECT FOR DEVELOPMENT OF FISHERIES.

1. Name : The name of the organisation shall be Narmada Inter-state Fisheries Development Authority (NIFDA).
2. Status : NIFDA shall be an Inter-state Statutory Body entrusted with regulatory and development functions.
3. Jurisdiction : The jurisdiction of NIFDA shall extend the area covered by Sardar Sarovar at F.S.L. 455 ft. in ~~to~~ the 3 participating states, viz. Gujarat, Madhya Pradesh and Maharashtra.
4. Aims & Objectives :
 - i) To undertake fisheries development in Sardar Sarovar through regulatory and promotional activities.
 - ii) To negotiate and resolve disputes if any, between the three participating States with regard to the fisheries development in the reservoir.
 - iii) To undertake welfare measures for the fishermen.
 - iv) To take appropriate measures for the protection of resources in the reservoir.
 - v) To take appropriate measures for prevention of pollution in the reservoir to ensure that the water remains conducive to fish growth.
 - vi) To take appropriate measures^{to} protect the resources in the downstream of the Narmada Dam.
5. Functions : The functions of NIFDA consist of regulatory and promotional activities.

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5.1. Regulatory Functions : NIFDA shall lay down policies regarding (1) stocking, (2) fishing (3) prevention of poaching, (4) marketing, (5) prevention of pollution and (6) conservation.

5.2. Promotional function : NIFDA shall promote the following activities :

1. Seed Production, (2) Resource development (3) Infrastructure development (4) Marketing arrangements, (5) Training and extension (6) Institutions building, (7) Research and Development (8) Ancillary industries, (9) Rehabilitation and (10) Welfare of fishermen.

6. Powers : NIFDA shall make rules and regulations for achieving the aims and objectives NIFDA shall have the appellate and adjudication powers.

7. Location : The headquarters of NIFDA will be in Gujarat.

8. Organisation

The members of the NIFDA shall be the representatives of the participating States. NIFDA shall have a Governing Council, an Executive Committee and an Appellate committee. The constitution of the Governing Council and the Committees shall be as follows :

: 3 :

B.1	<u>Governing Council.</u>	<u>No.</u>
	a) Secretaries of the Department of Fisheries of the 3 States	3 *
	b) Representative of Fisheries Cooperative Apex Federation/Corporations	3
	c) Representatives of fishermen to be nominated by State Governments	3
	d) Representative of NABARD	1
	e) Representative of Gujarat State Narmada Development Department	1
	f) Chief Executive Officer of NIFDA	1 Secretary

B.2 Executive Committee

a) Heads of Department of Fisheries	3 *
b) Representatives of fishermen	1
c) Representative of Gujarat State Narmada Development Department	1
d) Chief Executive Officer of NIFDA	1 Secretary

Appellate Committee.

a) Secretaries of the Fisheries Department	3 *
b) Representative of Gujarat State Narmada Development Department	1
c) Chief Executive Officer of NIFDA	1 Secretary

Each of them shall be Chairman of the Governing Council, Executive Committee and the Appellate Committee respectively for a term of two years by a system of rotation. The other two shall be Vice-Chairman of the respective body.

The staff required for carrying on the day-to-day activities of NIFDA will be identified by the Executive Committee and approved by the Governing Council.

Appointments will be made by the Chief Executive Officer in accordance with the Government rules and procedures in force.

Functions of the Committees.

The functions of the Governing Council, the Executive Committee and the Appellate Committee will be chalked out after discussions with the Narmada Development Department and the Narmada Planning Group.

9.1- Finance

The finance of NIFDA shall be through grant-in-aid from participating States and the royalty collected on the basia fish production.

Assets

The assets created by NIFDA either through grant-in-aid from the participating State Govt. or by its own contribution shall be the property of NIFDA and shall be administered by NIFDA directly or through its agency.

Accounts

Accounts shall be done every year through a registered accountant.

NARMADA CONTROL AUTHORITY

MINUTES OF THE THIRD MEETING OF
ENVIRONMENT SUB-GROUP OF NCA
HELD ON 19.7.1988 AT NEW DELHI

NEW DELHI
AUGUST, 1988

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Chairman of the Environment Sub-group, NCA and Secretary to the Government of India, Ministry of Environment and Forests (Department of Environment), Shri K.P. Geethakrishnan welcomed the Members and Invitees to the 3rd meeting of the Environment Sub-group. A list of Members and Invitees who participated in the meeting is placed at Annex-1.

Chairman conducted the meeting upto about 12.00 noon when he left for another meeting and thereafter, Dr. A.C. Ray, Additional Secretary, Department of Environment conducted the rest of the proceedings.

Item No. III-1(1): CONFIRMATION OF THE MINUTES OF THE SECOND MEETING OF
ENVIRONMENT SUB-GROUP OF NCA

No other comments had been received from any of the participants except the following substitution suggested by Central Water and Power Research Station on page 5, lines 3 to 5:

"For engineering designs, the earthquake magnitude considered is 6.5 on Richter scale on which the seismic factor of 0.20 is based. This earthquake magnitude is somewhat higher than the largest earthquake magnitude of 6.25 known to have occurred in this region".

The Sub-group confirmed the minutes of the 2nd meeting with the above change.

Item No. III-2(2): REHABILITATION MASTER PLAN

It was intimated that a separate Sub-group to monitor the progress in respect of Rehabilitation and Resettlement (R&R) for Project oustees had been constituted and this subject was kept outside the perview of Environment Sub-group. The Chairman stressed the necessity of involving Department of Environment in the developments and progress of Rehabilitation Sub-group for the sake of completeness. He also wanted the progress made should be reported to this Sub-group from time to time. A representative of Department of Environment should be co-opted as a Member of the Rehabilitation Sub-group. A formal request may be made for consideration in the next meeting of the Rehabilitation Sub-group.

Item No. III-3(3): PHASED CATCHMENT AREA TREATMENT SCHEME

Govt. of Madhya Pradesh (GOMP) representatives outlined the progress in respect of phased area catchment scheme. It was indicated that non-forest lands and forest lands in the catchment areas were delineated and soil and land use surveys were being carried out in the free draining area of the projects. The free draining catchment of Sardar Sarovar in Madhya Pradesh was also being similarly got surveyed. This survey work had been entrusted to the Space Application Centre, Ahmedabad and also the All India Soil and Land Use Organisation. The Space Application Centre had carried out soil and land use survey based on land-sat imagery data. All India Soil and Land Use Organisation had provided the field checking and also field survey components in such surveys. It was indicated that the detailed surveys would be completed by 1989.

As the survey data became available in parts, the All India Soil and Land Use Organisation had further proceeded and sub-divided the intervening catchment into 54 water-sheds and had also identified 21 water-sheds as needing catchment treatment. In respect of 5 water-sheds prioritisation had also been done and the conclusion appeared to be that 26% to 55% of the area would be needing catchment treatment and consisting of both forest and non-forest lands. For planning the treatment measures in catchments varying in areas of 40,000 to 1 lakh ha, detailed surveys were also being taken-up. These detailed surveys would start with 2 water-sheds located in Narmada Sagar free draining catchment and 1 located in the Sardar Sarovar free draining catchment. Currently activity got centred on 1 pilot project area on tributary Datuni. It was also reported that staff had been posted for executing the pilot project. An emphasis was being placed on growing pastures and for plantation of Arhar on trial basis. As the full prioritisation of area needing treatment and also the survey work including data collection had not been completed, the cost estimates were at a preliminary stage.

At this stage, Dr. S.P. Chawarde of AIUSS explained the methodology evolved for prioritisation of areas needing treatment on the basis of silt yield index. This methodology was earlier applied in the base of Chambal catchment area. He also indicated that biological and structural measures would be necessary and have to be planned after detailed surveys were completed. At this stage, Chairman indicated that it would be necessary that catchment area treatment should explore the possibility of obtaining funds from the national scheme being run in that context by Department of Agriculture. He desired that even rough estimates should urgently be prepared so that the Narmada catchment treatment could get sponsored as part of the Central scheme. Member (Civil), NCA brought out that the Working Group for formulation of VIII Plan is already on this work and is expected to submit its report and recommendation to the Planning Commission by February, 1989. Thus, there is urgency for preparation of a broad catchment treatment plan and submitting the same to the relevant Sub-group of the Planning Commission for being included as a Centrally sponsored scheme.

At this stage, the overall position of costs for catchment area treatment based on the recommendations of the Dewan Committee were also gone into and it was brought out that the figure of Rs. 300 crores was estimated as the requirements for this scheme for undertaking work in the priority areas from Bargi to Narmada Sagar Project based on the earlier exercise. During discussions it was also brought out that in the area between Narmada Sagar Project and Sardar Sarovar Project another Rs. 276 crores would be needed for undertaking the catchment area treatment. At this, it emerged that catchment area treatment was a pioneering activity and the scheme formulation as also its scheduling was to be carefully supervised by a team of experts conversant with soil conservation measures and safeguards necessary for arresting the movement of soil. It was also pointed out that Dr. Abrol, representative of ICAR was already a Member of the Environment Sub-group and needs to be associated with the detailed scrutiny of any of the formulated scheme along with Prof. Ramaseshan, Prof. Katti and others.

It was also brought out that allocation of cost of catchment area treatment for working out the benefits from the projects had not been envisaged.

Chairman indicated that he had set up a Cell in the Department of Environment to secure constant interaction with the project authorities and the concerned state government officials and also for undertaking effective monitoring of the progress in the formulation as well as implementation of schemes for environmental protection in the Basin.

The question of a having fund to be placed with the Forest Department for executing the catchment area treatment schemes or for compensatory afforestation was brought out by GOG representative. Even though the creation of a fund as had been specifically stipulated in the forest clearance, GOG representatives pointed out that their Forest Department had expressed its inability to use this fund for purposes of expenditure by the Department due to procedural difficulties. Chairman indicated that this matter would be got examined and a solution would be arrived at very soon.

Item No. III-4(4): COMPENSATORY AFFORESTATION

GOMP representatives stated that the Forest(Conservation)Act, 1980 had stipulations for creation of forests in non-forest lands in lieu of area lost in submergence as a result of irrigation projects. Keeping such stipulations in view they had earlier proposed 25,000 ha of non-forest land in eastern Madhya Pradesh and about 19,000 ha of non-forest land in Western Madhya Pradesh to be considered for afforestation in lieu of submergence occurring due to NSP and SSP in Narmada basin. It was also brought out that afforestation in degraded forest land was based on the Tehri precedent.

Subsequent meetings in the Ministry of Water Resources as also with the officials of Department of Environment resulted in changing views on the suitability of non-forest land in Eastern Madhya Pradesh for creation of alternate forests in lieu of forest land submerging under Narmada Sagar. During October-November, 1986, the information was that non-forest land should be located in Western part of the Madhya Pradesh closer to the affected areas. Thus only about 10,000 ha of forest land available in Western Madhya Pradesh was included in the scheme of compensatory afforestation and was sent to Department of Environment. Along with submission of this scheme earlier identified non-forest areas of Eastern Madhya Pradesh were also allowed to be released for use with other irrigation projects located in that region. It was in this changed context that a letter from the Ministry of Environment and Forests for identifying afresh the full land from non-forest lands posed a difficulty. Government of Madhya Pradesh wanted that their proposals for compensatory afforestation of 10,000 ha of non-forest land and on 70,000 ha of degraded forest land be accepted.

GOMP representatives indicated that obtaining non-forest land in the project vicinity for re-afforestation was a difficult task as compensation such as providing land for land to PAP's, land for irrigation structures etc. also generated demand on non-forest land. Thus, preservation of the ecology near the vicinity of the project might need other measures like social forestry so that the vegetal cover was retained. Conversion of non-forest land into reserve forest and growing such reserve forest in the vicinity might not be practicable.

Dr. Katti indicated that the importance was the creation of forest cover or vegetal cover and an emphasis was to be laid on its creation and also on its preservation especially in the face of demands by displaced persons for fuel and fodder.

GOMP representatives also indicated that compensatory afforestation plan in Madhya Pradesh in respect of SSP submergence would be ready in about two months time and thereafter transmitted to Govt. of Gujarat. GOM representatives indicated that considerable forest land would have to be created and would be costing them about Rs. 22 crores in respect of forest lands submerging under SSP in their State.

GOG had indicated that 4650 ha of Revenue Department land had been identified for afforestation and they have taken up work in about 500 ha and they had incurred an expenditure of Rs. 13.4 lakhs on seed plans for afforestation and Rs. 1.92 lakhs of expenditure had also been incurred on plantation near the dam. GOG representative also indicated that they had incurred an expenditure of Rs. 2 lakhs for improvements in Shoolpaneshwar sanctuary located in Gujarat.

Chairman indicated that he would arrange an early dialogue between his Ministry officials and GOMP officials to sort out this issue.

It was also requested that compensatory afforestation scheme of GOM and GOG could be properly documented laying down physical targets and cost estimates. This could also be finalised after interaction with Department of Environment so that Environment Sub-group of NCA could appropriately monitor the action plans separately for NSP and SSP.

Item NO. III-5(5): COMMAND AREA DEVELOPMENT

The agenda note wanted the details of areas coming under command during the next five years both in respect of NSP and SSP so that the safeguards for arresting water logging, soil salinity, water borne diseases etc. could be monitored. Representatives from both Madhya Pradesh and Maharashtra indicated that no area was likely to come under the command in the next five years. As such, the State Government representatives were requested to continue with their surveys and planning for command area development so that appropriate measures were available in time to the Sub-group and also for monitoring.

Item NO. III-6(6): SURVEY OF FLORA AND FAUNA

GOMP representatives had indicated that Botanical Survey of India had stopped the field work due to other priorities being assigned to that Department. They indicated that they were taking up the matter with the Bombay Natural History Society for conducting the necessary studies.

Chairman of the Sub-group explained that the BSI and ZSI had been assigned priority for Survey by the Government of India so that country-wide floristic and faunistic survey can be completed quickly. In that context the resources of the Department were already fully utilised on the assigned priority tasks and thus there was necessity for inducting other agencies.

It was reported that the fauna studies in Narmada Sagar Project submergence areas were completed by Zoological Survey of India. Govt. of Madhya Pradesh was requested to make available a copy of the report of ZSI to the Department of Environment and also the NCA Secretariat.

Proposal by GOG to entrust the study of flora to the Department of Botany, M.S. University, Vadodara circulated with the agenda was gone into in detail. The views of Dr. C.T.S. Nair were invited on the terms of references contained in the proposal. Dr. Nair expressed an opinion that the scope of work was rather exhaustive. The matter was then discussed with Dr. A.C. Ray reading out each of the terms of reference. It was felt that the TORs as contained were by and large in order. Dr. Ray however, wanted that the experts or the team leader in charge of study in M.S. University could contact them for any clarifications in respect of approach for undertaking the study. At this juncture, it was also brought out by Gujarat that they were planning to entrust the study in respect of about 4500 ha of submergence area of SSP in the Gujarat State. Dr. Ray and Members felt that it would be appropriate if whole of the study in SSP submergence was done by one organisation. GOMP and GOM were requested to examine the matter and convey their acceptance to get this overall study done by M.S. University. GOG could also take up the matter with the M.S. University in that context and report back to the Sub-group.

In the matter of archaeological monuments, GOMP indicated that studies were being conducted and they would be making available a report and also the recommendations in respect of salvaging important monuments as soon as the studies were completed. GOG expressed an opinion that they had already listed out the monuments etc. being affected in the SSP submergence. However, GOG and GOM were requested to get together and compile the necessary documentation so that the matter was open for appreciation by the sub-group. GOMP areas in SSP submergence and related aspects needed to find a place in such a documentation.

As regards availability of fossils and salvaging any fossils, a reference was to be made to GSI. In this matter GOMP might take a lead and explore the possibility of involving GSI or Birbal Sahani Institute, Lucknow. If necessary, correspondence would be followed up by personal visits to the organisations concerned. The outcome of the above effort could be reported to the NCA Secretariat so that it could be reviewed during the next meeting of the Sub-group.

Item No. III-7(7): CARRYING CAPACITY OF SURROUNDING AREAS

GOMP representative indicated that the study of carrying capacity of surrounding areas of NSP was entrusted to Friends of Native Society, Bhopal. Experts like Dr. Samar Singh and Dr. Saharia of Wild Life Institute were consulted at the time of finalisation of Terms of Reference. During discussions it emerged that any future help needed as technical input could be obtained by contacting Department of Environment.

It was also reported that the Wild Life Board had been constituted by GOMP and they would be furnishing the details to both the NCA Secretariat and Department of Environment.

GOG representatives submitted that as per forest clearance letter, no extra effort was specified on the part of GOG. Even then, improvement work like rubble wall fencing, check dams etc. at Shoolpaneshwar were being undertaken by them. Dr. Ray indicated that eventhough an existing sanctuary was being improved in Gujarat, there was necessity to document that the effort being made would actually help the wild life and would result in sustaining the wild life in that area.

It was also brought out that if a specific study was needed that study might be entrusted to M.S. University, Vadodara if they were willing to undertake the same. There was also need for such studies to encompass area not only in Gujarat but areas affected in Madhya Pradesh and Maharashtra. Dr. Ray suggested that Gujarat could explore the possibility of such a study undertaken by Dr. Madhokar of Karnataka University as an alternative. GOM and GOMP representatives were requested to communicate their agreement for getting a combined study organised by GOG in respect of submergence areas of SSP.

The above could be further progressed and reported to NCA Secretariat for review during the next meeting.

Item No. III-8(8): SEISMICITY AND RIM STABILITY OF RESERVOIR

It was indicated by GOMP that a report containing the study of rim stability in the periphery of Narmada Sagar by Geological Survey of India was submitted to Central Water Commission during the second week of January, 1988. The report revealed that there was likely to be no problem as regards rim stability not only near the dam but all along the periphery of the reservoir.

In respect of SSP, GOG indicated that 50% of survey had been completed in the reservoir submergence area spanning all the three States and the remaining would be completed during the next three years. The survey work was being undertaken by GSI formation at Nagpur. As the time span for completing this study was given as three years, GOG representatives were requested to use the good offices of Department of Environment for expediting the matter with GSI through the controlling Ministry i.e., Department of Mines, Govt. of India.

Item NO. III-9(9): HEALTH ASPECTS

GOM submitted a preliminary Report and an Action Plan. This report needed revision as the problem adjoining the submergence areas located at Maharashtra would be one of fresh water bodies coming into position and the resettlement of affected persons. The situation would not be similar to that which would occur in commands where irrigation canals would be functioning. This position was to be taken note of and the Action Plan had to be appropriately recast by GOM. Such a recasted Action Plan would have to be forwarded to the Department of Environment and NCA Secretariat.

Properly documented health impact alleviation action plans were also unavailable from GOMP and GOG even though both these States have reported that they were undertaking measures for control of water borne diseases etc. State representatives were requested to attend to the task of compiling such documentation and present the same to the Department of Environment and NCA Secretariat.

Item No. III-10(10): FISHERIES DEVELOPMENT IN SARDAR SAROVAR
PROJECT RESERVOIR

The agenda circulated the proposal of GOG for setting up of an Inter-State organisation for management of fishery development in SSP. GOM, GOMP responded only in respect of equitable sharing of benefit that would accrue due to the proposed Fisheries Development. There were many aspects that would need attention such as components of fisheries development including the location of nurseries etc.

The representatives of GOM, GOMP and GOG were requested to involve the concerned Directors of Fisheries and study the details of the inter-state organisation already available at Tungabhadra. After joint visits and studies an agreed proposal through mutual consultations could be worked out by the States and placed before the Sub-group.

ANY OTHER ITEM

Dr. Katti suggested that a computerised data base system should be developed to store all physiographic, socio-economic, flora-fauna, land use and other related data being collected for Narmada Basin. He agreed to prepare and submit a report to the Environment Sub-group in this regard.

The meeting ended with thanks of vote to the Chair.

List of Members/Invitees participated in the 3rd Meeting of Environment Sub-group of NCA held on 19.7.1988 at Paryavaran Bhawan, CGO Complex, Lodhi Road, New Delhi.

1. Shri K.P. Geethakrishnan, Secretary to the Govt. of India, Ministry of Environment and Forests.
2. Shri T.V. Krishnamurthy, Secretary(Rehabilitation), Narmada Development Department, Govt. of Gujarat.
3. Shri I.M. Shah, Secretary(Narmada), Narmada Development Department, Govt. of Gujarat.
4. Shri Mahendra Singh, Secretary, Forest & Environment, Govt. of Rajasthan.
5. Shri R.S. Khanna, Additional Chief Secretary & Vice-Chairman NVDA, Govt. of Madhya Pradesh.
6. Shri Vir Amar Parkash, Executive Member, Narmada Control Authority.
7. Dr. A.C. Ray, Additional Secretary to the Govt. of India, Ministry of Environment and Forest.
8. Shri N.K. Dikshit, Member(Civil), Narmada Control Authority.
9. Shri S. Sathyan, Member(Rehabilitation), NVDA, Govt. of Madhya Pradesh.
10. Shri T.N. Maharishi, Member(Environment), CCF, NVDA, Govt. of Madhya Pradesh.
11. Shri V.C. Mandlekar, Chief Engineer, Environment, NVDA, Govt. of Madhya Pradesh.
12. Shri V.P. Shimpi, Chief Engineer, North Maharashtra Region, Govt. of Maharashtra.
13. Shri N.V. Kute, Chief Engineer, Indira Sagar Project, Madhya Pradesh.
14. Dr. G.S. Kaushal, Joint Director(Agriculture), Narmada Valley Development Authority, Govt. of Madhya Pradesh.
15. Shri Bhawani Singh Meena, Deputy Secretary, Environment, Govt. of Maharashtra.
16. Shri A.K. Venkatesha, Superintending Engineer(WM), Ministry of Water Resources.
17. Dr. R.K. Katti, Prof. Civil Engineering, Indian Institute of Technology, Powai, Bombay.

- 2 -

18. Dr. C.T.S. Nair, Dy. Inspector General, Ministry of Environment and Forest.
19. Shri I.P. Abrol, Deputy Director General, Soil Agronomy & Engineering, Indian Council of Agricultural Research Institute (ICARI), New Delhi.
20. Shri Y.V. Dharma Rao, Secretary, Narmada Control Authority.
21. Dr. S.P. Gawade, Sr. Soil Survey Officer, All India Soil & Land Use Survey, New Delhi.
22. Shri T.K. Mukhopadhyay, Specialist (Hydrology), Narmada Control Authority.
23. Shri O.P. Sengar, Dy. Finance Officer, NVDA, Govt. of Madhya Pradesh.
24. Shri A.V. Gururaja Rao, Executive Engineer, Narmada Planning Group, Govt. of Gujarat.
25. Shri O.P. Saxena, Dy. Director (E), Narmada Control Authority.

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NARMADA CONTROL AUTHORITY

AGENDA NOTES OF THE FOURTH MEETING OF
ENVIRONMENT SUB-GROUP OF NCA

VENUE: CONFERENCE ROOM
PARYAVARAN BHAWAN

DATE: 18.11.1988

NEW DELHI
NOVEMBER, 1988

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AGENDA NOTES FOR THE FOURTH MEETING OF ENVIRONMENT
SLB-GROUP

Item No. IV-1(11) CONFIRMATION OF THE MINUTES OF THE
THIRD MEETING OF ENVIRONMENT SUB-GROUP
OF NCA.

The minutes of the third meeting of Environment Sub-group of NCA were circulated to all members and invitees vide letter No.D-34(3)-88/803 dated 10.8.1988.

GOG had communicated its suggestion in respect of item No.III-(3) regarding phased catchment area treatment vide letter No.NPG/ENV/NCA/173 dated 9.9.1988 placed at Annex.IV-1.

In view of the above suggestion from GOG, it is proposed to replace the portion in the last paragraph on page 3 commencing from "Eventhough the creation of a fund as had been specially stipulated byprocedural difficulties" in the recorded minutes by paras as given below.

"At present, the Forest Department is operating a number of Personal Ledger Accounts under the head "Personal Deposits" in Part-III of Government accounts. These personal Ledger Accounts can not be utilised for meeting the expenditure for compensatory Afforestation Schemes.

The Special Fund to be created for meeting the Statutory stipulation that expenditure on compensatory Afforestation Schemes should be met out of moneys credited into a non-lapsable Special Fund is to be opened under the minor head 'Other Funds' under '8235-General and other Reserve Funds'.

As the Forest Department has not created the Special Fund and framed the rules governing the Fund, the Sardar Sarovar(Narmada Project) is unable to transfer funds to Forest Department for meeting the expenditure on Compensatory Afforestation Schemes".

No other comments had been received from any other member. As such, with the above proposed modification, the circulated minutes of the 3rd meeting of the Environment Sub-group may kindly be confirmed.

Item No. IV-2(12)

REHABILITATION MASTER PLAN

In the Third meeting, the Chairman stressed the necessity of involving Department of Environment in the development and progress of Rehabilitation Sub-group for the sake of completeness. It was also desired that the progress made should be reported to this Sub-group from time to time. It is understood that Additional Secretary, Department of Environment would attend these meetings in future and notices would be sent to him.

Item No. IV-3(13)

PHASED CATCHMENT AREA TREATMENT
SCHEME

The Sub-group had decided in the last meeting that proposal for earmarking outlays under centrally sponsored scheme for the 8th plan may be made by State Governments. Consequently, GOMP had submitted the proposal of catchment area treatment of SSP and NSP combined amounting to Rs.477 crores in M.P. part for inclusion in the centrally sponsored scheme of soil conservation in the catchment of river valley projects as against Rs.576 crores indicated by GOMP at their last Sub-group meeting. This is placed at Annex.IV-2. GOMP may specify separately the estimate for SSP and NSP and the phased implementation as funds to the tune of Rs.477 crores may not be available at one go.

GOMP had mentioned in their letter at Annex. IV-2 that according to PC's letter dated October, 1965 the expenditure to be incurred on setting right the damage to the environment including catchment area treatment arising out of irrigation projects should be at the cost of the project and the required fund should be provided from the project allocations. However, as per the PC's letter mentioned above, the position was slightly different and the cost of mitigating direct damage only has to be charged to the project estimate. GOG had in their letter dated 8.9.1988 addressed to GOMP had made it clear that they had not given their concurrence for charging the cost of treating the catchment area to the SSP and the question of the participating States bearing the cost was referred to the Sardar Sarovar Construction Advisory Committee which decided at its 26th meeting that this issue was to be settled by the Ministry of Water Resources. NCA Secretariat had requested the Secretary(WR) to take up the matter with the Ministry of Environment and Forest to arrive at an early decision in their letter dated 5.10.1988 (copy placed at Annex.IV-3). The present position may be discussed.

In the last meeting of the Sub-group, GOG's representative expressed that the State Forest Department had certain procedural difficulties for taking up the work of catchment treatment as they had to create a special fund and frame the rules covering such fund (Also see Annex.IV-1). The Chairman of the Sub-group had indicated that this matter would be got examined

and solution arrived at very soon. The present position may be indicated by the Ministry of Environment and Forest.

The participating States were to come up with action plan for NSP and SSP indicating priority areas and phasing of investment. Members may discuss the proposals in this regard.

In respect of Narmada Sagar Project GOMP wanted that their proposal for compensatory afforestation of 10000 ha. of non-forest land and 70000 ha. of degraded forest land be accepted. Such proposal remained under scrutiny of Ministry of Environment and Forest since November, 1987. GOMP representative indicated in the last sub-group meeting that the compensatory afforestation plan in Madhya Pradesh in respect of SSP submergence would be ready in about two month's time and thereafter transmitted to GOG. GOMP representative may like to indicate the present position in this regard. As regards compensatory afforestation plan for NSP, the Chairman of the sub-group had indicated in the last meeting that this issue would be discussed between the Ministry's officials and GOMP officials to sort out the matter. The present position may be indicated.

GOG had indicated in the last meeting of the sub-group that 4650 ha. of Revenue Deptt. land had been identified for afforestation and they had taken up work in about 500 ha. In the note for the Advisory Committee prepared by the CWC on updated estimate of SSP in August, 1988, it was mentioned that an amount of Rs. 14.55 crores towards the cost of compensatory afforestation programme coming under submergence in all the three States and treatment of catchment area directly affected by the project had been included in the estimate. In the Action Plan to be prepared by the three States, the breakup of this cost between afforestation and catchment treatment State-wise has to be indicated so that the funds required for implementation of the afforestation programme and catchment area programme beyond what is provided in the project estimate have to be found from other sources. If the corresponding requirement of funds for the entire programme is available with GOG, this could be discussed.

GOM had earlier indicated that they had identified 6205 ha. of non-forest land and 13000 ha. of the degraded forest land and proposed compensatory afforestation with a cost estimate of Rs. 22.87 crores. In the last meeting of the sub-group, the participating States were requested to prepare appropriately documented plan for compensatory afforestation laying down physical targets and cost estimates which could be finalised in consultation with the Ministry of E&F for both NSP and SSP so that their implementation could be monitored by the sub-group. The present position would be discussed.

Item No. IV-5(15) COMMAND AREA DEVELOPMENT

Representative from both the Government of MP and Government of Maharashtra had indicated in the last meeting that no area was likely to come under the command in the next 5 years. The State Government representatives were requested to continue with their surveys and planning for command area development so that measures for arresting water-logging, soil salinity and water borne diseases etc were available in time to the Sub-group and also for monitoring.

GOMP and GOG might like to present their programme of action.

Item No. IV-6(16) SURVEY OF FLORA AND FAUNA

In the last Sub-group meeting, the Chairman of the Sub-group stressed the necessity for inducting other agencies to carry out the flora and fauna surveys.

As regards the fauna studies in Narmada Sagar Project submergence areas, GOMP had forwarded a report prepared by Zoological Survey of India placed at Annexure-IV-4. This report was circulated to the members/invitees of the Environment Sub-group of NCA by the NCA Secretariat on 19th August, 1988 for the views/comments of the members. The comments of the GOG on the fauna survey carried out by the Zoological Survey of India is placed at Annexure-IV-5. The views of other Members may be discussed.

GOG had proposed to entrust flora and fauna studies to the Department of Botany, MS University, Vadodara. GOMP and GOM were requested to examine the matter and convey their acceptance to get the overall study in SSP submergence area by one organisation i.e. MS University. The present position in this context may be reported to the Sub-group.

In the matter of Archaeological monuments and salvaging of any fossils, GOMP had indicated to make available the report and also recommendations as soon as the studies were completed. The present position in respect of NSP and SSP separately may kindly be indicated. GOG and GOM were also requested to compile the necessary documents in respect of SSP submergence in their States. Such documents, if ready, might be made available to the members of the sub-group.

GOMP was requested to make an effort of involving GSI or Birbal Sahani Institute, Lucknow for salvaging of fossils of any. The outcome of the effort is yet to be available. Members might like to discuss and advise.

Item No. IV-7(17) CARRYING CAPACITY OF SURROUNDING AREAS

GOMP had indicated that the study of carrying capacity of surrounding areas at Narmada Sagar Project was entrusted to Friends of Nature Society, Bhopal and it was also indicated that the Wild Life Committee had been constituted. The details of the studies made by them was awaited in the NCA Secretariat and Department of Environment. GOMP representative may indicate the present position.

GOG maintained that improvement works were being under-take by them at Shoolpaneshwar sanctuary. The Deptt. of Environment was of the opinion that there was necessity for documentation that such works undertaken would result in sustaining Wild Life. In the earlier meeting GOG and GOMP were requested to communicate their agreement for getting a combined study organised by GOG in respect of submergence areas of SSP either through M.S. University, Vadodra or by Dr. Madhokar of Karnataka University. The progress made in this respect needs to be placed before the Sub-group.

Item IV-8(18) SEISMICITY AND RIM STABILITY OF
RESERVOIR

GOG may like to indicate the status of study and the progress made by the GSI regarding the survey work in the reservoir submergence area of all the three States.

GOMP had indicated in the last meeting that the report in respect of rim stability of NSP proposed by GSI was submitted to CWC. GOMP may indicate the reaction of CWC to the report.

Item No. IV-9(19) HEALTH ASPECTS

GCM had to recast health aspect plan for submission to Department of Environment and NCA Secretariat taking into account the effect on adjoining area of the reservoir. GCM representatives may like to place such action plans if ready, covering the present status of water-borne diseases, preventive measures in its territory likely to be affected by SSP both in command area and area adjoining submergence.

Properly documented health impact alleviation action plans both around reservoir periphery and in commands were also awaited from GOMP and GOG. This may be placed before the sub-group.

Members may like to discuss.

Item No. IV-10(20)

**FISHERY DEVELOPMENT IN SSP
RESERVOIR**

GOG had the proposal for setting up of an Inter-state Organisation for management of fishery development in SSP. The representatives of GOSP and GOG were requested to involve the concerned Directors of fisheries and study the details of the inter-state Organisation already available at Tungabhadra. An agreed proposal was to be worked out by the States and to be placed before the Sub-group.

Members might like to discuss.

ANY OTHER ITEM

DATE AND VENUE OF NEXT MEETING

ANNEXURES VOLUME

Annex No.	Agenda Item in which referred to	Page No.
Annex IV-1	Item No. IV-1(11), IV-3(13)	1
Annex IV-2	Item No. IV-3(13)	2-4
Annex IV-3	Item No. IV-3(13)	5-9
Annex IV-4	Item No. IV-6(16)	10-21
Annex IV-5	Item No. IV-6(16)	22-24

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Secretary,
Harmada Control Authority,
Vijaya Bhavan,
Sector-XIII, R.K. Puram,
New Delhi-110066.

3rd

Subj: Minutes of the meeting of Environment Sub Group
held at New Delhi on 19th July, 1988.

For Item No. III-3(3) regarding Thane Catchment
a Treatment Scheme the last para of the minutes at
interalia states that the Government of Gujarat
representatives pointed out that their Forest Department *had*
resorted its inability to use this fund for ~~any~~ purposes
expenditure by the Department. Due to procedural
difficulties. I may state that this portion of the minutes
not correctly bring out the point raised by the
representatives of Government of Gujarat. The correct
position as brought out during the meeting is as under :

" At present, the Forest Department is operating
under of Personal Ledger Accounts under the head
"Personal Deposits" in Part-III of Government Accounts.
These Personal Ledger Accounts can not be utilized for
meeting the expenditure for compensatory afforestation
schemes.

The Special Fund to be created for meeting the
statutory stipulation that expenditure on compensatory
afforestation schemes should be met out of moneys credited
to a non-lapsable Special Fund is to be opened under
minor head "Other Funds" under "8235-General and other
Service Funds".

As the Forest Department has not created the Special
Fund and framed the rules governing the Fund, the Sardar
Sarabhai Trust (Harmada Project) is unable to transfer funds to
Forest Department for meeting the expenditure on Compensatory
Afforestation Schemes."

It is requested that the minutes may be modified
accordingly.

Yours faithfully,

I. H. Shah

(I. H. Shah)
Secretary (H)

Harmada Development Department.

Copy forwarded with compliments to :

1. The Secretary (R&R), Harmada Development Department,
Sachivalaya, Gandhinagar for information.

2. The Secretary, Forest & Environment Department,

Narmada Valley Development Authority
Narmada Bhawan; Tulsinagar

NVDA/FOU/7191

Bhopal, dtd.

The Secretary,
Govt. of India,
Deptt. of Environment & Forests,
Paryavaran Bhawan, B-Block,
CCO Complex, Lodi Road,
New Delhi.

Catchment Area Treatment in the Narmada Valley.

Kindly recall the discussion we had during the meeting of the Environmental Sub-Group on Narmada Valley Project held on 9-7-84 in Paryavaran Bhawan. A proposal was made during the meeting that the aspect of catchment area treatment of Narmada and Sardar Sarovar Project may be included in the Centrally Sponsored Schemes of Soil Conservation in the Catchments of River Valley Projects. This scheme is operated by the Ministry of Agriculture. Since the Govt. of India are poised to commence the preparation of VIII Five Year Plan, it seems an opportune time to include it in the plan.

The Narmada is the largest west flowing river of the country, is the fifth largest amongst the Indian rivers. It has the catchment area of over 95,700 sq.kms; of which about 85,000 sq.kms. is in MP and the balance in Gujarat and Maharashtra State territories.

The Ministry of Agriculture, vide order No. 5-3/83-FRY(Cons) dated 19th September 1984 had set up an Inter-Departmental Committee, headed by Dr. M.L.Diwan to study the status of soil erosion in the catchment of the Narmada river. This committee submitted its report on August 85. The report had concluded that the estimated volume of siltment, that is flowing down the river is around 5 ha. meters per 100 sq.kms. This indicated that the catchment is in need of intensive treatment if the envisaged water storage capacity of the dam is to be met as planned. The Committee went on to suggest that the NVDA authorities may undertake treatment measures in the catchment to the following extents.

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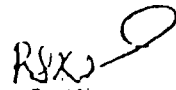
State	Estimated area (in thousand ha) for priority treatment under			Percentage of total area in need of treatment
	Forest	Agriculture	Total	
1	2	3	4	5
Gujarat	20	12	32	53.1
Maharashtra	45	17	62	36.9
M.P.	500	800	1300	15.1
	565	829	1394	15.8

The total expenditure to be incurred on the treatment of these areas was estimated at Rs. 515 crores as follows:

State	Cost in crore Rs.			Average cost/ha. (Rs)
	Forest	Agriculture	Total	
1	2	3	4	5
Gujarat	6.62	4.37	10.99	3434
Maharashtra	18.20	9.01	27.21	4389
M.P.	287.30	189.41	476.71	3667
	312.12	202.79	514.91	3694

Thus an expenditure of Rs. 477 crores was estimated to be incurred in the MP part of the catchment.

The Planning Commission, vide letter NO. 16(12)/85/I&CAD dated 20th Oct., 1988 has prescribed that the expenditure to be incurred on setting right the damage to the environment including catchment area treatment arising out of irrigation project should be on the cost of the project and the required funds for it should come from part and parcel from part and parcel of the project. This cost, therefore, has to be borne by the project. However, in view of the massive nature of the work involved, it would be a rather heavy bill on the project, unless other sources of funding are harnessed. In view of this it is suggested that the catchment area treatment of the river Narmada may be got included in the Centrally Sponsored Schemes of Soil Conservation in the Catchments of River Valley Projects, so that the Project implementation gets speeded up and the objective also achieved.


 (R. S. Khanna)
 Vice Chairman.

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Adl. Chief Secretary, Narmada Valley Development Deptt.
Govt. of M.P., Bhopal.

Secretary, Deptt. of Agriculture, Govt. of M.P., Bhopal.

Secretary, Deptt. of Planning, Govt. of M.P., Bhopal.

Secretary, Narmada Control Authority 118 Palika Bhawan K.K. Purani
Sector-XIII, New Delhi.

Secretary, Narmada Deptt. Gujrat.

Secretary, Irrigation Deptt. Bombay.

202-2.
(R S Khanna)
Vice Chairman.

D-4(2)1988. / 102 3

5,10.

88

Secretary,
Ministry of Water Resources,
Ram Shakti Bhawan,
New Delhi-110 001, (Attention: Shri S. S. Sahasrabudhe, Commissioner
(PR))

Subject: Catchment area treatment under Sardar Sarovar Project.

The Ministry of Environment & Forest at the time of issuing clearance for Sardar Sarovar and Narmada Nagar Projects, vide their letter No. 3-87/80-IA dated 24.6.1987 (copy enclosed) laid down, inter alia, that catchment area treatment programme and the rehabilitation plans be so drawn as to be completed ahead of reservoir filling. In this connection, copies of correspondences between Governments of Gujarat and Madhya Pradesh with regard to charging the cost of catchment treatment are enclosed. The main question raised is about charging the cost of the catchment treatment to the Sardar Sarovar Project. The Government of Gujarat have mentioned in their letter dated 8.9.1988 (copy enclosed) that the issue of catchment area treatment was discussed in the XXVI meeting of the Sardar Sarovar Construction Advisory Committee wherein the following decision was taken:

Item No. XXVI -2 - Catchment area protection.

"Chairman indicated that this was an important item. He was, however, of the view that the SSCAC was not the appropriate forum for deliberating on this issue since this was a policy matter concerning all the States. It was decided that the matter would be taken up at the Ministry's level in consultation with the concerned departments and the State Governments".

SA is not aware of further action taken in the matter by the Ministry on this important issue. Since M.P. Government have proposed in their letter to take up pilot project covering an area of 10,000 ha. in the catchment area of Sardar Sarovar Project in Madhya Pradesh at a cost of Rs. 4 crores, and further surveys have to be done to firm up the cost of entire catchment treatment, the question of charging the cost of the catchment works has to be decided early. It may be mentioned that according to the Planning Commission letter No. 16(12)/85-I&CAD dated 28.10.1985 addressed to all State Governments, the project report for catchment treatment has to be prepared along with the project report for the main engineering project so that the estimate is

- 2 -

firmly up for taking suitable action for funding the catchment treatment works suitably. In that letter it was also mentioned that the cost due to direct damage only was to be borne by the main engineering project.

Since an early decision on the question of charging the cost of catchment treatment in the case of Sardar Sarovar Project would enable concrete action plans to be drawn up by the respective State Governments, it is requested that the matter may please be taken up by the Ministry with the Ministry of Environment & Forest at an early date.

Yours faithfully,



(N.K. Dixit)
Member (Civil)

Encl: as above.

o/c

ISSUED

Cm
6/10

Sardar Sarovar Narmada Nigam Ltd.

Page 138

Box No. 12, 1st Floor, New Sakinaka Complex,
Lal Bahadur Shastri Road, New Delhi-110 011

P.A. RAJ
Vice Chairman & Managing Director

Phone : 0 20001 0101 R-450152 A B A D

D.O. No. NMD/1006/14/11 /224
Dated the 08th Sept., 88.


Dear Shri Khanna,

Appreciate your d.o. letter No. NVDA/Agri./42/93/74/3099 dated 23rd August, 1988 regarding treatment of catchment area of Sardar Sarovar Project. I may state that Govt. of Gujarat has not given concurrence for charging the cost of treating the catchment area to the Sardar Sarovar Project. At the same time it is not meant that Govt. of Gujarat is not interested in getting treated the catchment area of Sardar Sarovar lying in M.P. as well as in other States. As indicated in my d.o. letter of 14th July, 1988 Govt. of Gujarat has agreed that the Madhya Pradesh may undertake the required survey. So far as the question of charging the cost of catchment area treatment on the Sardar Sarovar Project and bearing the cost by the participating States is concerned, the same is yet to be finalised.

As you know the issue of catchment area treatment for the Sardar Sarovar Project was discussed in 26th meeting of the Sardar Sarovar Construction Advisory Committee. Since the decision on the issue would require laying down definite policy concerning all the States it was decided that the matter would be taken up at the level of Ministry of Water Resources, Govt. of India in consultation with the concerned departments and the State Governments. The issue is since pending with the Ministry of Water Resources.

With regards,

Yours sincerely,



(P.A. RAJ)

To
Shri R.S. Khanna,
Vice Chairman
Narmada Valley Development Authority
Narmada Bhawan,
Tulsi Nagar
Bhopal.

Copy forwarded with compliments to

1. The Secretary, Narmada Control Authority, P.A. Bhawan, Sector XIII, R.K. Puram, New Delhi-110 066.
2. The Secretary, Terr. Dept., Govt. of Madhya Pradesh, Vallabh Bhawan, Bhopal.
3. The Secy.(R)/R.D.D., Sachivalaya, G'nagar.

From:-
R.S. Khanna
Vice Chairman
IWCA, Bhopal.

Subj:- Treatment of Catchment Area of SSP.

Dear Sir,

Please refer your D.O. letter No. VC & M/SSXXXII/235. So far the cost of catchment area treatment is concerned it may be stated that the Govt. of India, Ministry of Environment and Forest, while issuing permission for diversion of forest land for Narmada Sagar Multipurpose Project vide their letter on 7th August 1987, clearly indicated that the plan for treating the catchment area would be prepared by 15th November 87, and implemented at the project cost. Similarly while according the environmental clearance to Sardar Sarovar Project and Narmada Sagar project vide their letter on 24th June 1987, the Environmental Ministry clearly laid down "Catchment Area Treatment programme and the rehabilitation programme be so drawn as to be completed ahead of reservoir filling."

There is no chance before us except to agree that the cost of catchment area treatment be borne by the project. This point was reiterated by me in the meeting held on 15th June 1988 and the concurrence for charging the cost of treating the catchment area to the Sardar Sarovar project was given. Any way, if the Govt. of Gujarat is not interested in getting treated the catchment area of Sardar Sarovar lying in M.P., we would not be undertaking any catchment area protection work in SSP areas. Undertaking survey would also be of no avail. But it is worth mentioning that according to the decision of Planning Commission addressed to the Chief Secretaries of the State Governments/Central Administrations vide their letter No. 16(12)18701&CND, dated 20th October 85, the catchment area treatment has to be considered as an integral part of JVP even at the project preparation stage and the cost due to direct damage has to be borne by the project. But this note superseded by the clearance letter referred above. It is further

emphasised that there should not be any hitch in debiting the cost of treatment to the project if the catchment protection work is to be taken up for increasing the life of the dam.

As per recommendations of the Diwan Committee the appointed by the Govt. of India to look into the requirement of the soil conservation measures in the Narmada Valley, one pilot project covering area of 10,000 ha, has been selected in the catchment of Sardar Sarovar. Pilot project is located in the Man watershed. The staff has been sanctioned & posted at the project site for the execution of the project. This staff has so far completed the detailed Soil Survey work and is busy in doing contour and vegetation survey. The pilot project is likely to cost about 4 crores. Detailed plan and estimates would be drawn after the completion of contour survey etc. Your approval for this pilot project is required.

An early action in the matter would be helpful to undertake survey and implementation work in the sub-catchment as per schedule so as to complete it ahead of reservoir filling.

Yours sincerely,

22/11 -

(H.S. Khanna)

To,

Shri P.A. Raj
Vice Chairman & Managing Director
Sardar Sarovar/Narmada Nigam Ltd.,
Govt. of Gujarat
1st Floor Block No. 12.
New Sachivalaya Complex
Gandhinagar - 382010.

Copy to:- D.O. No. Narmada/493/42/03/74/3100 Dated 22/10/89
Shri X.Y. Dhanraj Rao. Bhas
✓ 1. Secretary, Narmada Control Authority, Plot No 110, Ballikrishna
Sector 13, R.K. Nagar, New Delhi - 110006.
2. Secretary, Irrigation, Govt. of Madhya Pradesh, Vallabh Bhawan,
Bhopal.

(H.S. Khanna)

- 9 - Vice Chairman.

Government of Madhya Pradesh
Narmada Valley Development Department

...

Memo No. 583 /2/19/27/86 Bhopal, dated 5/8/88

To,

The Secretary,
Narmada Control Authority,
Palika Bhawan,
Sector-XIII, R.K.Puram,
New Delhi - 110066.

Sub:- Faunal Survey of the Narmada Valley by the
Zoological Survey of India.

In the Agenda note circulated for the 3rd
meeting of the Environment Sub-Group of NCA ^{held on 19.7.88} report on
the faunal Survey of Submergence area of Indirasagar
Project has been desired from Madhya Pradesh.

Survey of fauna in the submergence area of
Indirasagar project has been carried out by Zoological
Survey of India. 20 copies of the impact assessment
report received from Zoological Survey of India are
enclosed herewith.

Encl : 20 copies.

M.R. Pandit
5/8/88
(M.R. Pandit)
Under Secretary, NVDD.

Endt.No. /2/19/27/86 dated /8/88.

Copy is forwarded to the Chairman, Narmada
Valley Development Authority Narmada Bhawan, Bhopal
for information.

Encl:- one

52/
(M.R. Pandit)
Under Secretary, NVDD.

R/4888

H I T A H I T
GOVERNMENT OF INDIA

Calcutta
Director-26 9210
Dr. Adnan
Gillmer - 26-0211
Office-27-0202 (3 lines)

হিটাহিট
ZOOLOGICAL SURVEY OF INDIA
14, CHITTARANJAN AVENUE
CALCUTTA-700 012

207-12/83-Tech./ 6580

Dated 17th July, 1987.

To
Shri T.N. Maharishi,
Additional CCF
Narmada Valley Development Authority,
Narmada Bhavan,
Tulsinagar,
Bhopal (M.P.)

Subject ; Faunal Survey of the Narmada Valley by the
Zoological Survey of India.

.....

Sir,

Reference your letter No. NUDA/ENV/FOR/501-FN/1337,
~~dated the-18th-May,-1987,~~ on the subject stated above,

I have gone through the report submitted by Dr. A.K. Ghosh, Scientist 'D', of this survey and sent to you and am of opinion that it is imperative the project does not cause destruction to the vast forested land harbouring the diverse wild life. One way to ensure it will be extensive reafforestation of the contiguous areas to make up for the forested area lost under the project.

The last para (4. Conclusion) of . Ghosh's report may please be substituted with the following ;

" 4. Conclusion

• Taking into consideration the observations mentioned above it may be pointed out that it is imperative that the project does not cause destruction to the vast forested land harbouring the diverse wild life. One way to ensure it will be extensive reafforestation of the contiguous areas to make up for the forested areas lost under the Project.

This substitute reafforestation should be made an integral part of the project itself. "

The report may, otherwise be considered as final.

Yours faithfully,

भारतीय प्राणि सर्वेक्षण विभाग
Zoological Survey of India,
Pondicherry Building
Jawahar Lal Nehru Road,
Indian Museum
Calcutta-700 016
Phone : 23-6924 ; 23-3070 ; 23-9513

103-Tech./ 3847

Dated, the 3rd April, 1986

To
The Chief Engineer
(Environment)
Narmada Valley Development
Authority
Narmada Bhawan,
Tulsinagar
BHOPAL 462 002

Sub; Environment Impact Assessment for Narmada
Valley Project.

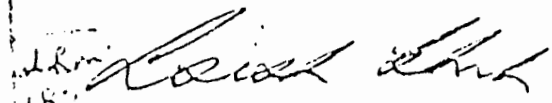
Sir,

With reference to your letter D.O.No.NVDA/ENV/501-B/1...
dated the 6th June, 1986 I am to forward herewith the EIA report
based on the faunal survey of Narmada Valley by the scientists
of the Zoological Survey of India.

Kindly acknowledge the receipt of the same and oblige.

Thanking you,

Yours faithfully,


11/8/86

(DR. A.K. GHOSH)
DEPUTY DIRECTOR

and

IN-CHARGE

Environment Monitor.

Report on the survey of the Narmada Sagar area, conducted by the Environment Monitoring Wing, Zoological Survey of India, for Impact Assessment.

INTRODUCTION

Narmada Sagar Project area has been surveyed for Environmental Impact Assessment by a party of six members from Zoological Survey of India during 3rd & 4th week of January 1987. The party consisted of 5 experts on different groups of animals and one Statistical Assistant. Investigation been done around Dam Site (North & South banks of Narmada river) and throughout the proposed submergence area in the Northern & Southern sides of the river. A short report based on field observation is given below:-

The submergence area falls within 21°50' to 22°25' North & 76°25' to 77°10' E. Most of the area come under the Vindhya. The climate of the area is dry and hot with average rainfall 903 mm (at Khandwa). The forest is mostly Southern tropical dry mixed deciduous type. The forested area is affected come under Pungesh, Pundi, Chandgarh, Balda and Kiti forests. The forest on the Southern bank of the river comprises of 'dry kh' and 'dry mixed deciduous' types, whereas the forest of the Northern side is very from 'dry-deciduous' 'moist' 'teak' types. The teak is the dominant accompanied by Saja, Dhaura, Salai, Haldu, Tendu, Anjan etc. (See Appendix II).

FAUNA & FLORA

The area surveyed has been found to be extremely rich in faunal resources (Vide Appendix I).

The threatened and endangered animals recorded in the area are Tiger, Leopard, Desert Cat, Sloth Bear, Black Buck, Chinkara, Wolf, Peacock, Jackal, Crocodile, Monitor Lizard and Python (included under Schedule I of Wild Life Protection Act, 1972, revised 1980)

2 The area surveyed also reveals an array of plant species of economic importance. The Plants such as Anjan, Haldu, Dhaura, Salai, Teak etc, are worth mentioning.

ASSESSMENT

As per the Project document 35325 ha. of forest land will be submerged. However, it appears that some forested area that will be left as patches at the eastern and Western boundaries of the Submergence Zone (South bank) and the forest that will be left on islands to be formed by the hill-tops whose lower portion will be submerged, have not been taken into account. In all probability these forests will ultimately be destroyed due to human interference and also due to the effect of high level of water, thus increasing the projected figure of total forest area to be affected to a great extent. Even if these forest as claimed by the project authorities could be preserved no wild life worth the name will be able to thrive on these patches without contiguous foraging area.

2. The wild life habitat that will be destroyed can be divided into two categories:

The dry teak forest on the Southern side of the river:-

This area supports good number of animal species of which Tiger, Leopard, Desert Cat, Bear, Wolf, Crocodile come under endangered category, in addition to these there are various other species of animals (Appendix I). Not only this, there is at least one plant viz., Anjan (more or less an endemic plant of M.P.) which needs protection. The idea of green belt or planting equal number of trees in the adjacent area of submergence is not practicable because of the topography, soil condition and other factors.

A. a matter of fact most of the forest covering in these areas are thriving because of natural regeneration and not by plantation.

b) The mixed deciduous forest and moist Teak forest, on the northern side of the river.

The forests in the Chandgarh range are definitely the best forest in the submergence area that has come to our notice. Though teak is still the predominating species, there are very good growth of other species viz. Dhoro, Salai, Tendu, Amla, Charuti, Karoi, Moyna etc.

The wild life (Appendix 1) in these forests are varied including Tiger, Leopard, Deer, Black buck, Chinkara, Peacock, several species of Hawks, Crocodile, Monitor, Lizard etc. which are all considered as endangered species. This area and its contiguous forests are ideally suited for declaration as a 'Sanctuary' because of the dense floral & faunal composition and the natural protection offered by the river from human interference.

4. CONCLUSION

Taking into consideration the observations mentioned above it may be pointed out that it is imperative that the project does not cause destruction to the vast forested land harbouring the diverse wild life. One way to ensure it will be extensive reafforestation of the contiguous areas to make up for the forested areas lost under the Project.

This substitute reafforestation should be made an integral part of the project itself. "

APPENDIX - I

List of some Wild Life (Fauna) species observed in the proposed submergence area of Narmada Sagar Project.

Mammals :Schedule I

1. Panthera tigris (Linnaeus), Tiger
2. Panthera pardus pardus (Linnaeus), Leopard
3. Ursus ursinus (Shaw), Sloth Bear
4. Gazella gazella bennetti (Sykes), Chinkara
5. Antelope cervicapra (Linnaeus), Black Buck
- * 6. Canis lupus Linnaeus, Wolf
7. Felis libyca ornata, Desert Cat
8. Felis chaus kutas Pearson, Jungle Cat
9. Viverricula indica Desmaresh, Small Indian Civet
10. Herpestes edwardsi (Geoffroy), Common Mongoose
11. Vulpes bengalensis (Shaw), Bengal Fox
- * 12. Hyaena hyaena hyaena Linnaeus, Striped Hyaena
13. Canis aureus Linnaeus, Asiatic Jackal
14. Sus scrofa cristatus Wagner, Indian Wild Boar
- * 15. Hystrix Sp.
16. Axis axis axis Erxleben, Chital
17. Cervus unicorn Kerr, Sambar
18. Boselaphus tragocamelus (Pallas), Nilgai
- * 19. Suncus stoliczkae stoliczkae Anderson, Stoliczka's Shrew
20. Lepus nigricollis nigricollis F. Cuvier, Black naped Hare
21. Funambulus palmarum robertsoni Wroughton, Indian Palm Squirrel
22. Taibia indica indica (Hardwicki), Indian Gerbil
23. Rousettus leschenaulti leschenaulti Desmarash, Leschenault's Fruit Bat.
24. Pteropus giganteus giganteus (Brinnich), Indian Flying Fox
25. Rhinolophus lepidus lepidus Blyth, Common Leaf nosed Bat
26. Presbytis entellus anchises (Blyth), Hanuman Langur
27. Macaca mulatta, Zimmermann, Rhesus macaque

Schedule II to IV

Reported.

BIRDS

- Schedule I
1. Accipiter badius dussumieri (Temminck) - Shikra
 2. Neophron percnopterus (Linnaeus) - Scavenger Vulture
 3. Circus macrourus (S.G. Gmelin) - Pale Harrier
 4. Pavo cristatus Linnaeus - Common Peafowl

- Schedule IV
5. Phalacrocorax carbo sinensis (Shaw) - Large Cormorant
 6. Ardea grayii grayii (Sykes) - Pond Heron
 7. Egretta garzetta garzetta (Linnaeus) - Little Egret
 8. Bubulcus ibis coromandus (Boddaert) - Cattle Egret
 9. Ardea cinerea rectirostris Gould : - Grey Heron
 10. Tadorna ferruginea (Pallas) - Brahminy Duck
 11. Elanus caeruleus vociferus (Latham) - Black Winged Kite
 12. Milvus migrans novinda Sykes - Pariah Kite
 13. Francolinus pictus pallidus (J.E. Gray) - Painted Partridge
 14. Francolinus pondicerianus interpositus Hartert - Grey Partridge
 15. Himantopus himantopus himantopus (Linnaeus) - Black winged Stil
 16. Vanellus indicus indicus (Boddaert) - Red wattled Lapwing
 17. Tringa hypoleucos hypoleucos Linnaeus - Common Sandpiper
 18. Sterna aurantia J.E. Gray - Indian River Tern
 19. Columba livia intermedia Strickland - Blue Rock Pigeon
 20. Streptopelia chinensis suratensis (Gmelin) Spotted Dove
 21. Streptopelia dactylo dactylo (Frisvaldszky) Indian Ring Dove
 22. Treron phoenicoptera chlorogaster (Olyth) Green Pigeon
 23. Psittacula eupatria nipalensis - (Hodgson) - Large Indian Parakeet
 24. Psittacula krameri borealis (Neuman) - Rose ringed Parakeet.
 25. Psittacula cyanocephala Blossom headed Parakeet
 26. Cuculus varius varius Vahl - Brainerver Bird
 27. Centropus sinensis parroti Stressemann - Crow Pheasant
 28. Athene brama brama (Temminck) - Spotted Owlet
 29. Glancidius radiatum radiatum (Tickell) - Jungle Owlet
 30. Bubo hubo bengalensis (Franklin) - Eagle owl
 31. Caprimulgus asiaticus asiaticus Latham - Common Indian Nightjar
 32. Apus affinis affinis (J.E. Gray) - House Swift
 33. Cynsiurus parvus balasienis (J.E. Gray) - Palm Swift
 34. Halcyon smyrnensis (Linnaeus) - White breasted King fisher
 35. Ceryle rudis leucomelanura Reichenbach - Pied Kingfisher
 36. Merops orientalis orientalis Latham - Green Bee-eater
 37. Coracias benghalensis indica Linnaeus : - Indian Roller

38. Upupa epops epops Linnaeus - Hoopoe
39. Megalaima zelandica caniceps (Franken) - Green Barb
40. Dinopium benghalense benghalense (Linn) - Lesser Golden-backed wood pecker
41. Eremopterix grisea (Scopoli) - Ashy Crowned Finch Lark
42. Hirundo rupestris Scopoli - Crag Martin
43. Lanius schach erythrogaster (Vigors) - Rufous backed Shrike
44. Dicrurus caeruleus caeruleus (Linnaeus) - White bellied Drongo
45. Dicrurus adsimilis macropterus Vieillot - Black Drongo
46. Oriolus xanthornus xanthornus (Linnaeus) - black headed Oriole
47. Sturnus pagodorum (Gmelin) - Black headed Myna
48. Sturnus contra contra (Linnaeus) - Pied Myna
49. Acridotheres tristis tristis (Linnaeus) - Common Myna
50. Dendrocitta vagabunda vagabunda (Blyth) - Indian Tree Pie
51. Corvus splendens splendens Vieillot - House Crow
52. Corvus macrorhynchos culminatus Sykes - Jungle Crow
53. Aglyptis tiphia humei Baker - Common Iora
54. Pycnonotus color humayuni Dignaud - Redvent Bulbul
55. Pycnonotus jocosus fuscicaudatus (Gould) - Red whiskered bulbul
56. Turdoides striatus orientalis (Jerdon) - Jungle Babbler
57. Muscicapa parva albicilla Pallas - Red breasted Fly Catcher
58. Rhipidura aureola aureola Lesson - White browed Fantail Fly Catcher
59. Troglodytes paradisi paradisi (Linnaeus) - Paradise Fly Catcher
60. Prinia socialis stewarti Blyth - Ashy Wren Warbler
61. Cisticola exilis erythrocephala Blyth - Fantail Warbler
62. Orthotomus sutorius guzeratus (Latham) - Tailor Bird
63. Phylloscopus inornatus humei (Brooks) - Leaf Warbler
64. Copsychus saularis saularis (Linnaeus) - Magpie Robin
65. Phoenicurus ochruros rufiventris (Vieillot) - Black Red start
66. Oenanthe picata (Blyth) - Pied chat
67. Saxicoloides pulcata cambaiensis (Latham) - Indian Robin
68. Parus major stupae koloz - Gray Tit
69. Anthus novaeseelandiae richardi Vieillot - Paddyfield Pipit
70. Motacilla alba dukhunensis Sykes - Pied Wagtail
71. Nectarina asiatica asiatica (Latham) - Purple Sunbird
72. Lonchura malacca malacca (Linnaeus) - Black headed Munia
73. Emberiza melanocephala Scopoli - Black headed Bunting

PTILES

- Schedule I.
1. Crocodilus palustris (Lesson), Mugger
 2. Varanus bengalensis (Daudin), Common Indian Monitor
 - * 3. Python molurus (Linnaeus), Indian Rock Python
 4. Kachuga Sp. Turtle

Reported.

Contd

FISHES

1. Notopterus notopterus (Pallas)
2. Chela laubuca (Ham)
3. Garillius barna (Ham)
4. B. bandulisia (Ham)
5. B. chakra Ham.
6. Esomus danrica (Ham)
7. Rasbora daniconius (Ham)
8. Puntius conchonus (Ham.)
P. sarana (Ham)
10. P. sulphore (Ham)
11. Labeo calbasu (Ham)
12. L. bonnet (Sykes)
13. Garra mullia (Sykes)
14. Lepidocephalus guntea (Ham)
15. N. denisonii Day
16. Ompok bimaculatus (Bl.)
17. Wallago attu (Schm.)
18. M. cavasius (Ham)
19. M. sengkhal (Sykes)
20. Rita rita (Ham)
21. Strongylura strongylura (V. Haas)
22. Nandus nandus (Ham)
23. Mastocembelus pancalus (Ham)
24. M. armatus (Lac.)

List of some conspicuous Plants:

1. <u>Acacia arabica</u>	- Babul
2. <u>Acacia catechu</u>	- Khair
3. <u>Adina cordifolia</u>	- Haldu
4. <u>Ailanthus excelsa</u>	- Maharukh
5. <u>Albizia lebeck</u>	- Kala si
6. <u>Albizia procera</u>	- Sured siris
7. <u>Anogeissus latifolia</u>	- Dhaora
8. <u>Azadirachta indica</u>	- Neem
9. <u>Boscullia serrata</u>	- Salai
10. <u>Buchanania - Latifolia</u>	- Achar
11. <u>Casuarina equisetifolia</u>	- Dhau
12. <u>Dalbergia peniculata</u>	- Phansi
13. <u>Dalbergia sissoo</u>	- Sissoo
14. <u>Diospyros embryopteris</u>	- Naked - Tendu
15. <u>Ficus anothiana</u>	- Pipli
16. <u>Ficus bengalensis</u>	- Bargad
17. <u>Ficus glomerata</u>	- Gular
18. <u>Ficus religiosa</u>	- Pipal
19. <u>Hardwickia binata</u>	- Anjan
20. <u>Maduca indica</u>	- Mahua
21. <u>Melia azadirachta</u>	- Bakayan
22. <u>Pterocarpus marsunium</u>	- Bija
23. <u>Salmalia malabarica</u>	- Semal
24. <u>Sterculia ureus</u>	- Kulu
25. <u>Syzonium cumini</u>	- Jamun
26. <u>Tectona grandis</u>	- Teak
27. <u>Terminalia catappa</u>	- Desi Badam

ENVIRONMENTAL STATUS

Does the area support economically viable aquatic life - Fish, Crocodiles? Please give details ;

Please refer to enclosed report.

Are there any Fish/Crocodiles Breeding grounds in the river/tributaries in the submergence area (3).

Yes.

Does the site contain a wildlife (including bird) habitat breeding area / feeding area

Yes.

Please refer para 2.1; 3.2 (a) & (b)
Not known but likely

Migration route.

Indicate the number of wildlife available in the area (7).

Please refer Appendix I of the report.

Is the site potential wildlife sanctuary?

Yes. Please refer p. of 3.2(b) of the report.

Specify any rare or endangered species of flora and fauna in the affected area along with their approximate number and measures to salvage/rehabilitate them (5) (7).

Please refer to and para 3.2(a) of report.



Phone : 20374 (O) 22334 (R)
NARMADA DEVELOPMENT DEPARTMENT,
પાલિકા ભવન,
GOVERNMENT OF GUJARAT,
સચિવાલય, ગાંધીનગર,
Sachivalaya, Gandhinagar-382 010
સચિવાલય, ગાંધીનગર-૩૮૨ ૦૧૦.

Secretary (Narmada)

સચિવ

Dated.....

તારીખ :

- 7 SEP 1988

To:

The Secretary,
Narmada Control Authority,
Palika Bhavan,
Sector-XIII,
R.K. Puram,
New Delhi-110 066.

Sub:- Faunal Survey of the Narmada Valley
by the Zoological Survey of India.

Ref:- Your letter No. D-34(4)/88/830,
dtd. 19.8.88.

.....

Sir,

Please refer to your letter mentioned in the reference enclosing a copy of the Report on the faunal survey carried out by the Zoological Survey of India in the submergence area of Narmada Sagar Project. The Report has been studied in the Narmada Development Department, Government of Gujarat. The comments of Government of Gujarat on the Report are given in the accompanying note.

Yours faithfully,

N. D. D.
Secretary (H)
N. D. D.

Enclosure: One note. - 22 -

Comments of Govt. of Gujarat on the Faunal Survey of the Narmada Valley by the Zoological Survey of India.

Ref:- Letter of NCA No.D-34(4)/88/830, dt. 19-8-1988.

In para 3.1 of the report, it is stated that no wild life worth the name will be able to thrive without contiguous foraging area. It is true that carnivorous and herbivorous animals will not be able to thrive, but such patches of hill tops that will be left behind will be ideal to protect and foster a large number of water birds.

In Sardar Sarovar Project, the total forest land going under submergence is only 10713 ha. out of total land of 34871 ha. going under submergence. The reservoir that will be created will be 214 km. long with an average width of about 1.6 km. with a maximum width of about 16 kms. just up stream of the dam. Thus, the reservoir will be a narrow, ~~but~~ enlarged strip of the river. The reservoir will, therefore, submerge only small areas along the river banks which will leave enough forest area on both the banks of the reservoir for the wild life to stay. It is also not necessary to provide any corridor for movement of wild life.

A number of habitat improvement measures have also been envisaged in the proposals forming part of the project. In addition it has been decided to raise tree vegetation in the vicinity of the Dam site in an area of 270 ha.

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Government of Gujarat has also enlarged the area of an existing sloth bear sanctuary by adding 297 sq.km. to the existing area of 150 sq.kms, making a total area of 447 sq.km. and designating the enlarged sanctuary as Shoolbaneshwar wildlife sanctuary. Several habitat improvement measures have been taken up for implementation in the enlarged wild life sanctuary.

Thus, Government of Gujarat, has taken necessary measures for preservation and betterment of wild life in the areas adjoining the Sardar Sarovar reservoir.

NARMADA CONTROL AUTHORITY

MINUTES
THE FOURTH MEETING
ENVIRONMENT SUB-GROUP
NCA

HELD AT NEW DELHI
18TH NOVEMBER, 1988

NEW DELHI
DECEMBER, 1988

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Shri K.P. Geethakrishnan, Chairman welcomed the members and invitees to the 4th meeting of the Environment Sub-group. A list of members and invitees who participated in the meeting is enclosed at Annex-1.

Chairman expressed concern that concerned agencies, have not been able to translate environmental safeguards into time bound action plans. He stressed the need to fix milestones and lay down targets. Responsibility shall lie with project authorities to get action plans prepared for the Narmada basin by entrusting them to appropriate agencies. State Governments shall build up adequate infrastructure for quick implementation of the action plans. He emphasised that positive action by the project authorities can alone counter the media criticism that is increasing with passage of time.

Item No. IV-1(11) CONFIRMATION OF THE MINUTES OF THE
THIRD MEETING OF ENVIRONMENT SUB-GROUP
OF NCA

Chairman indicated that the suggestion of the GOG can be accepted. The request of the GOG will be considered by the Ministry of Environment and Forests. The representative of GOM indicated that they have passed a resolution, copy enclosed at Annex-II, which is in force in their State without encountering any difficulty. This document would be examined by the Ministry of Environment and Forests and GOG could perhaps take similar action in the matter.

No other comments have been received from any of the participants. The Sub-group confirmed the minutes of the 3rd meeting with the above clarification.

Item No. IV-2(12) REHABILITATION MASTER PLAN

Chairman stated that necessary action has already been taken and the Ministry of Welfare has been requested to include the Additional Secretary, Department of Environment in the Rehabilitation Sub-group.

Item No. IV-3(13) PHASED CATCHMENT AREA TREATMENT SCHEME

Regarding mobilisation of funds for implementation of CAT Scheme, Member(C), NCA mentioned that it may not be possible to provide the entire funds asked by GOMP under the Centrally sponsored programme for soil conservation in river valley catchments of the Ministry of Agriculture. While some funds are available from the project estimate of SSP, as recently cleared by Planning Commission, balance funds will have to be found by the States concerned from their normal plan programmes. The issue regarding apportioning of the cost of catchment treatment is already referred to the MOWR on which a view is yet to be taken.

Vice-Chairman, NVDA(MP) stated that the cost of mitigating the direct damage to the environment arising out of the irrigation projects should be charged to the project estimates as per Planning Commission's circular of October, 1985.

2. Chairman stated that the basic object of the Ministry of E&F is to ensure that the mandatory environmental package envisaged in the clearance letters is implemented effectively. While mobilisation of funds is the responsibility of the project authorities, the Ministry of Environment & Forests could help by requesting the concerned agencies like Planning Commission, Ministry of Agriculture etc. on the basis of the requests received from the concerned States. But the fact remained that the primary responsibility of this Committee was to ensure that the various activities for securing effective protection of the environment kept pace with the implementation of the engineering works and did not lag behind. Constraints of funds would not be an acceptable plea for failure to implement the environmental action plans.

3. GOMP representative indicated that at the instance of GUG, survey work had been completed for the SSP area lying in Madhya Pradesh. Catchment area plans were discussed with GUG in June, 1988 and a pilot project has been drawn up. Non-availability of funds was the major issue. Conditions in the forest clearance letter of September, 1987 were ambiguous. The Planning Commission's circular of October, 1985 does not specify the agency which is to bear the cost of catchment area treatment. At this stage, Dr. Maudgal, Department of Environment explained that degraded areas in the free draining catchment were to be treated at project cost. The Chairman stated that the ambiguity in the clearance letter would be rectified by the Ministry of Environment and Forests.

4. Regarding progress of catchment area treatment scheme in Narmada Sagar Project (NSP), it was mentioned that catchment area of NSP is 61000 Sq.Km out of which 48000 Sq.Km is upto Bargi Dam. In the catchment treatment scheme, the catchment area of Bargi was, therefore, not included. Free draining area is 24000 Sq.Km. The intervening catchment has been divided into 54 water sheds. Out of 54 water sheds, only 21 water sheds come under high and very high priority. Due to constraint of funds, priority delineation at sub-water shed level for 13 water sheds (phase-I) lying in the vicinity of the reservoir and project impact districts alone had been completed. It was stated that catchment treatment covered under phase-I alone would be taken up and its cost charged to NSP while areas to be covered under phase-II & III would be treated either by future projects or under the ongoing Water shed Management & Soil Conservation programme. This stand was, however, not acceptable and it was stressed that both the NSP and SSP should prepare plans for their free draining catchment in entirety and the cost incurred for treatment of the catchment intercepted by a project to come up later could subsequently be suitably debited to individual

projects as and when they are taken up in future. The fact that some dams are yet to be conceived can not be a justification for not carrying out the surveys in their catchment or for implementation of the catchment treatment plan in those areas. The revised estimate for phase-1 covering an area of 2.41 lakh ha(non-forest) and 0.66 lakh ha (forest) has been worked out at Rs.123 crores. The phasing of works and requirement of funds for NSP is given in Annex-3. It was also mentioned that a fullfledged cell comprising of 15 sub-divisions has been created at NVDA level and staff is being posted for implementation. Detailed soil survey has been completed and the report is expected by December, 1988 based on which detailed plans are to be prepared for implementation.

5. Chairman stressed the need for urgent action for positioning of staff so that time schedule drawn for treatment of water sheds can be adhered to. He wanted that all the information should be available for the experts to examine and complete details of Phase-2 and 3 with corresponding time frame should be furnished.

6. GOG has prepared work plans only for catchment treatment of the area lying within the Gujarat State. This is contrary to the basin approach which called for treatment of the free draining catchment irrespective of State boundaries. Chairman made it clear again that carrying out surveys, preparation of catchment treatment plans of the areas between SSP and NSP and implementation of these plans before submergence begins is to be done at project cost by the SSP authorities.

GOMP representatives stated that SSP should be implemented as an inter-State project and the catchment area treatment lying in other States i.e., M.P. and Maharashtra should also be integrated with the area lying within Gujarat. Chairman stressed the need that the project authorities of SSP i.e., Sardar Sarovar Narmada Nigam should initiate action urgently to take up catchment area treatment work in all the three States and should co-ordinate the activities with GOMP and GOM. Failure to prepare treatment plans and undertake

treatment works as a time bound programme would be a violation of the conditions imposed while clearing the project and would invite action from the Ministry of Environment & Forests including stoppage of engineering works if found essential. The work done within Gujarat territory upto December, 1988 was presented and noted.

7. GOM representatives indicated that plans had been prepared in 40000 ha area and they had submitted catchment area plans to the NCA Secretariat and Ministry of Environment and Forests. Out of the anticipated submergence area of 7725 ha. the major portion is under forest and the rest is under agriculture.

8. As regards the point raised by GOG about creation of non-lapsable special fund for implementation of the catchment treatment programme by the State Forest Department, the Government of Maharashtra representative indicated that Maharashtra has issued a resolution in this respect in consultation with A.G. Maharashtra, copy placed at Annex-2. Chairman stated that the Ministry of Environment and Forest would examine the question and advise GOG accordingly.

Item No. IV 4(14) COMPENSATORY AFFORESTATION

GOMP representative mentioned that there was difficulty in identifying non-forest land in the vicinity of Narmada Sagar Project and wanted that their proposal for Compensatory Afforestation of 10,000 hectares of non-forest land and 70,000 hectares of degraded forest land submitted to the Ministry of Environment and Forest be accepted. This issue was to be discussed between the officials of Ministry of E&F and the State's representatives. Chairman suggested that Additional Secretary(E&F) should visit Bhopal shortly in order to sort out the issue. During his visit he could also check up the availability of additional non-forest land for the programme. As regards SSP, GOMP's representatives were asked to expedite submission of the Plan for Compensatory Afforestation, both to the GOG and Ministry of E&F.

2. GOM representative submitted that Compensatory Afforestation plan for 6205 ha. of non-forest land and 13000 ha. of degraded land was accepted by State Forest Department and they would submit the same to Ministry of Environment & Forest by 15th December, 1988. A copy of their action plans would also be submitted to NCA by GOM.

3. GOG representative indicated that they had already submitted the details of the work plan. The progress of work was mentioned as below:-

- a) Plantation in 500 ha. have been completed and 12.5 lakh saplings planted so far.
- b) Rs.110.31 lakh have been placed at the disposal of Forest and Environment Department.
- c) They have incurred an Expenditure of Rs.29.38lakhs up to the end of October, 1988.

The State-wise break up of the provision of Rs.14.05 crores for Compensatory Afforestation and catchment treatment provided in the updated estimate of Sardar Sarovar Project at 1986-87 prices was given as under:

Gujarat	Rs. 4.65 Crores
Maharashtra	Rs. 6.49 Crores
Madhya Pradesh	Rs. 2.91 Crores

The Chairman desired that Additional Secretary, Ministry of Environment and Forest should visit Bhopal on 6th and 7th December and visit the forest, non-forest and other areas for Compensatory Afforestation and resolve the issue of identification of lands. The Compensatory Afforestation plan from GOM would go to the State Forest Department by middle of December, 1988 for submission to Ministry of Environment and Forest.

Item No. IV-5(15)

COMMAND AREA DEVELOPMENT

GOMP representative stated that the detailed surveys are in progress but drainage and ground water studies have already been completed. Command Area Development Programme is likely to be ready by 1991-92 so that it could be implemented in time before the First phase of the project is completed in 1997.

Regarding SSP area, the representative of GOG indicated that soil survey and ground water studies have been completed upto Mahi. Master Plan for road construction was also ready. Prof. R.K. Katti stressed the need for coordination between the catchment area treatment, command area development programmes and the engineering works. Proper measures for prevention of soil salinity right from the beginning were also emphasised.

Chairman of the Sub-group stated that it was necessary for the State Governments to furnish a detailed programme for Command Area Development with its time frame.

Item No. IV-6(16)

SURVEY OF FLORA AND FAUNA

Dr. K.S. Singh, Director General, Anthropological Survey of India observed that the recent finding of a prehistoric fossil of Homo Erectus in the Narmada Basin has aroused deep interest of the anthropologists in the study of the basin and while he would not recommend stoppage of work, he strongly recommended the need for quick survey of the basin so that historical remains and fossils could be excavated and preserved. He also stressed the need for cataloging cultural artifacts, flora, fauna etc. in a coordinated manner by conducting the surveys under one umbrella i.e. botanical survey, zoological survey, archaeological & anthropological surveys and geological survey should coordinate their activities. He offered that Rashtriya Manava Sanghralaya, Bhopal would be able to take up anthropological surveys in the basin. Shri Khanna, V.C. NVDA responded that the concerned officers could contact him and he will ensure coordination.

Prof. Ramaseshan appreciated the idea of coordinating these activities and wanted that terms of reference should be properly drafted so that the ultimate goal of isolating endangered species, migration routes etc. becomes possible as a result of the study.

GOMP representative indicated that Archaeological Survey of India as well as the state Archaeological Department are already involved in conducting surveys and cataloging monuments and other artifacts likely to be affected due to submergence. It is understood that an authorisation would be forthcoming from Gujarat and Maharashtra also for extending the surveys right upto Sardar Sarovar Project in the concerned state territories.

In respect of flora and fauna surveys for SSP, GOG indicated that they had already entrusted such studies to M.S. University, Vadodara. Terms of reference and also methodology adopted by BSI and ZSI for such surveys could be ascertained either from the Deptt. of Environment or the concerned Directors so that uniform procedures are followed. It was noted that the states of Maharashtra and M.P. would give their concurrence for extending the surveys in submergence area of SSP falling in their territories.

Chairman indicated that it would be appropriate if such studies and surveys are carried out by non-governmental organisations. However, technical inputs could be provided by a small expert committee where representatives from Department of Environment could also be present.

GOMP representative indicated that they were having difficulties in obtaining the services of non-governmental organisations such as Bombay Natural History Society or the Birbal Sahni Institute, Lucknow. Chairman desired that the project authorities should contact the right people in these agencies to seek their help and offered that the Department of Environment would extend all help whenever needed.

Chairman stated that the project authorities should clearly define the Terms of Reference and the Methodologies to be adopted uniformly for conducting field surveys and studies. Competence of the agencies should be ascertained before assigning any of the studies to them. He desired that the project authorities should finalise these steps latest by 15th Jan. 1989.

Item No. IV-7(17) CARRYING CAPACITY OF SURROUNDING
AREAS

Members were informed that carrying capacity study of surrounding areas of NSP has been entrusted to the Friends of Nature Society, Bhopal and that a Wildlife Committee had been constituted by Govt. of M.P. This committee along with experts from Institute of Wildlife, Dehra Dun and representatives from Deptt. of Environment could guide the work. Progress made would be reported in the next meeting of the Sub-group.

Carrying capacity study for SSP was to be organised through M.S. University, Vadodara or, by Dr. Madhokar of Karnataka University. The Chairman directed that the project authorities should finalize the Terms of Reference and the methodology for this vital study and also ascertain carefully the capability of the agencies to be engaged. Target date for finalisation of the proposals was fixed for 15th Jan. 1989.

Item No. IV-8(18)

INDUCED SEISMICITY AND RIM
STABILITY OF RESERVOIRSA. RESERVOIR INDUCED SEISMICITY

As regards induced seismicity of Narmada Sagar reservoir, stations for seismic surveillance and monitoring have already been decided on the basis of studies done by CWPRS. The area from upstream of NSP and up to Maheshwar project has been covered in this study. Specifications for instruments etc. have also been finalised but pending finalisation of World Bank loan for NSP procurement has not been initiated. There is need to watch the progress of procurement of instruments and also their installation as per a programme that could be placed before the sub-group by GOMP.

As regards the areas surrounding NSP, GOG has decided on the locations for the instruments, their specifications and orders have also been concluded. GOG representatives could perhaps clarify to the sub-group whether the locations encampse reservoir rim falling in Maharashtra and Madhya Pradesh. They could also place before the Sub-group a programme of procuring instruments and arranging for their set up at the decided locations so that the Sub-group could monitor its progress.

B. RESERVOIR RIM STABILITY

In respect of NSP, GOMP representative indicated that the report by GSI in respect of rim stability of NSP was submitted to CWC some time back and the CWC have not reported the action taken on the report. No copy of the report was received in NCA. The Chairman desired that the report of GSI be forwarded by GOMP officials to the Department of Environment and NCA

Secretariat before 15.01.1989 so that it could be discussed in the next meeting of the Sub-group. In the meantime, NCA would arrange a meeting with GSI, CWC and also invite Additional Secretary(E&F) for participation in the meeting.

In respect of GSI, the rim stability surveys are still in progress by the GSI and it was reported during the last meeting that three years would be needed for the completion of the survey. GOC was requested to pursue the matter for expediting the GSI using good offices of Department of Environment for completing these surveys. Only after the surveys get completed, it would be possible to know whether there are rim locations which would need treatment or special measures for stability. As of now the Sub-group could be intimated the progress in respect of rim-stability surveys by GSI, from meeting to meeting.

Item No. IV-9(19)

HEALTH ASPECTS

GOMP representative indicated that surveys undertaken in NSP for health aspect and water quality and Schistosomiasis Survey in SSP area would be submitted.

GOG representative indicated that work plans have been prepared covering i) surveillance and control of water related diseases and communicable diseases ii) surveillance and control of malaria.

Chairman desired that the GOMP and GOG will prepare a detailed write up, if not already available, and present it in the next meeting of the Sub-group.

Item No. IV-10(20) FISHERY DEVELOPMENT IN SSP RESERVOIR

Chairman expressed the opinion whether fishery development per se was really the concern of this Sub-group or the Ministry of Environment. It was clarified that development of fisheries has the following important environmental implications:

- Protection and conservation of migratory fish and other aquatic life;
- Protection of fish, prawns and other aquatic life in the estuary area; and
- Provision of employment to the oustees.

The development of fisheries, therefore, has to be examined in this light and not just the introduction of carp varieties after the reservoir comes into existence. A Proper survey should be carried out to demarcate the migratory route, breeding places and action plans prepared for their protection.

ANY OTHER ITEM

Mr. Mammgat, Ministry of Environment & Forests informed the members of the numerous petitions and representations received by the Prime Minister and the Ministry of Environment & Forests against the Narmada Sagar and Sardar Sarovar Project on the following counts:

- Lack of Rehabilitation Plans;
- Lack of Compensatory Afforestation Plans;
- Lack of Catchment Area Treatment Plan;
- Lack of Command Area Development Programme; and
- Necessity for the review of benefit-cost ratio of both Narmada Sagar and Sardar Sarovar Projects.

The best strategy to counter such criticism is to gear up the organisations for implementation of detailed Action Plans on all the environmental aspects. It was therefore, agreed that the project authorities have to

- i) Prepare detailed implementation plans both for Engineering and Environmental aspects;
- ii) Gear up the necessary organisation for implementation of needed Action Plans on all environmental aspects; and
- iii) Provide necessary funds for the various programmes.

Chairman suggested that criticism against the project can be silenced only by positive action and the project authorities should gear themselves to demonstrate that they are capable of resolving the outstanding environmental issues satisfactorily. He also stated that the public and the press should be taken into confidence and suggested that it would be desirable to have a session with the press immediately after the next meeting of the Sub-group.

DATE AND VENUE OF NEXT MEETING

The next meeting of the Sub-group would be held some time towards the end of January, 1989 at New Delhi. The State representatives were requested to send the material for the Agenda notes covering the details of action taken at least one month before the date of the meeting.

NARMADA CONTROL AUTHORITY

List of Members/Invitees who participated in the 4th meeting of Environment Sub-group of N.C.A. held on 18.11.1988 at Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi;

1. Shri K.P.Ganthakrishnan, Secretary to the Govt. of India, Ministry of Environment and Forest.
2. Shri T.V.Krishnamurthy, Secretary (Rehabilitation), Narmada Development Department, Govt. of Gujarat.
3. Shri I.M.Shah, Secretary (Narmada), Narmada Development Department, Govt. of Gujarat.
4. Shri R.S.Khanna, Additional Chief Secretary & Vice Chairman, Narmada Valley Development Authority, Govt. of Madhya Pradesh.
5. Shri C.K.Modi, Secretary (R&FD), Govt. of Maharashtra.
6. Shri Vir Amar Parkash, Executive Member, Narmada Control Authority, Palika Bhawan, New Delhi.
7. Dr.A.C.Ray, Additional Secretary to Govt. of India, Ministry of Environment & Forest.
8. Shri N.K.Dikshit, Member (Civil), Narmada Control Authority, New Delhi.
9. Shri C.T.S.Nair, Dy. Inspector General, Ministry of Environment and Forest.
10. Shri T.N.Maharishi, Member Environment & Forest, Narmada Valley Development Authority, Govt. of Madhya Pradesh.
11. Shri M.S.Billore, Member Engineering, Narmada Valley Development Authority, Govt. of Madhya Pradesh.
12. Dr.S.C.Maudgal, Director, Ministry of Environment and Forest, Deptt. of Environment.
13. Shri Y.V.Dharma Rao, Secretary, Narmada Control Authority, New Delhi.
14. Shri S.M.Pai, Director, Narmada Control Authority, New Delhi.
15. Shri S.Y.Shukla, Superintending Engineer, Nasik Irrigation Project Circle, Nasik, Govt. of Maharashtra.
16. Dr.G.S.Kaushal, Joint Director (Agricultures), Narmada Valley Development Authority, Govt. of Madhya Pradesh.
17. Dr.K.S.Singh, Director General, Anthropological Survey of India, Govt. of India.
18. Dr.S.Ramaseshan, Professor of Civil Engineering, I.I.T., Kanpur.
19. Dr.R.K.Katti, Prof. Civil Engineering, I.I.T., Bombay.
20. Shri H.S.Panwar, Director, Wild Life Institute of India, Dehradun.
21. Shri Ashok Khosla, President, Development Alternative, New Delhi.

22. Shri P.Ambasta Development Alternatives, New Delhi.
23. Shri K.K.Tandon, Under Secretary, Ministry of Water Resources, Govt. of India, New Delhi.
24. Shri D.P.Manchanda, Dy.Finance Officer, N.C.A., New Delhi.
25. Shri D.P.Saxena, Dy.Director, N.C.A.

GOVERNMENT OF MAHARASHTRA
Finance Department,
Circular No. 30T 1086/479/FUD-2,
Mantralaya, Bombay-400 032.

Date : 15th February 1988

READ : Government Resolution, Revenue and Forests
Department No. FLD 1084/4058/F-3, dated the
9th January, 1985.

C I R C U L A R

According to the guidelines issued by the Government of India in the Ministry of Environment and Forests, if forest land is acquired for any project, it is necessary that afforestation is done on non-forest or degraded forest land. It is further provided that the area for afforestation on non-agricultural or degraded forest land should be twice the forest land acquired for the project and that the cost on this account should form part of the project. No project for which forest land is required to be acquired will be cleared by the Government of India unless it includes separately cost required to be incurred for afforestation work on twice the area of the forest land to be acquired for the project.

2. The question regarding making separate provision for compensatory afforestation would fall into two categories viz:-

i) Where forest land is allotted to private parties for their projects.

and

ii) Where forest land is acquired for projects implemented by the Government Departments.

3. It has been decided in consultation with the Accountant General, Maharashtra-I, Bombay that in respect of the category (i) i.e. forest land allotted to private parties for their projects, the amount received from the private parties should be credited to the Receipt Head "0406, Forestry and Wild Life, 01-Forestry (300) Other Receipts (ix) Receipts realised for clearance of forest land as well as compensatory afforestation under the Forest (Conservation) Act, 1980", and the expenditure against

P.T. O.

-2-

this should be provided under the Budget Head "2406, Forestry and Wild Life -01, Forestry, 101, Forest Conservation and Development-(viii) Compensatory afforestation in replacement of the forest land proposed to be used for non-forest use" under the Revenue and Forests Department.

4. In respect of the category (ii) i.e. forest land acquired for projects implemented by Government, the provision on account of compensatory afforestation should be shown separately in the project report. This provision should not be kept at the disposal of the department implementing the project but should be provided to the Forest Department. For this purpose, the outlay to be provided each year should be broken down into two components viz. normal outlay and the outlay for the compensatory afforestation. The cost on account of compensatory afforestation should be provided under the Major Head "2406-Forestry and Wild Life -01, Forestry, 101-Forest Conservation and Development (viii) Compensatory afforestation in replacement of the forest land proposed to be used for Non-forest use" under the Revenue and Forests Department. For this purpose the Planning Department should indicate the projectwise allocation for compensatory afforestation, separately while allotting the funds for the various projects for which forest land has been proposed to be acquired.

5. While forwarding the Budget Estimates for providing expenditure for compensatory afforestation, the following procedure should be followed :-

- 1) The Forest Officer should give full understanding about the cost of the afforestation to the Project Authority. This cost should be the same as in accepted by the Forest Department for other afforestation schemes i.e. Rs. 10,000/- per hectare over a period of five years or as revised from time to time by the Government due to escalation in prices of material and wages.

11) The Project Authority should transfer the Plan outlay to the Forest Department in one lump sum where the compensatory afforestation involved per project is less than 100 hectares in area or in a phased manner over a period not exceeding three years to be decided by the Forest Department where it exceeds 100 hectares in area. The concerned Conservator of Forest should prepare the statement showing clearly, projectwise annual requirements of funds and communicate it to the Nodal Officer/Principal Chief Conservator of Forest. The Principal Chief Conservator of Forest should consolidate all such information and forward the annual budget estimates in the prescribed "A", "B" and "C" Statements indicating therein the departmentwise, projectwise details including the Budget Head upto sub-head, under which provision of annual plan outlay earmarked for compensatory afforestation has been included. The procedure should be followed from the financial year 1987-88 onwards. The amount so received by the Principal Chief Conservator of Forests should be disbursed to such Conservators of Forest in whose circle the forest land or the non-forest land is taken up for compensatory afforestation, irrespective of the location of the project.

111) During the current financial year 1987-88, the following procedure should be followed :-

The projectwise requirements of the grant for taking up new areas as well as for maintenance of the work done in the previous year should be worked out by the Nodal Officer in consultation with the concerned Deputy Conservator of Forest/Conservator of Forest and should place demands with the concerned heads of department who should place the amount from his sanctioned grants at the disposal of Forest Department.

iv) The compensatory afforestation taken up should be on identified lands which are secured for the purpose and declared as protected forest.

v) The Deputy Conservator of Forest/Divisional Forest Officer should be assigned the job of undertaking the compensatory afforestation. The Nodal Officer in the office of the Principal Chief Conservator of Forests should ensure that the total areas of land undertaken for compensatory afforestation shall be equal to and in any case not less than the area involved in such cases which have been approved by the Government of India for diversion for non-forest purpose.

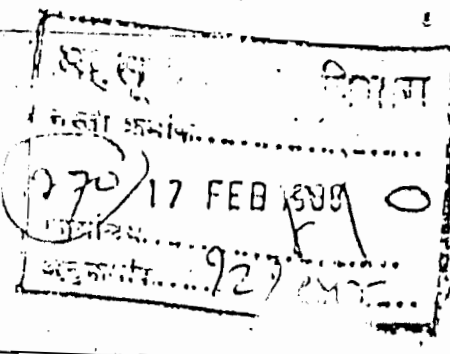
vi) The Marathi version is being issued separately.

By order and in the name of the Governor of Maharashtra,

(S.S. Karnik)
Deputy Secretary to Government
Finance Department.

To

The Accountant General-I, Maharashtra (Accounts and Entitlement), Bombay.
The Accountant General-II, Maharashtra (Accounts and Entitlement), Nagpur.
The Accountant General-I, Maharashtra (Audit), Bombay.
The Accountant General-II, Maharashtra (Audit), Nagpur.
The Pay and Accounts Officer, Bombay.
The Resident Audit Officer, Bombay.
The Principal Chief Conservator of Forest, Nagpur.
The Nodal Officer, Office of the Principal Chief Conservator of Forests, Nagpur.
All Conservator of Forests,
All Deputy Conservator of Forests/Divisional Forest Officers,
All Divisional Commissioners,
All Collectors,
All Departments of Mantralaya,
The Director of Accounts and Treasuries Maharashtra, State, Bombay.
The Chief Auditor, Local Fund Account, Konkan Bhavan New Bhavan, New Bombay.
The Deputy Directors of Accounts and Treasuries, Maharashtra State, Pune, Nagpur, Aurangabad, Nashik.
The Revenue and Forests Department (Desk F-10) (Five copies)
All Depts Officer in Finance Department,
The Select File.



FOURTH MEETING OF ENVIRONMENT SUB-GROUP OF R.C.A.

Item No. IV-3(13) :- Phased Catchment Area treatment Scheme.

Cost Estimates for ISP :-

On the basis of Priority delineation survey reports the NVDA has worked out the revised estimates of cost for treating the Indira Sagar Catchment. Only 21 watersheds out of 54 watersheds, come under high and very high priorities. Due to constraints of funds and looking to the immediate need for soil and water conservation, NVDA has decided to treat the priority area and lying in the vicinity of reservoir and in Project impact districts. Accordingly, 13 watersheds come under project impact districts i.e. Khandwa, Dewas, Sehore and Harda Tehsil of Hoshangabad district. The priority delineation at subwatershed level for 13 watersheds have been completed by All India Soil and Land Use Survey Organisation and M.P. State Agriculture Department. However, the data for 7 watersheds (covering nearly 6.6 lakh ha) have been received. Taking into consideration the priority delineation reports at sub-watershed level, the revised estimates for Phase-I have been worked out. It requires Rs. 123.00 crores. The phasing of works and requirement of funds would be as follows

1
Table * Physical and Financial phasing of Catchment Area Treatment

NON FOREST AREA

YEAR	Area proposed to be treated ha.	Estimated Expenditure Rs. in lakh	Employment Generation lakh man- days	Remarks
1988-89	3700	368	3.00	*Cost figures are comparatively higher as they include expenditure on establishment along with assets.
1989-90	21000	*1000	17.30	
1990-91	23000	*844	22.45	
1991-92	28000	669	22.45	
1992-93	28000	669	22.45	
1993-94	28000	669	22.45	
1994-95	28000	669	22.45	
1995-96	28000	669	22.45	
1996-97	28000	669	22.45	
1997-98	19900	*74	15.90	
Total	241200	6700	193.35	

Contd...../-

2
Table No. 8

Physical & Financial Phasing of Catchment Area
 Treatment (Forest Area)

Year	Area proposed for treatment (in ha)	Estimated expenditure in Rs. lakhs	Employment generation in lakh manday	Remarks
1. 1988-89	2,700	109.82	3.78	The estimated annual expenditure includes re-curing establishment expenditure as well as expenditure on building & purchase of equipment & machinery for the first four years.
2. 1989-90	5,000	351.18	11.53	
3. 1990-91	10,000	569.65	19.98	
4. 1991-92	15,000	639.19	26.44	
5. 1992-93	17,000	682.36	28.31	
6. 1993-94	17,000	682.36	28.31	
7. 1994-95	17,000	682.36	28.31	
8. 1995-96	17,000	682.36	28.31	
9. 1996-97	17,000	682.36	28.31	
10. 1997-98	14,300	592.36	23.60	
Total	1,32,000*	5,674.00	227.08	

* This is the total area which is proposed to be covered.
 But the actual area which is supposed to receive intensive treatment is about half of this.

Watershed management plan for catchment treatment of Sardar Sarovar was prepared in 1986. The total cost was estimated to Rs. 276 crores. As per recommendations of Diwan Committee a Pilot project namely 'Man' in the district Dhar (MP), has also been launched in the catchment of Sardar Sarovar. It will cost about Rs. 4.00 crores. Staff have been posted and they are doing survey work. Prioritisation survey work is being assigned to Shri G.S. Institute of Technology and Science, Indore at a cost of Rs. 3.28 lakh only.

At present eight sub-divisions of soil and water conservation are working in the catchment of Sardar Sarovar. These Sub Division to be shifted to Indira Sagar catchment. These can be maintained if question of sharing cost is settled early.

NARMADA CONTROL AUTHORITY

AGENDA

The Fifth Meeting
Environment Sub-Group
Narmada Control Authority

Venue: Conference Room
4th Floor,
Paryavaran Bhavan
CGO Complex, Phase-II
Lodi Road, New Delhi

Date : 7th March, 1989

Time : 10.00 AM

NEW DELHI
FEBRUARY, 1989

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AGENDA NOTES FOR THE FIFTH MEETING OF ENVIRONMENT
SUB-GROUP

Item No. V-1(21) CONFIRMATION OF THE MINUTES OF THE FOURTH
MEETING OF ENVIRONMENT SUB-GROUP OF NCA

The Minutes of the 4th meeting of the Environment Sub-group of NCA was circulated to all members and invitees vide letter No. D-34(4)/88/1123 dated 8.11.1988.

No comments have been received from any Member as such the circulated minutes of the 4th meeting of the Environment Sub-group may kindly be confirmed.

Item No. V-2(22)

REHABILITATION MASTER PLAN

NCA at its 30th meeting held on 10.1.1989 approved inclusion of Secretary(EF)/ Addl. Secretary(EF) as member/alternate member of the R&R Sub-group of NCA. Shri A.C. Ray, Additional Secretary of Ministry of Environment and Forest attended the 5th meeting of Rehabilitation Sub-group of NCA held on 19.12.1988.

Government of Maharashtra in their D.O. No. RPA-3188/CR-100/88/R-5 dated 7th January, 1989 addressed to Secretary, Ministry of Environment and Forest have proposed for diversion of about 2583 ha. of forest land for the rehabilitation of oustees of SSP (Copy at Annex.I). The present position of its consideration may be indicated by Ministry of Environment and Forest at the meeting.

Item No. V-3(23) PHASED CATCHMENT AREA TREATMENT SCHEME

1. It was mentioned in the last meeting of Sub-group that the issue of apportioning the cost of catchment area treatment of SSP to the party States was referred to the Ministry of Water Resources. Chairman, NCA and Secretary (WR) discussed this matter with the Chief Secretaries of concerned States at the meeting held on 10.1.1989. It was decided that "While exact cost sharing of environmental safeguard measures should be decided subsequently, the initial cost of surveys and preparation of projects report etc. should be charged to the SSP Dam". It was also indicated that there was necessity to establish reasonable limits as to how much upstream of SSP, the given treatment could be loaded on to SSP. Chairman, NCA indicated that a paper was being prepared in the WR Ministry on the catchment area treatment and also the relative efficacy of such treatment in enhancing the lives of created reservoirs. Ground rules on what costs are to be loaded to the reservoirs are also to be worked out according to this paper. The present position may be outlined by the representative of Ministry of Water Resources.

Narmada Sagar Project:

2. GOMP had mentioned about the status of work as on July, 1988 and Nov., 1988 in their letter dated 5.1.1989 regarding catchment treatment programme under NSP. It is stated that the staff for pilot projects is in position since last one year and various surveys and preparation of Detailed Project Report (DPR) were in progress in such water-shed level. The staff posted for work in

other areas was to be in position in about a month's time. The present position may be indicated by GOMP representatives. World Bank mission recently visited India to discuss the environment aspects of NSP. Relevant extracts from the 'Aide Memoire' are enclosed at Annex. 3(1). Action taken on the observation is to be ascertained from the GOMP representative.

Sardar Sarovar Project:

Govt. of Madhya Pradesh

3. GOMP had carried out survey for SSP area lying in M.P. Vice-Chairman, NVDA's letter dated 29.12.1988 to Secretary, Ministry of Environment and Forest (Copy at Annex.2) indicates that some studies were entrusted to Govindram Seksaria Institute of Technology and Science (GSITS), Indore regarding methodology for preparation of catchment area works. The present position needs to be indicated by GOMP.

Govt. of Gujarat

4. GOG prepared a work plan in 1986 for catchment treatment in Gujarat State only and submitted to the Ministry of E&F and took up implementation. During the 4th meeting of the Environment Sub-group, GOG indicated the work plan in Gujarat territory up to December, 1988. Progress in this work may please be indicated by GOG representative.

5. GOG had sent a proposal for creation of non-lapsable fund for implementation by State Forest Department and the reaction of Ministry of E&F was awaited. The present position may be indicated.

Govt. of Maharashtra

6. GOM during 4th meeting of the Environment Sub-group indicated that plans have been prepared in 40000 ha. of which 7725 ha. was under forest and the rest under agriculture and had submitted catchment plans to NCA Secretariat and Ministry of Environment and Forest. Ministry of E&F may indicate their reaction in this regard.

7. During the 4th meeting of the Environment Sub-group, Chairman stressed the need that project authorities of SSP should initiate action urgently to take up catchment area treatment work in all the three States and should co-ordinate the activities with GOMP and GOM. Progress in this regard may be indicated by the SSP project authorities.

8. World Bank Mission recently visited India to discuss the environmental aspects of SSP. Relevant extracts from the 'MOU' with World Bank Team concerning implementation of SSP at New Delhi between 5th and 8th December, 1988 is placed at Annex.3(2), which specifies certain action to be taken by them in this regard.

9. The World Bank Team proposed for creation of an Environment Cell in GOI's Ministry of Environment & Forests and also to engage an expatriate consultant to assist the Environmental Cell. GOI agreed to give the Bank by 31st January, 1989 its reaction to this proposal. As requested in Member(C), NCA's D.O. letter No. D-19(2)/88/1287 dated 21.12.1988 to Addl. Secretary, Ministry of E&F, latest position in this regard may be indicated by Min. of Env. & Forest.

10. The GOI team also undertook to present to the World Bank by January 31, 1989 (i) status of all studies and activities underway (ii) firm dates for undertaking and completing outstanding studies, (iii) date by which the Environment Cell will be created and the environmental framework prepared. Present position may be indicated by the concerned States.

Item No. V-4(24) COMPENSATORY AFFORESTATION

Narmada Sagar Project:

GOMP was to identify the areas where compensatory afforestation would be launched acceptable to the Ministry of Environment and Forest, for which Additional Secretary of E&F alongwith NVDA officials visited the NSP project area on 9th to 11th December, 1988. A copy of his D.O. letter dated 29.12.1988 addressed to the Secretary, Ministry of Water Resources regarding action to be taken on various points is placed at Annex.4. It was forwarded to Shri R.S. Khanna, Vice-chairman, NVDA vide NCA's letter dated 2.1.1989. GOMP representative may like to indicate the present position.

Sardar Sarovar Project:

Govt. of Madhya Pradesh

In the 4th meeting of the Environment Sub-group, GOMP representatives were asked to expedite submission of plan for compensatory afforestation both to the GOG and Ministry of E&F. GOMP may please indicate the progress made in this regard.

Govt. of Gujarat:

As indicated in the minutes of the 4th meeting of Environment Sub-group, GOG had already submitted the details of the work plan and the progress of work and State-wise breakup of the provision for compensatory afforestation as provided in the project estimate of SSP. Further progress in this regard may be indicated.

Govt. of Maharashtra:

The Compensatory Afforestation plan from GOM was to be submitted to the Ministry of Environment and Forest by middle of December, 1988 through the State Forest Department. Action taken in this regard may please be indicated by the GOM.

Item No. V-5(25)

COMMAND AREA DEVELOPMENT

Narmada Sagar Project:

During the 4th meeting of the Environment Sub-group, GOMP indicated that the Command Area Development programme is likely to be ready by 1991-92 and the detailed surveys are in progress. Drainage and ground water studies have already been completed. Further progress made and the time frame for completion of the studies may be indicated.

Sardar Sarovar Project:

GOG earlier indicated that soil surveys and ground water studies had been completed upto Mahi in SSP area. GOG had to submit the programme for CAD together with its time frame to the Ministry of E&F and NCA. The present position may be indicated.

Chairman of the Sub-group indicated in the last meeting that it was necessary for the State Governments to furnish a detailed programme for Command Area Development with its time frame. GOMP and GOG may like to present their programme of action.

Item No. V-6(26) SURVEY OF FLORA AND FAUNA

Narmada Sagar Project:

Flora and Fauna Studies:-

With regard to the fauna studies in NSP submergence area, GOMP had forwarded a report prepared by Zoological Survey of India to the Ministry of E&F which was placed in the 4th meeting of the Environment Sub-group. As regards flora studies, GOMP were to contact the Bombay Natural History Society and get their involvement finalised by 15th January, 1989 so that the flora studies can be done for NSP area. Progress made in this regard may be indicated.

Archaeological Studies:-

In the last meeting of the sub-group, GOMP had indicated that Archaeological Survey of India as well as the State Archaeological Department are already involved in conducting surveys and cataloging monuments and other artifacts likely to be affected due to NSP submergence. GOM and GOG were to give authorisation for extending the surveys right up to SSP in the concerned State territories. The present position may be indicated.

In the minutes of the 4th meeting of the Sub-committee it was indicated that Anthropological Survey of India observed that the recent finding of a prehistoric fossil of Homo Erectus in the Narmada basin has aroused deep interest of the anthropologists in the study of the Narmada basin. A quick survey of the basin was recommended

so that historical remains and fossils could be excavated and preserved. It was also proposed that Rashtriya Manava Sanghralaya, Bhopal would be able to take up anthropological surveys in the basin and GOMP was to initiate the studies accordingly. Progress made so in this regard may be indicated by GOMP.

Sardar Sarovar Project

Flora and Fauna studies:-

In the last meeting of the Environment Sub-group, it was indicated that GOG had already entrusted flora and fauna studies to MS University, Vadodara. It was noted that the States of Maharashtra and M.P. would give their concurrence for extending the surveys in submergence area of SSP falling in their territory. Vice-chairman, NVDA, GOMP had indicated his no objection as per minutes of the meeting held between officials of GOMP and GOG on 23.12.1988 (vide Annexure 2). The present position regarding concurrence of GOM may be indicated.

The Chairman of the Sub-group had stated in the last meeting that the Project authority should clearly define the terms of reference and the methodology to be adopted uniformly for conducting field surveys and studies. GOG was to finalise the terms of reference for extension of the study to M.P. and Maharashtra areas in consultation with the Ministry of E&F by 15.1.1989. The present position may be indicated.

Archaeological Studies:

The concerned department of the States of M.P., Maharashtra and Gujarat have to co-ordinate their efforts to prepare inventory and identify salvage action plan, cost and time frame etc. and finalise terms of reference and methodologies for studies by 15.1.1989. GOG, GOMP and GOM may indicate the latest position.

Item No. V-7(27) CARRYING CAPACITY OF SURROUNDING AREA

Narmada Sagar Project:

The carrying capacity study for NSP has been entrusted to the Friends of Nature Society, Bhopal. The latest position of progress of studies may be indicated.

Sardar Sarovar Project:

The carrying capacity study for the SSP was to be entrusted by GOG to Professor Madhokar of Karnataka University or to M.S. University, Gujarat. GOMP and GOM was to co-operate with GOG in carrying out such studies in their territory.

In the last meeting of the Sub-group, Chairman desired that Project authority should finalise the terms of reference and methodology for this vital study by 15th January, 1989 in consultation with Ministry of E&F.

The present position may be indicated.

Item No. V-8(28) SEISMICITY AND RIM STABILITY OF
RESERVOIR

A. Reservoir Induced Seismicity:

Narmada Sagar Project:

Stations for seismic surveillance and monitoring have already been decided on the basis of studies done by CW&PRS. GOMP may like to place before the Sub-group the progress of procurement of instruments and also the installation programme.

Sardar Sarovar Project:

GOG may place before the Sub-group a programme of procurement of instruments and installation programme in Gujarat and stations falling in Maharashtra and M.P.

It has been reported in the 32nd meeting of SSCAC that GOG is finding difficulty in getting land for one station at Shahada situated in Maharashtra. GOM may expedite the provision of land and indicate the status in this regard.

As already agreed in SSCAC meeting, GOMP and GOM may take urgent action to post necessary staff to the seismological stations in their territories, so that they got trained in making observations.

B. Reservoir Rim Stability:

Narmada Sagar Project:

The report of GSI in respect of reservoir rim stability of NSP was submitted to CWC. The comments of CWC alongwith relevant

extracts of the report of GSI were sent to Director, Ministry of Environment and Forest, Govt. of India by the Member (D&R), CWC vide letter No.3/4/86-NDC(Dams)/60-61 dated 2nd February, 1988 and copy was also endorsed to Member (Engineering), NVDA. The same is again placed at Annex. 5 for the information of the members. Ministry of E&F may like to give their reaction to the report.

Sardar Sarovar Project:

In respect of SSP, GOG was requested in the last meeting of the Sub-group to persue the matter for expediting the work by GSI using good offices of Ministry of E&F for completing these surveys. GOG may like to indicate the status of the study and progress made so far.

Item No. V-9(29) HEALTH ASPECTS

Narmada Sagar Project:

As per the minutes of the 4th meeting of Environment Sub-group, GOMP was to submit the work plan, safeguard measures, time frame on the basis of the surveys undertaken by the State Health Department in NSP to the Ministry of E&F. GOMP may present the status in this regard.

Sardar Sarovar Project:

Documentation of health safeguards, cost/time frame for areas around projects i.e. submergence area and command area has to be done by GOG, GOM and GOMP and properly presented to give an overall picture. GOG may indicate the position about preparation of a co-ordinated report in this regard.

Item No. V-10(30)

FISHERY DEVELOPMENT IN SSP/NSP
RESERVOIR

In the last meeting of the Sub-group it was emphasised that before preparing a scheme for fisheries development in the Narmada reservoirs, a proper survey should be carried out to demarcate the migratory route and breeding places of fish before action plans are prepared for protection. The present position of these surveys may be indicated by GOG and GOMP in respect of SSP and NSP respectively.

GOG had earlier a proposal for setting up of an inter-State Organisation for management of fishery development in SSP. For this purpose, GOMP and GOG and GOM were to study inter-State Organisation already available under Tungabhadra Board. GOMP has not agreed to this proposal of GOG. As per GOMP's letter dated 1.11.1988 (Annex. 6), the management of SSP reservoir for fisheries development should be given to the Madhya Pradesh State as 60 percent of the area under submergence will be within MP. The comments of GOG vide their letter dated 13.12.1988 are placed at Annex. 7. These proposals would be discussed in the Sub-group.

Item No. V-11(31)

FOREST CLEARANCE IN RESPECT OF APPROACH
ROAD AND NARMADA MAIN CANAL

In the meeting of the Chief Secretaries with Chairman, NCA held at New Delhi on 10.1.1989, it was pointed out that forest clearances needed in respect of approach road to the SSP reservoir and also in respect of some stretches of forest that were there on the Narmada Main Canal alignment have still not been obtained by the State Government. GOG was requested to take up the matter in consultation with the Addl. Secretary, Ministry of Environment & Forest. GOG may indicate the progress made in this regard.

ANY OTHER ITEM

Member Secretary of the Subgroup

In the 30th meeting of NCA held on 10.1.1989, it was decided that the Chairman of the Sub-group was authorised to co-opt Member/Member Secretary of the Sub-group depending on exigencies of work.

Chairman may please name the Member Secretary. /

DATE AND VENUE OF NEXT MEETING

INDEX TO ANNEXES

<u>Annex. No.</u>	<u>Item in which referred</u>	<u>Page No.</u>
Annex V-1	Item No. V-2(22)	1-7
Annex V-2	Item No. V-3(23), Item No. V-6(26)	8-13
Annex V-3(1)	Item No. V-3(23)	14-19
Annex V-3(2)	Item No. V-3(23)	20-21
Annex V-4	Item No. V-4(24)	22-27
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Annex V-6	Item No. V-10(30)	31-32
Annex V-7	Item No. V-10(30)	33-39

GOVERNMENT OF MAHARASHTRA

V. RANGANATHAN,
SECRETARY
(RELIEF & REHABILITATION)IMMEDIATED.O.No.RPA-3188/CR-100/88/R-5,
Revenue and Forest Department,
Mantralaya, Bombay - 400032.

Dated: 7th January, 1989.

Subject:- Sardar Sarovar Project
Proposal for diversion of forest
land for the rehabilitation of
oustees of

Dear

Please refer to Government letter, Revenue and Forests Department No.FLD-1688/CR-329/F-10, dated 28.12.88, on the above subject.

2. It might be recalled that the Narmada Water Disputes Tribunal award and the World Bank agreement executed with the Government of India and the participant states provide that the alternate lands to be given to the oustees of Sardar Sarovar Project have to be irrigable ones and should be of their choice. Hence, so long as the oustees do not approve of the lands offered to them, State Governments have to locate another lands. In Maharashtra State there is no command area of the Sardar Sarovar Project. Similarly, all the submerging villages are located in mountain ranges. The oustees are mostly tribals and depend on surrounding forests to satisfy their needs for fuelwood, fodder and other forest products. They have therefore, insisted on having lands as alternate lands from Akkalkuwa, Shahada, Taloda and Akrani talukas of Dhule District.

3. In the past this Government had made serious efforts in locating lands from commands of 9 minor irrigation projects, four medium irrigation projects, Government Waste lands and gairans. The command lands are available at scattered places and it is not therefore possible to rehabilitate the oustees after taking into account the village as a unit as is required by the objective set forth by the World Bank.

4. In this connection kind attention is invited to letter, dated 29.11.1988, from Mr. Moeen A. Warchhi, Sr. Vice President Operations, World Bank, addressed to the Chief Minister of Maharashtra. (copy enclosed). It has been suggested in that letter that it would be reasonable to let forest dwelling custees make use of some of available denuded or degraded forest areas, both for cultivation of subsistence crops and for tree planting. This in other words means implementation of the scheme of Agroforestry. On enquiries with the custees it is learnt that custees are agreeable to implement this scheme.

5. In view of this position and also in view of the fact that Government of Maharashtra has no other acceptable lands to offer to the custees, I have to request you to kindly look into the matter personally and arrange to move the Government of India to agree to the diversion of about 2583.42 Ha of forests lands for rehabilitation of custees of Sardar Sarovar Project.

With regards,

Yours sincerely,

^{st/}
(V. Kargamthan)

Encl.: A copy of letter
dated 29/11/1988 from
the World Bank.

Shri K.P. Gouthakrishnan,
Secretary to the Government of India,
Ministry of Environment and Forests,
Paryavaran Bhavan, B. Block,
Phase-II, C.G.C. Complex,
Lodi Road, NEW DELHI-110 003.

-3-

Copies with copies of accompaniments forwarded with compliments to :-

The Secretary to the Government of India,
Ministry of Water Resources,
Shram Shakti Bhavan,
NEW DELHI-110 001.

✓ The Secretary,
Narmada Control Authority,
Palika Bhavan, Sector XIII,
R.K. Puram,
NEW DELHI-110 066.

F-10 Desk, Revenue & Forests Department.

✓
Secretary to Government,
Revenue and Forests Department.

(Copy with accompaniment forwarded with compliments to:-

The Special Commissioner,
Government of Maharashtra,
Maharashtra Sadan, Copernicus Marg,
NEW DELHI-110 001.

2. He is requested to pursue this proposal with the Government of India, Ministry of Environment and Forests, New Delhi and arrange to obtain their approval to the said proposal immediately.

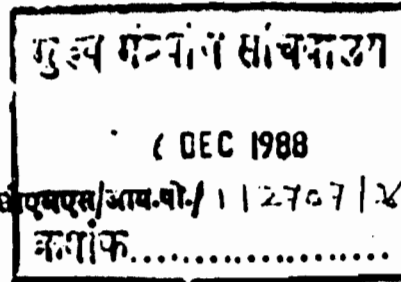
54 —
Secretary to Government,
Revenue and Forests Department.

The World Bank
Washington, D C 20433
U.S.A.

AIDEN A. O'NEILL
Senior Vice President, Operations

November 29, 1988

The Honourable Sharad Pawar
Chief Minister
Government of Maharashtra
Mantralaya
Bombay
India



Dear Sir:

I should like to thank you for the opportunity to meet you during my recent visit to Maharashtra and for the useful discussions we had regarding the Sardar Sarovar Project. As you know, the project involves the resettlement and rehabilitation of many thousands of people, most of them tribals. This, and the potential environmental impact of the project have become the focus of attention not only by the Bank, but by many concerned citizens and groups in India and worldwide. I was grateful to learn about the problems, challenges and proposed solutions in discussions with you, the Government of Gujarat, with concerned non-governmental organizations and with some of the "oustees" themselves.

I was impressed not only with the magnitude and complexity of the task, but also with the seriousness and the commitment of all parties involved. I felt that the officials in charge of planning and directing the efforts are dedicated to finding viable solutions to the problems of land acquisition, resettlement and rehabilitation, and environmental protection. It was satisfying to learn that there is now active involvement of non-governmental organisations. But I also took seriously those voices that warned that all is not yet well with the planning and implementation of resettlement and environmental mitigation and safeguards.

I listened carefully to those that are entirely against the project. I believe they should be heard, and their arguments should be noted and answered with openness, solid facts and sound reasoning. It was my impression that perhaps we - the concerned governments and the Bank - have not been totally successful in making plain all that the public should know about the project and its impacts, and that in some instances we may not really have satisfactory answers yet. This should become all the more reason to address the outstanding issues urgently, with thorough and action-oriented study and with well-conceived, practical plans.

Detailed report should be prepared by
29/12/88

29/12/88
DS (Hq) for Mr. Hugh Coz

Time is limited to come to grips with the immense problems we are facing, and urgent action is now called for by all concerned. Let me discuss what we believe are the most important issues to be addressed in relation to resettlement and rehabilitation:

The Narmada Water Disputes Tribunal's award and our agreements with Government of Maharashtra (as well as with the other two states) provide the principles and certain rules upon which resettlement and rehabilitation under the Sardar Sarovar project is to be based. I appreciate that Maharashtra has a specific law applying to involuntary resettlement. It was reassuring to learn that your government is prepared to combine provisions of the law, agreements with the Bank and Tribunal Award in the way most beneficial to oustees. It is important now to formulate the detailed provisions of a policy and to announce them. As I pointed out, there is a need to make policies in all three states comparable. The Bank would expect that such policy be issued urgently, and made public among the affected population, well ahead of the formulation of a resettlement and rehabilitation plan, as this will depend on such policy.

There are particular matters of policy that have been raised over the last year or so, such as the case of villages that may be made socially and economically unviable by the relocation of the major part of their inhabitants, cases of "marooned" land not being taken into account in compensation and rehabilitation of their owners, the entitlements of encroachers and landless people, and other matters in which the Narmada Water Disputes Tribunal has not ruled. Kindly let us know how your government intends to handle these problems.

Resettlement and rehabilitation is a large and complicated task; it requires well-conceived, meticulous planning and design - village by village and family by family - just as a major engineering project does. Actual involvement of the oustees, whose future is at stake, in the planning process is essential. So is the collection of accurate, up-to-date information about each village and each family, their properties, means of livelihood, and their preferences. Prompt identification of suitable lands for resettlement, wherever the affected people cannot be expected to find such land for themselves or with help from non-governmental organisations, careful preparation of rehabilitation options for landless oustees, and designs for development of relocation sites will be important elements of a plan. Detailed schedules must be worked out and tasks must be clearly assigned to the various organizational units and their staff. We trust that the preparation of implementable, detailed resettlement and rehabilitation plans is being accorded the utmost importance, so that these plans are ready by December 31, 1988, as requested by the Bank in earlier correspondence. In preparing this plan for Maharashtra, it will be important to address the following issues.

It has become clear to many concerned that the rehabilitation of forest-dwelling oustees is best achieved by settling them in a similar environment, enabling them to make the forest environment more productive to their own benefit and to that of the nation. The Bank attaches the greatest importance to both the effective rehabilitation of oustees and to the enhancement of the natural environment. The agreements with the Bank provide for use of forest land if this becomes necessary for purposes of implementing the project. We have learnt from Government of India that the release of forest land might be a possibility if alternative land is offered to the Forest Department in exchange. If appropriate schemes are planned, implemented and assisted adequately by government, it would appear no more than reasonable to let forest-dwelling oustees make use of some of available denuded or

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Mr. Sharad Pawar

degraded forest areas, both for cultivation of subsistence crops and for tree planting. We urge your government to consider such options and to propose them to Government of India.

It has been pointed out that many oustees are now depending on surrounding forests to satisfy their needs for fuelwood, fodder, and other forest products. It would appear important that provisions be made at relocation sites to assure the supply of fuel and fodder resources through what ever means. In this context, the recent decision of the Sardar Sarovar Narmada Nigam in Gujarat to approach development of relocation sites in a manner that takes the needs of both host and oustee communities into account seems to us a very helpful step that might be followed by your government also.

Communication with the affected people and their participation are not only desirable, they appear essential to successful implementation of resettlement and rehabilitation. Much of the resentment against the project among the "oustee" population may be due to their not being informed about the time and place of their resettlement and the means of their rehabilitation, and to their not being genuinely involved. We may have much to gain and nothing to lose in informing the affected people about government plans, and in actively involving them in their formulation.

Planning and implementation of resettlement and rehabilitation depend for their success on a strong, functional organization and on dedicated, compassionate and well-trained staff. We remain concerned that the creation of such organization with the proper staff has not been accorded a high priority in the past. We urge that your government review the present organizational arrangements and take decisive steps to make them effective and to select and train sufficient, suitable staff.

With regard to the environmental impact of the Sardar Sarovar Project, we are concerned that there has been very little progress in commissioning of thorough studies of the matters requiring attention, and feasible plans have not yet been formulated. Areas of concern are salvaging of plant and animal species from the submergence area, especially with regard to wildlife, catchment protection to prevent premature siltation of the reservoir and afforestation. We shall be writing a separate letter to Government of Maharashtra in these matters.

I should appreciate your taking a personal interest in resolving these issues. As you know, the closing date for the submission of the Sardar Sarovar Water Bellway and Drainage Projects is coming up on March 31, 1989. We shall take a view on an extension of this date, among other aspects, on the basis of progress achieved with resettlement and rehabilitation under the project.

In view of the urgency of resolving issues of resettlement and environment, I have asked my colleagues, Messrs. A. Golan and B. Merghoub, to visit Delhi in early December to discuss these matters with representatives of Gujarat, Maharashtra, Madhya Pradesh, the Government of India and the Narmada Control Authority. I hope that a firm action plan to address the issues can be agreed upon during these meetings.

FROM DELEGATION WASHINGTON
Mr. Sharad Pawar

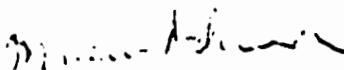
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NO. 47
November 27, 1988

I should like to thank you for the opportunity of frank and useful discussions on these matters, and for the hospitality extended to my staff and me.

Sincerely,



Moeen A. Qureshi

cc: The Secretary to Government of India, Ministry of Finance, New Delhi
The Secretary to Government of India, Ministry of Water Resources, New Delhi
Mr. Sanat Mehta, Chairman, Sardar Sarovar Narmada Nigam Ltd., Gandhinagar
Mr. C.R.K. Rao Sahib, Executive Director, World Bank

ANNEX, V-2

NARMADA VALLEY DEVELOPMENT AUTHORITY
Narmada Bhawan, Tulsinagar, Bhopal 462003

R.S. Khanna,
Vice-Chairman

D.O. No.1094/VC/PS

Date: 29.12.1988

My dear Geetha Krishnan,

In accordance with the decision taken in the Environmental Sub-group of NCA meeting held on 18th November, 1988, I went to Gandhi Nagar for discussing the various matters. Copy of the minutes of the meeting held on 23.12.1988 is enclosed. The Government of Gujarat should initiate action in connection with paras 4 and 5 of the minutes.

Encl: As above

Yours sincerely,

Sd/-

(R.S. KHANNA)

Shri Geetha Krishnan,
Secretary to the GOI,
Ministry of Env. & Forest,
Paryavaran Bhawan, B Block,
Phase II, GCO Complex,
Lodhi Road,
NEW DELHI

Endt. No.

Dated 29.12.1988

Copy along with enclosure forwarded to Shri Dharma Rao, Secretary, Narmada Control Authority, 117, Palika Bhawan, Sector XIII, R.K.Puram, New Delhi-110066 for information.

Encl: As above

Sd/-
(R.S.Khanna) 29.12.88
Vice-Chairman

Minutes of the meeting convened to discuss issues relating to rehabilitation and resettlement programme with Shri R.S.Khanna, Vice Chairman, NVDA, Bhopal on 23rd Decr. 1988.

1. The list of officers who attended the meeting is kept at annexure 'A'.
2. At the outset, Mr. P.A. Raj, Vice Chairman and Managing Director, SSNNL welcomed Shri Khanna and other officials.
3. Opening the discussion, Shri Khanna drew attention of authorities of SSP to clarify about the programme of submergence. He wanted this to avoid further confusions due to differing reports. Shri I.M. Shah, Director, SSNNL and Secy. (N) GOG, clarified that there is no acceleration in the submergence programme and the programmes sent in May 1987 still holds good.
4. The position in respect of various environment studies Shri T.V. Krishnamurthy, Director, SSNNL and Secy. (R&R) GOG informed that GOG entrusted study of flora and fauna to M.S. University Baroda. Shri Khanna stated that he had no objection to the study on wild life in SSP area in M.P. entrusted to the same organisation. Maharashtra may also like to do the same. TOR/Methodology of this study pertaining all the three states have to be worked out as indicated by Dr. Ray, Addl. Secretary, Department of Forest and Environment, Govt. of India. Meeting can be convened either at Delhi or at Baroda in first week of January alongwith the representatives of these three states and MSU. GOG may intimate the date after consulting MSU Baroda.
5. Regarding archaeology and enthnopological studies Shri Khanna informed that further information could be obtained from Shri O.P. Mehra, Member (Rehabilitation), NVDA who will be in IIM Ahmedabad next week. NVDA has entrusted this study to Archaeological Survey of India and state Archaeological Department. Shri I.M. Shah informed that GOG has completed the enthnopological study in M.P. have been entrusted to Rashtriya Manav Sangrahalaya, Bhopal. Maharashtra's position is not known.
6. Referring to catchment area treatment, Shri Khanna informed that GOMP entrusted this task to GSITS (Govindram Seksaria Institute of Technology and Science), Indore. He wanted to know about the task of ISRO in this regard. Shri I.M. Shah informed that ISRO Ahmedabad is doing mapping through remote sensing. Shri Khanna suggested that Shri Dharmarao has sent a technical paper of the World Bank which had stated that treatment of nearby catchments could be useful. This may be collected for further use. Shri T.V. Krishnamurthy explained satellite imageries. Shri Khanna suggested that two institutes should sit together and finalise the methodology for prioritisation.

7. Shri Khanna asked about the preparedness for prospective funding of R&R and environment component of the project by the World Bank as suggested by the Chairman SSNNL during the last visit of Vice President of the World Bank. He pointed out that the proforma and formats for costs estimation provided by the World Bank in the context of MSP may be utilised for this purpose. The World Bank could finance setting up of infra-structure like marketing facilities etc. in R&R programme.
8. Shri Khanna raised the issues of joint inspection of lands for PAPs of MP. Shri T.V. Krishnamurthy informed that lands were inspected between 9th August and 11th August 1988. Shri Khanna desired that the land available in Sankheda, Wagodia and Savli talukas should be inspected. He stressed the need for a time table for such joint inspection. It was agreed that officials of GOMP and GOG should sit together and chalk out a programme for such inspections. However, one month's programme of around 1320 Ha is already finalised in this regard. (copy enclosed).
9. Regarding purchase of selected land for oustee of MP, it was suggested by Shri Khanna that GOG should purchase land on behalf of PAPs of MP. Shri T.V. Krishnamurthy informed that there are legal and procedural impediments which makes it difficult for GOG. It was suggested that Section 4 Notification may be issued because entitlement of the oustee can only be determined according to land acquisition provisions. Atleast the villages likely to be submerged need to be notified immediately. The provisions of amended Land Acquisition Act have to be laid alongwith NWDTs award. According to the award the oustees can remain in possession even after the award under Land Acquisition Act has been given. Shri Shah suggested that NVDA may reconsider offer of Daman Ganga lands. (approximately 100 Ha).
10. It was clarified by Shri T.V. Krishnamurthy that the newspaper reports about the qualifying age for major son is not correct. He stressed that GOG will go according to the law in this issue.
11. Opening discussion on land for landless, Shri Khanna pointed out that GOMP has decided to diversify landless labourers to non-land based activities. He also cited GOMP's efforts to develop sericulture. Shri T.V. Krishnamurthy pointed out that only landless agricultural labourer can avail of this benefit for grant of land in Gujarat provided they decide to resettle in Gujarat. This expense is in non-shareable category provided resettlement is in Gujarat. Shri Khanna informed that besides sericulture, GOMP wants to undertake programmes of KVIC. He also suggested to explore possibility of setting up annu somewhat on the lines of the annuity scheme of Unit Trust of India. Shri Krishnamurthy suggested that the sharing of expenses in this regard needs to be examined by SSNNL and GOG.
12. Shri Khanna asked about training to be imparted to the PAPs and their dependants. Shri T.V. Krishnamurthy informed that ITI of GOG trains students for draftsman, surveyors, wiremen and drivers. Regarding the medium being Hindi, Shri Krishnamurthy stated that this issue will be examined by GOG.

13. Regarding employment generation for PAPs Shri Krishnamurthy informed that An Employment Exchange is already working at Kevadia and a placement officer is appointed by SSNNL to help oustee families to seek employment. Shri Khanna suggested to work out formats and procedures for registration and placement for PAPs. The domicile criteria accepted as in case of Maharashtra may also be approved for PAPs of MP.
14. It was informed by Shri I.M.Shah that Majmulee maps of tehsils in MP likely to be submerged wholly or partly under SSP are submitted to GOMP vide letter No.NPC/1280/1/K-4
15. The meeting dispersed after thanking the officers who participated.

PROGRAMME OF JOINT INSPECTION OF LANDS FOR ARMY, PRADHAN GUSTERS BY MADHYA
PRADHES AND GUJARAT OFFICERS.

Sr. No.	Village	Taluka	District	Area ha.	Date of Intillation of Maps Nos. and Maps to R.O. (MP)	Ends of Visit Date	Place of Start form.	Office to accompany.
<u>1st Round</u>								
1.	Chemulpatal	Mangrol	Surat	72	10.1.1988	17.18.19 in January, 1989	Kev-ole	R.O. Unit II Shri Parmar Shri Patel M.A.
2.	Chakra	Mangrol	Surat	39				A R.O. (MP) Gantam.
3.	Navachakra	Mangrol	Surat	34				
4.	Cheroli	Jhagadia	in such	27+60 ha. of Govt. land.				
5.	Dejipura	Villa	in such	64 156.60 220.60 ha.				
6.	Chhatorevanj	Jatpurpali	Baroda	251 527 ha.				
<u>IInd Round</u>								
1.	Sandbell	Thara	Chau.	200 ha.	19.1.1988	30th & 31st Jan.	Baroda	R.O. Unit II Shri Parmar R.S. (MP) Gantam.
2.	Jhaktipura	Kelol	Santh-nha	271 ha. 471 ha.		1st February 89	Baroda	do

Revisit of Govt. lands already seen by
Mr. Kuchel, Vester. M.L.A. E.C.

APPENDIX-A

List of participants in the meeting convened by Vice Chairman and Managing Director, SSNNL Gandhinagar, on 23.12.1988 at 10.30 A.M. to discuss 'R & R Programme' with Shri R.S.Khanna, Vice Chairman NVDA, Bhopal.

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- | | |
|---------------------------|--|
| 1. Shri R.S.Khanna, | Vice Chairman, NVDA, Bhopal |
| 2. " P.A.Raj | Vice Chairman and M.D.SSNNL, Gandhinagar |
| 3. Shri T.V.Krishnamurthy | Secy.(R & R, NDD) and Director (SSNNL) |
| 4. Shri I.M.Shah, | Secy.(NDD) and Director (SSNNL) |
| 5. Shri M.L.Joshi | Executive Engineer, NVDA, Bhopal |
| 6. Shri P.Cherunni, | Ex.Engr.N.D.Divn.No.22, Barwan-Khargam Dist.(M.P.) |
| 7. Shri C.G.Joshipura | Addl.Collector(N) Vadodara |
| 8. Shri A.A.Nagori | Director (R & D) Vadodara |
| 9. Shri B.V.Jha | Manager (R & R) SSNNL |
| 10. Shri L.N.Jadav | Dy.Town Planner (NDD) Gandhinagar |
| 11. Shri P.G.Patel | Manager (R & R) SSNNL |
| 12. Shri S.G.Barot | U.S.to Govt.(NDD) Gandhinagar |
| 13. Shri T.J.Kachhia | O.S.D. N.P.G. Gandhinagar |
| 14. Shri B.M.Patel | Ex.Engineer, N.P.Kevadia |
| 15. Shri K.H.Vasavada | R.O. NPG, Gandhinagar |
| 16. Shri G.B.Vaghela | R.O. NPG, Gandhinagar. |

(Extracts from World Bank's Aide Memoire Sept 30-Oct 17)
for NSP

Afforestation

- Current progress of this component appeared to be restricted to identification and mapping (1:50,000) of degraded or denuded forest lands within the "Project Impact Area". (This area, approximately 1.14 million hectare in size, has been defined as 13 priority watersheds above Narmada Sagar dam in parts of Khandwa, Hoshangabad, Dewas and Sehore districts and was documented on a map.) All afforestation to be supported under the project would take place within the Narmada basin. The mapping is to be completed by end of 1988, at which time the exact extent and location of afforestation areas under the project will be known. The current estimate is about 60,000 ha of afforestable land in the project impact area. This would be an adequate size to be funded under a Bank-supported project over some seven years.
- The extent of submergence of actual forest cover was discussed. It was noted that some 11,000 ha out of 40,300 ha officially counted as forest land are certain not to have any significant tree cover, but the extent of cover on the remaining 29,300 ha is still not known. It is estimated to amount to about 20,000 ha only. In addition, the 4-meter vertical contour strip located in the reservoir is estimated to contain some 400 to 5000 ha of forest which would not be cut.

040211

- The central problem with the component is the persistent lack of a clear concept of afforestation. The mission stated that the Bank could not support any afforestation which had little chance of being sustainable, and which did not involve the local communities as guardians and beneficiaries of the new plantations. While the choice of "treatment" remains vague (planting or regeneration, species, land preparation, soil and moisture conservation, integration of fodder species, setting aside of pasture areas), there is also no agreed and feasible concept for participation of local communities. The issues of protection mechanisms (protecting plantations from cutting and grazing through fencing, trenching, social enforcement, etc.), community contributions to planting, guarding and maintenance, "kissan" nurseries, regulated access of communities to forest products, and restriction of grazing to intensively managed pasture areas were not further addressed, although certain concepts had been discussed intensively during the previous mission.
- The mission urged again the integration of a community involvement specialist in the planning and design of the component, but such individual has not been found by NVDA. Efforts should be made to locate examples of successful community involvement countrywide and the associated individuals and to secure their help. Also, help from interested NGOs will have to be sought as communicators with and organizers of communities to be involved. As an alternative concept, the mission urged NVDA again to consider the beneficiary plantation schemes ("hitgrahi"), which involve landless families as lessees of forest land responsible for its afforestation and maintenance, but which had been dropped by GOMP earlier, for unknown reasons.
- No further progress appears to have been made with preparation of measures to reduce the pressure on fuel wood resources, through introduction of innovative cooking devices (biogas plants, solar cookers and fuel saving stoves). The Bank considers such measures to be of prime importance, particularly with regard to all oustee families. Efforts should be made to identify the various sources of such equipment in India, and to identify the ways and means by which the equipment could be made available to oustee and other families.
- NVDA will prepare by December 31, 1988 a comprehensive plan for a pilot area of some 400 ha already selected, and a "treatment plan" for the first year afforestation area of some 2,500 ha. This should include detailed estimates of unit costs and overhead costs for various treatment options. Tentative implementation plans and cost estimates for the following years should also be prepared. The mission indicated that a comprehensive outline for the elements of an afforestation plan (and watershed management plan) were given to NVDA during the last mission which continue to be worth following.
- NVDA informed that the five-year period for afforestation mandated by GOI had not yet started, and that it was seeking an extension beyond five years from GOI. NVDA intends to employ itself 20 (?) complete plantation divisions to implement the afforestation program. The ultimate number would depend on the annual targets for planting. The mission noted that the overhead cost of tree planting with these traditional divisions appeared rather high. Also, it would appear that NVDA's taking over these divisions (rather than leaving the implementation to the Forest Department) is only justified if the method and approach to afforestation is sufficiently new and innovative, so that the Forest Department could not be relied upon to implement the component in the desired way. The mission requested that NVDA clearly define the responsibilities of NVDA itself and the various line departments of GOMP that will be involved in one way or the other.

040212

- It was decided that clearfelling of the reservoir area would not be an element of the proposed "Area Development Project", although a precise clearfelling plan was needed and should be agreed upon with the Forest Department.

Watershed Management

- A paper on the approach to watershed management was presented. Data collection and mapping have made good progress and are on schedule. However, land use data based on remote sensing data for the middle Narmada basin are still not available. An NVDA watershed management cell has been created and its staffing and responsibilities have been detailed. It will include ten experts of various disciplines, three soil conservation divisions with 15 sub-divisions, and a soil survey unit. Some catchment treatment works have been started, including engineering and vegetative measures. The mission was pleased to learn that a vetiveria (khus) grass nursery had been started on 2 acres, and that khus grass had been planted already in about 10 ha.
- Out of 54 watersheds between Narmada Sagar and Bargi dams, 21 have been declared high-priority watersheds, based on the survey and mapping work on 1:250,000 scale. (The silt yield index formula was used to identify priority watersheds). Of these, 13 watersheds fall within the "Project Impact Area" in the vicinity and upstream of future Narmada Sagar lake. Priority delineation at sub-watershed level has been completed for the project impact area (1:50,000). It is expected that some 300,000 ha will require treatment, out of which some 66,000 ha are forest land. The 300,000 ha would be treated over a 10-year period. Areas considered for compensatory afforestation as well as areas falling under the Tawa irrigation command are excluded from the watershed management approach, although a good part would also lie within the project impact area's priority sub-watersheds. Instead, forest area treatment would also be undertaken by the watershed management cell. While it was understood by the mission that compensatory afforestation served the main purpose of restoring tree cover, and that of watershed management to conserve soils and moisture, the mission reiterated that there should be maximum overlap between the two programs, and the closest coordination of forest area treatment between the units responsible for compensatory afforestation and those responsible for catchment treatment. In particular, compensatory afforestation areas should not be excluded from the watershed management approach wherever they overlap.
- Current plans still call for a substantial amount of engineering measures as opposed to vegetative measures. NVDA mentioned several disadvantages of vegetative bunding, and remains reluctant to embrace the approach fully. In particular, alternative grassy/husky species for such bunding were advanced, without any documentation of their suitability. The mission reiterated that the Bank's experience in India over the last three years has given rise to the highest expectations for the vetiveria technology. Further visits by NVDA to sites in various states in India where its beneficial effects have been amply proven might be in order. Also, GOMP has already committed itself to the technology under the Rainfed Watershed Development Project; it remains thus unclear why NVDA would deviate from this approach. NVDA had decided that while vegetative measures would be tried on all non agricultural areas, they would be restricted to slopes of 3% and less on agricultural areas, but tried on higher-slope agricultural land in the pilot watershed (Daruji). The mission requested that vegetative treatment - which is much less costly, much more likely to withstand storm runoff, prone to grow with gradual silt deposition, and much easier to maintain - should be applied as the standard treatment, even as substitute for gully plugs, check dams, etc. NVDA should try to minimize the cost of watershed

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management and at the same time to make it more effective. The mission questioned also the extraordinarily high percentage of overhead cost for this program (almost 30%).

- Similar to the afforestation component, the watershed management component is still lacking a clear, coherent concept for involvement of local communities, without which a lasting effect of catchment treatment cannot be expected. NVDA appears to be thinking of a combination of agricultural extension efforts and local watershed management committees. The mission stated that for the Bank to consider funding of a watershed management component, it would be necessary not only that the innovative techniques of vegetative "in-situ" soil and moisture conservation be employed to a maximum, but also that the efforts be soundly supported by the local communities. The Bank is willing to employ a consultant to assist NVDA with preparation of the community aspects if NVDA so desires. But NVDA should urgently seek to employ its own community participation specialist, as recommended earlier.
- As in the case of afforestation, NVDA intends not only to plan and coordinate, but also to implement the watershed management program largely with its own forces. The reasons given are that there will be better coordination if NVDA responsible, that there is a special obligation towards GOI to implement the component within a certain time frame linked to construction of the dam, and that it would be doubtful that other line departments could be made to implement the component within the specified time and with the adopted (new) methodologies. However, other agencies would be involved, such as the Agriculture Department's Extension Service, the Forest Department (to authorize treatment of forest land), the Land Development Corporation (to lease heavy equipment), and the departments of Horticulture and Farm Forestry (for nurseries and extension services in the case of private tree planting). Some form of agreement will be required with each of these agencies at appraisal outlining their various responsibilities for both afforestation and watershed programs. (The fact that all agencies belong to GOMP is immaterial in this context).
- The mission asked whose responsibility the maintenance of watersheds (or of watershed protection works/measures) would be after first treatment. It suggested that this should functionally be a responsibility of NVDA, as soil conservation and silt reduction will be of direct concern to NVDA as manager of reservoirs and irrigation schemes. While it would not be necessary that NVDA physically execute any maintenance measures itself, it would be proper that NVDA have the authority to coordinate or even mandate such maintenance, and that the cost of watershed maintenance be charged to the users of basin water facilities (irrigation, power, downstream releases) as regular O&M cost. NVDA noted this aspect with interest and will discuss it further with GOMP.
- NVDA will have its pilot watershed management project in Danuni watershed ready by December 31, 1988. The mission requested a copy of the documents when they are ready.
- It was noted that little empirical data are as yet available on actual soil losses in various catchments and under various land uses in the basin. Thus statements as to the quantities of soil loss to be avoided by specific protection measures are rather meaningless. Similarly, no data have been generated to allow some estimate of potential benefits from the watershed management program. The mission requested that these data deficits be addressed before appraisal.

040214

- The mission suggested that Bank-employed consultants would visit NVDA again in January 1989 to review the preparation of afforestation and watershed components.

Other Environmental Concerns

- An agreement to conduct a wildlife management study was finally signed with the "Friends of Nature Society" (Bhopal). It will be headed by an experienced wildlife specialist (Mr. Dutta). NVDA stated that the terms of reference used in the contract were amended to reflect earlier comments by the Bank's environmental specialist (Mr. Rees). However, the final agreement was not reviewed by the mission. NVDA promised to send a copy of the final agreement to the Bank as soon as possible. The study would last three years (until October 1, 1991). The mission considered this an exceedingly long period given the present schedule for dam construction. It will be necessary for NVDA to closely monitor the schedule and progress of the study to assure that a viable wildlife relocation plan is indeed available at the end of the study period.
- NVDA presented plans for extended monitoring of water quality. The MP Water Pollution Control Board (MPWPCB) is already conducting regular water sampling and analysis at 11 points on the river, only one of which is on tributary (Tawa), and considers these points as sufficient at this time. The number of physical and chemical parameters sampled monthly is 23 (list on file). MPWPCB has suggested a list of other parameters that it agrees to sample whenever desired by NVDA; NVDA will have to pay for the cost of sampling and analysis as well as additional equipment needed. It is now up to NVDA to agree with MPWPCB on a program of sampling additional parameters on a regular basis. Some of these parameters would only be requested on an ad-hoc basis if special circumstances so warrant. NVDA is further proposing to contract the services of three universities to conduct regular, multi-disciplinary monitoring and analysis of limnological, botanical, zoological and sanitary aspects of river waters in the entire basin (in MP). This would include exchange of data with MPWPCB, "bio-assay" studies, and pre-impoundment baseline surveys at the sites of existing and proposed reservoirs, and the issuance of three reports per year to NVDA on their findings. NVDA would keep data banks resulting from the monitoring exercises. NVDA should formalize the arrangements and commence the monitoring work now. The costs of contracts with the universities and MPWPCB might be eligible for funding under a proposed Bank project. The mission stressed that any limnological/pre-impoundment studies undertaken should be closely coordinated with the fishery specialist in NVDA so that no duplication of efforts results.
- No further information was presented on sediment load measurements in the basin, although this was requested in January. NVDA should prepare comprehensive documentation as to the various points on the river and its tributaries at which sediment data are being gathered; the responsibilities for such measurements; their frequency; methods used; and data series for past measurements. In particular, the mission requested that NVDA review and revise its reservoir sedimentation model and provide new estimates for the useful life of the Narmada Sagar reservoir.
- The proposed reservoir fishery component was discussed. A Director (Fisheries) post in NVDA has been created and filled. The directorate will be responsible not only for Narmada Sagar fisheries, but for development of lake fisheries in other existing or proposed basin reservoirs also. An establishment to conduct pre-impoundment surveys is being created. Further clarification is needed with regard to the overlap and coordination with monitoring studies to be undertaken by the three

FROM WASHINGTON WASHINGTON

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universities mentioned above. A rough implementation schedule had been worked out, which now needs detailing. Selection of hatchery sites is under way, and selection of landing center locations has been completed. A training-cum-production center will be located at the dam site. Rough cost estimates have been provided; they are being reviewed. The mission questioned whether such large and detailed survey was necessary to determine which families currently engaged in fishing and which oustee families would be interested in taking up fisheries. A review of the scope and detail of such survey is urged. Staffing details for the entire fisheries scheme were presented; the mission noted that these proposals appeared somewhat generous and should be reconsidered with a view to cost savings and efficiency.

- The mission requested reports on surveys in the submergence area of archaeological, historical and religious monuments, which were not available at the time of the visit.

Washington DC
November 3, 1988

The World Bank team reiterated the urgency of formulating and implementing an environmental impact programme. Specific actions to be undertaken include: (i) preparation of comprehensive environmental framework and its subsequent institutionalization in the States of Madhya Pradesh, Maharashtra and Gujarat. An outline of tasks involved in preparing the framework are presented on attachment 4; (ii) initiating and completing studies concerning fish and fisheries, forest and wildlife and public health; (iii) appointment of an Environmental Director in the Nizam. (Sd/-) informed the meeting that this appointment along with that of an Environmental Consultant have already taken place; and (iv) creation of an Environment Cell in GOI's Department of Environment and Forests to assist and monitor environmental activities for SWP and NBP. The World Bank team recommended the engagement of an expatriate consultant to assist the DEF Environmental Cell with preparation of the environmental framework. GOI agreed to give the Bank by January 31, 1989 its reaction to this proposal.

The meeting also agreed that in view of the creation of an Environment Cell in DEF, it would not be necessary to engage an environmental specialist in the NCA. The GOI team undertook to present to the World Bank by January 31, 1989: (i) status of all studies and activities underway; (ii) firm dates for undertaking and completing outstanding studies; (iii) date by which the Environment Cell will be created and the environmental framework prepared.

Environmental Impact.

Sanjay Kumar Project - Extracts from Memorandum of Understanding with the World Bank.

Outline of Tasks

An environment management framework ("blueprint") for implementation by the Narmada Planning Group and Narmada Valley Development Authority by undertaking shall have the following tasks:

- review the status of existing studies and identify critical information gaps and constraints to further progress;
- priority rank immediate and long-term actions to be taken and delineate methods for their effective implementation. (This shall necessitate reviewing existing procedures and institutional arrangements and how they might be improved.
- based on the above, formulate a pragmatic operational framework for coordinating and monitoring the required environmental studies.
- suggest reporting arrangements and detail liaison/ coordinating arrangements.

ANNEX, V-4

Dr. A.C. RAY,
Additional Secretary.

Telegram: PARYAVARAN
NEW DELHI
Telex: W-66185 DOE IN
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT &
FORESTS, PARYAVARAN BHAWAN,
C.G.O. COMPLEX, LODI ROAD
NEW DELHI-110003

D.L.No.8-646/84-FC

Dec. 1988

Dear Shri Chandra,

This is in continuation of Shri K.P. Geethakrishnan's U.O. letter No.3/87/88/Env.IA, dated 30.11.1988, regarding some important issues which came up during the last meeting of the Environmental Sub-Committee of NCA held on 18.11.1988.

2. I, along with some concerned project officials of the Narmada Valley Development Authority(NVDA) visited the project area on 9th, 10th and 11th December, 1988.

3. The project involves diversion of 41111.97 ha of forest land in Khandwa, Dewas and Hoshangabad districts of Madhya Pradesh. As per condition stipulated by the Ministry while according forestry clearance, (vide condition(i) in the clearance letter dated 7.10.1987, a copy of which is enclosed for ready reference) the State Government was to intimate by 31.12.1987 complete details of equivalent non-forest land identified for compensatory afforestation preferably in the project impact area. The State Government however, submitted a scheme of compensatory afforestation on 10142.99 ha of non-forest land and 70802 ha of degraded forest lands. The Chief Secretary, Madhya Pradesh, issued a certificate to the effect that 10142.993 ha of non-forest area is available for afforestation. Such certificate is relevant when it shows non-availability and not availability of land. Hence this certificate was not acceptable to this Ministry. The State Government has been advised in the matter.

4. We also scrutinised details of the village-wise non-forest areas proposed for compensatory afforestation. In some cases the area proposed consists of small blocks of a few hectares. It is apprehended that scattered plantations on small patches will create problems regarding management and protection. Therefore, only viable blocks of 20 ha and more should be taken up.

-2-

5. While visiting the project area we inspected plantations raised by the Social Forestry Division along the banks of the Narmada. The seedlings were planted during 1987 rains and the results appeared to be encouraging. If such green belts can be created on either side of the river extending in width upto 1 to 2 kms all along the Narmada banks, this will go a long way in creating more or less similar eco-system that is being submerged. Hence, the State Government and NVDA should immediately look into the possibility of identifying land along the river banks for compensating afforestation. We have requested the State Government and NVDA in this regard.

6. Raising and management of nurseries is one of the crucial tasks in compensatory afforestation. We were informed that NVDA do not intend to raise nurseries themselves, instead they will purchase seedlings from the villages who will be raising seedlings under the scheme of "Kissan Nurseries/ decentralised nurseries". We are requesting the State Government for furnishing complete operational modalities of this mechanism, ensuring that only location specific land indigenous species should be planted.

7. One very important point in this regard is protection of the plantation. NVDA must protect and guard all the plantations for a minimum period of five years. The modalities of handing these over to the State Forest Department thereafter and further maintenance should be worked out quickly by NVDA in consultation with the State Government and this Ministry. It is essential that NVDA provides for adequate field staff for effectively guarding these plantations.

8. It is to be ensured that all non-forest areas taken up for compensatory afforestation are surveyed, demarcated and declared as protected forests under the relevant State Forest Act. Action in this regard should be taken urgently.

9. The plantation work will be executed by NVDA itself, it has to be ensured that necessary funds as per the Action Plan of compensatory afforestation are earmarked from year to year basis in the NVDA budget. Details of such provisions should be furnished to this Ministry for monitoring.

10. As per condition (xi) of the clearance letter a plan for treatment of the catchment area

was to be prepared by NVDA by 15.12.1987 and implemented at the cost of the project. NVDA is still compiling data. Complete catchment area treatment plan with PERT chart, etc., must be made available to this Ministry quickly.

11. For rehabilitation of oustees, 40,000 ha of land will be required. Initially, the State Government informed that 33800 ha of land would be available from voluntary sales, and 7000 ha of government land will be available for rehabilitation of the oustees. It appeared that land has not yet been identified. This is a very serious gap. NVDA must identify and purchase/acquire the land within a definite time-frame. It was stipulated in the clearance letter vide condition (v) that rehabilitation plan of the oustees should be drawn up by 15.12.1987 to the satisfaction of the Government of India. It appears that no such plan has as yet been prepared. It is essential that a complete rehabilitation plan is prepared immediately.

12. In order that construction labour and staff while working on the project in the forest area may not cause destruction to the forests for meeting their fuelwood needs, it was stipulated, vide condition (xiv) that project authorities should establish fuelwood depots and should provide fuelwood free of cost to the labourers and staff. However, no depot has been established so far by NVDA. In the project site thousands of labour are now working and for their fuel needs, the neighbouring forest areas are being exploited. NVDA should have taken steps to provide fuel to the workers and staff as stipulated. They must take immediate steps to supply fuel.

13. While according forestry clearance, it was specifically mentioned that until and unless land for compensatory afforestation and rehabilitation of the oustees is identified and rehabilitation plan is drawn up (vide conditions No.(i) and (v)), no work on the project in forest area would commence (vide condition No.vi). During our visit we found that in many areas the works have started although these pre-conditions have not been met. This amounts to serious violation of the basic conditions of the forestry clearance.

14. We felt that we should bring these matter to our notice for action as deemed fit.

With Kind regards

Enc: a copy of letter
No.8-646/84-FC,dt.7.10.88
Shri Naresh Chandra,
Secretary,
Ministry of Water
Resources & Chairman, Narmada Control
Authority, New Delhi

Yours sincerely,
A.C. Ray
(A.C. Ray)

No.8-646/84-FC
 Government of India
 Ministry of Environment and Forests
 (Department of Environment, Forests and Wildlife),

.....

Paryavaran Bhavan, CGO, Complex,
 Lodi Road, New Delhi, 110003.

Dated the 7th Oct. 1987.

To

The Secretary,
 Forest Department,
 Government of Madhya Pradesh,
Bhopal.

Subject:- Diversion of 41111.97 hectares of forest land in Khandwa, Dewas and Hoshangabad districts for the Narmada Sagar Multipurpose Project.

Sir,

I am directed to refer to your letter No.5/111/84/10/3 dated 15.10.1984 on the above mentioned subject seeking prior approval of Central Government under Section 2 of the Forest (Conservation) Act, 1980.

2. After careful consideration of the proposal, the Central Government hereby conveys its approval to diversion of 41,111.97 hectares of forest land in Khandwa, Dewas and Hoshangabad districts for the Narmada Sagar Multi-purpose Project as under:-

Item No.	Purpose	Area (ha)
(1)	Submergence	40,332.00
(2)	Power House	50.00
(3)	Saddle Dam	37.26
(4)	Road	70.73
(5)	Colony, approach road, etc.	621.98 (already utilised before 1980)
Total:		41,111.97

3. The approval is subject to the following conditions:

1) The State Government of Madhya Pradesh will intimate by 31st December, 1987, the complete details of equivalent non-forest land identified for compensatory plantation, preferably in project impact area.

- 11) The work of compensatory afforestation will be completed in five years' time. Depending upon the availability and selection of suitable area in the non-forest/forest land, a detailed scheme will be prepared by the State Government showing year-wise targets and expenditure, keeping in view the cost escalation on account of inflation. The project will release the amount for these annual plantation programmes as per the scheme in the beginning of each financial year in the non voted fund to the Forest Department of the State Government. The State Government would ensure that these amounts would be in addition to the normal forestry budget.
- 11i) 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 Government 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.
- 1v) The areas will be surveyed, demarcated and declared protected forests and placed under the control of the Forest Department for compensatory afforestation at the cost of the project. Areas not found suitable will be substituted by suitable areas.
- v) The State Government will also intimate details of the non-forest land identified for rehabilitation of the oustees and draw up by 15th December 1987 a rehabilitation plan to the satisfaction of the Government of India.
- vi) No work on the project in forest area will commence unless conditions (i) & (v) above are fulfilled.
- vii) Under item (2) of paragraph 2 above only 50 hectares should be utilised for construction of the power house only. The proposed colony in the Power House area should be accommodated in the area of 621.98 hectares already utilised under item (5).
- viii) Sand quarry should be located in the submergence area. Therefore, the area of 72.50 hectares for sand quarries and 41.15 hectares for approach road for sand quarries is not being permitted for non-forest use.
- ix) For conservation and management of wildlife, a committee will be constituted by the State Government by 15th December, 1987 which will include a representative from the Government of India. The Committee will suggest the necessary steps to be taken and draw up a plan which will be implemented at the cost of the project.
- x) Forest clearance will be done only upto 4 M below FRL.
- xi) A plan for the treatment of the catchment area will be prepared by 15th December, 1987 and implemented at the cost of the project.
- xii) Tree planting will also be done on either side of canal,

- 3 -

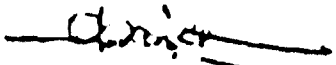
road and foreshore of the reservoir and in the wasteland/ vacant lands under the control of the Irrigation Department in the command area.

xiii) Water should be supplied free of cost to the Forest Department for raising nursery and irrigated forest plantations in the command area.

xiv) In order that the construction labour and staff while working on the project in the forest area may not cause destruction of forests for meeting their fuelwood needs, the Project Authorities will establish fuelwood depots, and will provide the fuelwood free of cost to the labourers.

xv) Satisfactory fulfilment of the above conditions will be a deciding factor for the future proposals of the State Government for diversion of forest land under Forest (Conservation) Act, 1980

Yours faithfully,


(R.S. Bisht)

Under Secretary to the Government of India.

No 3/4/86-NDC (DNMS) 60-61/

K. MADHAVAN,
MEMBER(DER) & EX OFFICIO ADDL.
SECRETARY TO GOVT. OF INDIA

401, Sewa Bhawan, R.K. Puri,
NEW DELHI 110 066.

Dated 2nd Feb 1988

Dear Dr. Maudgal,

As indicated during the discussions of the environmental sub-group, the Geological Survey of India have made studies of the stability of the rim in the vicinity of Narmada Sagar reservoir. I have enclosed the relevant extract of the report of the GSI.

They have observed that there is no significant problem of the reservoir rim stability due to the expected draw down every year in view of the topographical and geological conditions. The disturbance will be limited only to some rock blocks adjacent to the escarpment portions of the rim.

I will be sending you the details regarding the Sardar Sarovar Project separately.

With regards,

Yours sincerely,

(K. MADHAVAN)

Dr. S.C. Maudgal,
Director,
Ministry of Environment & Forests,
Parayavaran Building,
CGO Complex, Phase-II,
NEW DELHI 110 001.

Copy to Shri S. Seshadri, Member (Engineering), NVDA,
Narmada Bhawan, Tulsi Nagar, Bhopal, 462 001.

(K. MADP
Member

SLOPE STABILITY :

As mentioned earlier, the Archaean and Bijawars form only low gently rolling and hummocky topography, respectively and are therefore devoid of any ground features consisting of steep slopes. These formations occur in the reservoir about 15 Km away from the dam and are therefore under a moderate hydraulic head not exceeding 40 m. In view of the above any major slide or slope instability problem in the reach of the reservoir is not anticipated.

Upto 15 km from the dam and beyond in parts the reservoir area is dominated by Vindhyan sediments and Malwa Trap basalt flow. Because of sub horizontal to horizontal nature of these formations, aided by mutually intersecting bedding and vertical joints, this area has a plateau aspect, well dissected

by Narmada and its tributaries. The ground level is high and the hydraulic head reaches its maximum of about 80 m. immediately upstream of the dam. Hillocks of blocky Vindhyan bounded by steep slopes and scarps are common. Some of the conspicuous scarps and steep slopes are encountered along the course of Narmada, Chahin Ho,, Bajrikund Nalla, Pipalghat Nalla, major islands west of Nawghata and west of north of Junapani etc., Adversely oriented bedding joints dissected by vertical sets of joints, some of which are gaping, have given rise to instable rock blocks of varying sizes which have a tendency to slide into the proposed reservoir. However, none of the slides or rock slips may be expected to generate waves in the reservoir, large enough to overtopple the dam.

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•GVJ•/12383•/•

NARMADA VALLEY DEVELOPMENT AUTHORITY
NARMADA BHAWAN : BHOPAL-462003.

No.NVDA/D(Fish,)/88/3067

Bhopal, dtd. 1.11.88

To,

The Chairman,
Narmada Control Authority,
Palika Bhawan, Ring Road,
Sector-XIII, R.K.Puram,
NEW DELHI-110066.

Sub:- Management of Fisheries Development in
Sardar Sarovar.

Ref:- Agenda Item No.III-10(10); Fisheries Development in
Sardar Sarovar Reservoir; Environmental Sub-Group
Meeting.

Sir,

The proposal of the Govt. of Gujarat to set-up an inter-state organisation for management of Fisheries Development in Sardar Sarovar included under Agenda item No.III-10(10), Environmental Sub-Committee Meeting dated 19th July, 1988 of NCA cannot be agreed upon by this state Government. The provision under Sub-clause (V)(8) of the NWDT award clearly gives exclusive fishing rights to the party states in respect of fisheries development in that part of the reservoir that falls within their respective territorial limits. Sardar Sarovar, on completion will impound an area of 34867 ha. (at R.L. 138.68 m) spread over the three states as under:-

S.No. State	Submerged area (Hactares)	Percentage of sub- mergence
1. Madhya Pradesh	20,828	59.73%
2. Maharashtra	6,570	18.84%
3. Gujarat	7,469	21.43%
Total:-	34,867	

: 2 :

Thus, in view of the fact that nearly 60% of the total area under submergence will be within Madhya Pradesh territory, the management of SSP reservoir for fisheries should be given to this state. This is also in consonance with the proclaimed state policy which states that the inter-state reservoirs (i.e. reservoirs which are on common borders) should be developed by the state in whose jurisdiction the greater part of the reservoirs fall (i.e. single control.).

It is also proposed that for the integrated development of the reservoir, monitoring and evaluation etc. a committee of Direction may be constituted under the NVDA, which will also be represented by a nominee from each of the State of Gujarat and Maharashtra. The said representatives should also ensure that the dictates of NWDT are fulfilled.

Further, the Gujarat Govt. should agree to bear the financial cost on development of fisheries, as this activity constitutes an integral part of the overall environment development programme to which the Gujarat government is committed under the environmental and other clearances by Govt. of India to Sardar Sarovar Project.

Yours faithfully

RSK? S

(R. S. KHANNA)
Vice-Chairman

Narmada Valley Dev. Authority, Bhopal-3.

Jayant.

ANNEX.V-7

No.NPG/ENV/Fish/150(P)

Phone No. (O) 4169 (R) 44139
NARMADA PLANNING GROUP.
Government of Gujarat
12, Narmada Block,
New Sachivalaya Complex,
Gandhinagar-382010.

Dated 13th December, 1988

To

The Secretary,
Narmada Control Authority,
Palika Bhawan,
Ring Road,
Sector XIII, R.K.Puram,
NEW DELHI-110066.

Subject:- Management of Fisheries Development in
Sardar Sarovar.

- Ref. :- 1. Agenda Item No.III-10(10) of the Third
Meeting of the Environmental Sub-group
of NCA.
2. Letter No.NVDA/D(Fish)/88/3067 dtd. 1.11.88
of Vice Chairman, Narmada Valley Develop-
ment Authority, Bhopal.

Sir,

I am directed to communicate the views of Narmada
Planning Group and also of the Commissioner of Fisheries,
Government of Gujarat on the suggestion made by the Vice-
Chairman, Narmada Valley Development Authority, Bhopal in
his letter under reference (2). You are requested to
take further action as may be deemed fit.

Yours faithfully,

Sd/-

(B.L. Shah)
Officer on Special Duty,
Narmada Planning Group,
Gandhinagar.

DA: Copies of two notes.

Copy with copies of notes to the Commissioner of
Fisheries, GOG for information.

The following observations are made on the letter of Vice Chairman, NVDA.

1) Vice Chairman, NVDA has referred to the provision under Sub-clause (V) (8) of NWDT decision relating to fisheries development in SSP. The NWDT direction regarding this is in para 7 of Sub-clause V of final order and decision of NWDT in Chapter XX of the Report of NWDT, Volume II. The decision is reproduced below :-

"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~~ prejudice of any utilities of the legitimate performance of their duties by the ^{Project} personnel".

It may be noticed from the above that the decision of the Tribunal States that M.P. and Maharashtra shall be entitled to the rights of fishing in the part of lake over the submerged land within the respective State provided that such right is not exercised to the prejudice of any utilities of SSP or cause hindrance in the legitimate performance of their duties by the project personnel.

The Vice Chairman, NVDA has also mentioned in his letter that management of SSP for fisheries development by M.P. will also be in consonance with the proclaimed state policy which states that the

inter-state reservoirs (i.e. reservoirs which are on common borders) should be developed by the State in whose jurisdiction the greater part of the reservoirs fall (i.e. singel control)". It is not clear to which state policy the Vice Chairman of NVDA refers, as no such directions seem to have been received by Govt. of Gujarat in respect of SSP.

Development of fisheries in the SSP reservoir requires the production of fish seed and releasing them into the reservoir for further development. The typical characteristic of fish development is that seedlings which are released into the watershed travel upstream during the stage of development and thereafter settle in ~~stages of development~~ ~~and thereafter settle in~~ certain selected pockets in the watershed. Thus, in SSP the production of fish seed has to be done near reservoir and they will have to be released into the ~~reservoir just upstream of the dam~~ dam. This can best be ensured by Govt. of Gujarat and it will also be in compliance with the direction NWDT quoted above that the fishing right should not be exercised to the prejudice of any utilities of SSP or cause hindrance in the legitimate performance of their duties by the project personnel.

If the development of fisheries is handled exclusively by M.P. as proposed by the Vice Chairman of NVDA, this function of producing fish seed near dam site and releasing them into the reservoir just upstream of dam will also have to be handed over to M.P. state personnel and such an arrangement may lead to conflicts and cause hindrance

.. 3 ..

in the legitimate performance of duties of SSP project personnel. Thus, the direction and decision of the NWDT cannot be fulfilled if a fisheries development in SSP is handled exclusively by M.P.

In the draft constitution of the inter-state body which has been proposed by Govt. of Gujarat, adequate precaution has been taken to ensure smooth development of fishery in the reservoir and to this end the Chairmanship of governing council, executive committee and appellate committee has been proposed to be shared by the three participating States in a system of rotation. No difficulties are thus anticipated in the implementation of fisheries development programme if the inter-state body as proposed by Govt. of Gujarat is ~~xxxx~~ set-up.

The NIFDA is envisaged as an autonomous independent body entrusted with the systematic development of fisheries in Sardar Sarovar Reservoir System, as a whole. It is a body ~~which~~ which does not belong to any individual State but duly represented by each of the 3 participating States. It would not be appropriate to say that the initiative taken by Gujarat leads to edging out any other State from the entire activity.

The objectives of the proposed NIFDA has been enlisted in the draft proposals which can be further elaborated, if necessary. In order to achieve these objectives in a systematic way it is felt desirable to have an autonomous authority to function in this regard. Perhaps, this is the only one of its kind that it is difficult to draw experience from any similar projects in the country.

The Sardar Sarovar Reservoir system is a single eco system irrespective of the fact that it transcends the geographical boundaries of the 3 States. It would be irrational and unscientific to think of independent management and administration system to achieve a sustainable fisheries development in a single eco system like Sardar Sarovar Reservoir. In order to have an integrated mutually supporting development model for this eco system a common autonomous agency would be perhaps the ideal set up to coordinate between the 3 States. The argument that any particular State has a greater area under submergence should not be the criterion to decide whether the whole management of such an eco system should be done by that particular State irrespective of the strategies that other 2 States would like to adopt.

The management of such an eco system involves various critical issues like stocking, prevention of poaching, marketing of products and provision of infrastructural facilities. Instead of each State independently making its own arrangements it would also be a desirable approach to have a coordinated effort in this regard. It would possibly be easier and more cost effective to provide the forward and backward linkages if coordinating agency as the one proposed is set-up.

The Vice-Chairman, Narmad Valley Development Authority, Bhopal has proposed that for the integrated development of the reservoir, monitoring and evaluation, etc. a Committee of Direction may be constituted under NVDA which will be represented by a nominee each of the State of Gujarat and Maharashtra. From this the need for a Committee for an institutional arrangement for the integrated development of the reservoir has been felt by the Vice ~~Chair~~ Chairman, NVDA. The question possibly is that he is unwilling to accept the constitutional of an autonomous independent institution. It is worth considering if it would not be desirable to have an independent autonomous authority with suitable representation for all 3 partners than to have a representative each in a Committee of an institution ~~constituted~~ constituted by one State Government viz. Madhya Pradesh. From the letter it appears that the need for institutional arrangement is not ~~disputed~~ disputed but M.P.'s desire is that the set up should be under one of their already existing institutions. The difference between their proposal and

ours is that what we support is an apex body where the partners would have suitable representation and say in deciding the issues to the development of Sardar Sarovar Reservoir System.

One major issue that Gujarat is concerned is pertaining to the future of the highly flourishing fisheries existing in the downstream of the proposed Narmada dam. The development of the downstream cannot be ignored by any agency that undertakes fisheries development in the reservoir. Any institutional arrangement which is only an agency of any single State Government would not be able to view all the issues pertaining to the fisheries development of Sardar Sarovar Reservoir System. Hence a system approach for the integrated development of fisheries in the Sardar Sarovar is possible only through an autonomous independent body like NIFDA or any other institutional arrangement better than that.

It may be clearly indicated that the initiative taken by the Gujarat to establish NIFDA does not amount to taking away all the benefits of fisheries development from other 2 States' due share. Gujarat is only interested in getting the due share to each and every State in an equitable fashion and that the whole development issue is taken in a holistic approach than in a narrow and compartmentalised effort.

Sd/
Christy Fernandez
Commissioner of Fisheries

NARMADA CONTROL AUTHORITY

**MINUTES OF THE FIFTH MEETING
OF
ENVIRONMENT SUB GROUP
OF
NARMADA CONTROL AUTHORITY
HELD ON 7.3.1989 AT NEW DELHI**

**NEW DELHI
MARCH, 1989**

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Item No V-1(21): **CONFIRMATION OF THE MINUTES OF THE FOURTH
MEETING OF ENVIRONMENT SUB GROUP OF
NCA**

Shri K.P. Geethakrishnan, Chairman of the sub-Group welcomed the members and invitees to the 5th meeting of the Environment Sub-group. A list of participating members and invitees is enclosed at Annexure-I.

Since no comments on the minutes of the 4th meeting of the Sub-Group were received from any of the Members, the minutes as circulated earlier were confirmed.

[2]

Item No.V-2(22): REHABILITATION MASTER PLAN

This item is covered in detail by the R&R Sub Group. The Chairman indicated that he would like to attend the next meeting of the Rehabilitation Sub Group of NCA fixed for 13th March, 1989.

GOM representatives presented the case for diversion of about 2583 ha. of degraded forest land for rehabilitation of Sardar Sarovar Project (SSP) oustees with the following points:

--Lands available in the commands of the other irrigation projects are rather scattered and do not permit rehabilitation of the villages as a unit as required by the World Bank;

--The available scattered land is not acceptable to the oustees;

--1480 out of the 1690 affected families are tribals who are dependent on the forest produce for meeting their needs of fuel, fodder, etc.;

--The Vice-President of the World Bank has also suggested in his letter to the Chief Minister, Maharashtra that it would be reasonable to let the forest dwelling oustees make use of available denuded or degraded forest areas both for cultivation and tree planting, etc.

The Chairman stated that the policy of the Government of India did not permit use of any type of forest land for rehabilitation and as such the suggestion to allow degraded forest to be used by the oustees was not acceptable. Indeed, the proposal sent by the Maharashtra Government had been rejected with the request that alternate non-forest land may be identified for rehabilitation. Maharashtra representatives stated that they are left with no alternative for the rehabilitation of the tribal oustees and, therefore, have to request for reconsideration of their earlier proposal. The Chairman asked them to submit complete details so that the various options can be examined in a comprehensive manner. Prof. Katti suggested that the data related to social and cultural aspects of the oustees should be collected and kept in mind while devising the rehabilitation plan.

[3]

Item No.V-3(23): PHASED CATCHMENT AREA TREATMENT

The two issues requiring urgent decision on this subject are:

- (a) Extent of the area needing treatment at project cost;
- (b) Apportioning of the cost of the SSP catchment area treatment among the party States.

Member(C), NCA referred to a paper being prepared by the Ministry of Water Resources on cost sharing aspects of Catchment Area Treatment for multipurpose river valley projects but stated that the present status of this paper is not yet known.

At the request of the Chairman, Dr. Maudgal, Ministry of Environment & Forests intimated that the concept of the integrating Catchment Area Treatment and Command Area Development with the engineering works had been mooted by this Ministry in 1980 and has been generally accepted since 1982. Decision was taken and formalised in this regard by the Committee of Secretaries in 1985. The Ministry of Environment & Forests had, therefore, included in its guidelines that:

- Critically degraded areas in the free draining catchment should be treated in a phased manner as an integral part of the reservoir project;
- Catchment Area Treatment shall be at project cost but it may or may not be accounted while calculating the Benefit-Cost Ratio.

In pursuance of these guidelines, an inter-Departmental Expert Committee was constituted in 1984 under the Chairmanship of Dr. M.L. Dewan to study the status of soil erosion and extent of treatment required in the Narmada basin. The report indicated that extensive treatment was needed in the basin and the cost of effectively treating almost 25-30% the catchment area may be around Rs.1300 crores. The NSP and SSP authorities were to formulate detailed Catchment Area Treatment Plans on the basis of identified priorities.

[4]

GOMP representative stated that catchment survey within the MP territory covering Maheshwar Catchment has been carried out and a pilot project in Mann catchment has been proposed to GOG for funding. GOG representative explained that their Government agreed to bear the cost of surveys and investigation works in the MP and Maharashtra territory. It was suggested that CWC may initiate action to have the catchment treatment of SSP/NSP included in the Centrally sponsored schemes of the Ministry of Agriculture for the 8th Plan so that adequate funding is made available without burdening these projects.

Chairman stated that for the present the project authorities will pick up the bill and this commitment could be ensured through a directive by the Ministry of Water Resources within about 4 weeks. A decision on the overall cost sharing for the implementation of the Catchment Treatment programme also be expedited by the MOWR; otherwise, the matter may have to be taken to the Review Committee.

NARMADA SAGAR PROJECT

GOMP representative was requested to indicate the present status of the action taken on the observations in the World Bank Aide-Memoire (Sept.30-Oct.17) as listed in Annexure-II(a). GOMP representative explained briefly that the catchment area treatment under Phase-I covers 13 watersheds, lying in close vicinity of NSP reservoir, which have been delineated at sub-watershed level by October, 1988. Further detailed studies in the watersheds have been entrusted to different agencies such as All India Land Use & Soil Survey Organisation, Space Application Centre, Ahmedabad; MP State Agriculture Deptt. of MP Council of Science & Technology. These studies are expected to be completed by 1992. In addition, pilot projects in two catchments - Datuni and Godpachar - have been taken up. Datuni pilot study was formulated by the Agricultural Finance Corporation (GOI) and the work is stated to be in progress for the last one and a half year.

GOMP representative was requested and promised to send the status note(s) on various related points along with phased plans to the Ministry of Environment & Forests and NCA Secretariat shortly.

[5]

SARDAR SAROVAR PROJECT

GOG -- GOG representative indicated that they have identified two watersheds and the programme is being implemented @ about 2000 ha. per year on the basis of surveys already carried out. The total non-forest area to be covered was 27,184 ha. of which 19,380 ha. needed priority treatment. Besides, forest area to be covered was estimated as 7800 ha. The estimated cost of the programme was mentioned as Rs. 301 lakhs. The pace of work is too slow compared to the engineering works which will be completed in 1994. GOG representative promised to send details of expenditure incurred upto 1988-89, the outlay proposed for 1989-90 and the details regarding targets and achievements year-wise along with phased plan of action in future.

GOM - GOM representative stated that the survey was being carried out in 2000 ha. but the programme of completion of the survey in the entire catchment area was not indicated. GOM representative promised to send the details of the catchment treatment programme to Ministry of Environment & Forests and NCA Secretariat shortly.

GOMP - GOMP has entrusted the surveys for preparation of catchment area works to the Govindram Seksaria Institute of Technology and Science, Indore and the survey is expected to be completed in about a year's time. The State has also taken up pilot project in the Mann catchment area as suggested by the Dewan Committee and has requested GOG to provide the necessary funds for its implementation.

Referring to the MOU with the World Bank team (December, 1988) the Chairman indicated that Ministry of E&F has already created a cell specifically for the Narmada Basin projects and that the services of an expatriate expert are not needed.

[6]

Item No.V-4(24): COMPENSATORY AFFORESTATION**NARMADA SAGAR PROJECT**

GOMP representative stated that the position regarding various points raised by Dr. A.C. Ray, Additional Secretary (E&F) in his D.O. letter dated 29.12.88 (Annex V-4 of the Agenda) had been conveyed in January, 1989. Regarding exclusion of blocks less than 20 ha. in compensatory afforestation, GOMP representative stated that out of total area of 10143 ha. non-forest land identified for compensatory afforestation, the total land in blocks of less than 20 ha area was only 749 ha. The 2nd suggestion of creating a 1 to 2 km wide green belt along the Narmada Banks was not found practicable by GOMP because it would be difficult to acquire land for the purpose. Regarding Kisan Nurseries/centralised nurseries, it was mentioned that Social Forestry Wing of the State Forest department was on the job and NVDA has also set up 3 nurseries in Khandava district. More nurseries will be set up in Devas and Hoshangabad by end of April, 1989 for which land has been selected and work was in progress. GOMP will take some time to submit details of the plan. The first plantation will be ready for inspection in 1990-91.

Chairman suggested that Dr. Maudgal, Ministry of Environment & Forests, may visit MP to ascertain whether the area originally identified in Eastern MP was still available for compensatory afforestation or not. Secretary, E&F, would take a meeting with GOMP officials on 6.4.89 regarding finalisation of the proposal of diverting non-forest land.

SARDAR SAROVAR PROJECT

GOMP representative indicated that compensatory afforestation plan would be sent both to GOG and Ministry of E&F shortly.

On the work plan submitted by GOG, Chairman suggested that land for compensatory afforestation should be selected in the project impact area and the plan modified accordingly. If necessary, some experts from Ministry of E&F may visit the project area.

[7]

The compensatory afforestation plan due from GOM by middle of December was not yet submitted. GOM representative explained that they have identified 9205 ha of land in Dhule district for compensatory afforestation. The estimate for implementation of this work has to be worked out and GOM promised to submit the details shortly.

[8]

Item No.V-5(25); COMMAND AREA DEVELOPMENT**NARMADA SAGAR PROJECT**

GOMP representative made available a note on present status of command area development (placed at Annex.3) which will be discussed in the next meeting. The detailed project report for command area development is under preparation and would be submitted by 1992-93.

SARDAR SAROVAR PROJECT

GOG representative indicated that soil and ground water surveys have been completed up to Mahi in SSP area. For the area beyond Mahi, a proposal is being formulated. It was also indicated that first irrigation is likely to commence in 1993-94 when the SSP dam is expected to be completed.

Chairman suggested that it was necessary for the GOG to furnish a detailed programme for Command Area Development with time frame.

[9]

Item No.V-6(26): SURVEY OF FLORA AND FAUNA**NARMADA SAGAR PROJECT****Flora & Fauna studies:**

The preliminary report regarding fauna studies in NSP submergence area prepared by ZSI had earlier been submitted to the Ministry of E&F and was found to be too sketchy. As regards flora studies, GOMP representative indicated that they had contacted Bombay Natural History Society team comprising of six experts who are to start the work. Chairman desired that GOMP should arrange a meeting of these experts with Dr. Ray, Ministry of Environment & Forests so that the Terms of Reference and methodology could be agreed upon by the end of March, 1989 before survey work is initiated.

Artifacts, Monuments etc.

GOMP representative indicated that survey and cataloging work is in progress by the State Archaeological Deptt. and the work is expected to be completed in two years' time.

Anthropological Survey

Chairman suggested that Ministry of E&F might pursue with the Rashtriya Manava Sangralaya, Bhopal to take up the studies, as no progress was reported by GOMP in this regard, although the matter is reported to have been discussed by GOMP with the Agency.

SARDAR SAROVAR PROJECT**Flora and Fauna studies:**

GOG representative indicated that they had entrusted the study of flora and fauna to MS University, Vadodra. It was informed by the representatives of GOMP and GOM that they have no objection to the studies being conducted by the same organisation in their territories also. However, GOG representative mentioned that MS University had expressed reservations to take up the study in Maharashtra and MP due to the academic work load. Chairman indicated that Additional Secretary (E&F) might discuss the matter with MS University before the end of March, 1989, so that they either take

[10]

up in the entire SSP area or cancel the present assignment.

The party states may have to assign the work to some other Agencies in case no agreement is reached with MS University.

Archaeological studies:

GOG representative indicated that there were no major archaeological or historical sites except for two temples in Gujarat and Maharashtra namely Hafeshwar on right bank (about 46 km along the river upstream of the dam) and Surpaneshwar on the left bank (about 6 km along the river U/S of the dam). These two temples will be shifted and relocated before the reservoir is filled up. Preliminary work to select suitable sites for relocation of these two temples has been started. The restoration of these two temples will be carried out with the consent of temple trustees. No further progress of work on preparation of inventory of monuments and salvage action plans has been reported by GOG.

Regarding archaeological and anthropological survey of the SSP submergence area in MP, GOMP stated that necessary survey has been undertaken and is being attended to by State Department of Archaeology and Rashtriya Manava Sangrahalaya, Bhopal respectively. The activities in respect of Archaeological survey and relocation/reconst-

[11]

ruction and preparation of salvage report are proposed in 3 phases and to be completed in 1991. GOMP representative stated that they had a meeting with RMS, Bhopal and not much progress has been made.

GOM has not submitted any information about similar work in Maharashtra and the State representatives promised to send the information shortly to Ministry of Environment & Forests and NCA Secretariat.

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Item No.V-7(27): CARRYING CAPACITY OF SURROUNDING AREA

Chairman suggested that the Friends of Nature Society, Bhopal should hold discussions with Ministry of E&F on 14th March, 1989 regarding the job requirement & TOR for this work in respect of NSP. Also the MS University, Vadodra should have similar discussion with the Ministry of E&F for the studies needed in SSP impact area before the end of March, 1989. GOG & GOMP will accordingly arrange these discussions.

[12]

Item No.V-8(28): SEISMICITY AND RIM STABILITY OF RESERVOIR**(a) RESERVOIR INDUCED SEISMICITY:****Narmada Sagar Project**

GOM representative explained that 10 observation stations have to be set up on the basis of studies carried out by CW&PRS for the entire area upstream of NSP and Maheshwar. Old instruments supplied by CWPRS for the time being have been recording data for some time but the desired results could not be obtained. Specifications for the instruments had been finalised but World Bank did not approve and, therefore, fresh bids are being called in consultation with IMD. List of seismic instrumentation for Narmada Sagar complex projects is given in Annex.4 and may be discussed in the next meeting.

Sardar Sarovar Project

GOC representative mentioned that they have identified locations for 9 stations, one station is to be installed in Shahbad which is in Maharashtra. The land is to be transferred to GOG and GOM representative was asked to have it expedited. Installation and civil works in the remaining eight stations are in progress.

Regarding posting of necessary staff to the seismological station in their territories, it was informed by GOMP and GOM that necessary action would be taken as desired by GOG.

(b) RESERVOIR RIM STABILITY

Dr. Maudgal stated that the reservoir induced seismicity and the rim stability have to be examined not only in the context of dam design but also in terms of the stability of civil buildings and infrastructure facilities in the area. He informed the members that GSI had prepared a report and submitted it to the Central Water Commission and the Ministry of Environment & Forests had been given a brief extract early in 1988 with a promise that the detailed report shall follow. This report has not yet been received. The MP representative mentioned that they will request GSI to send the

[14]

detailed report to Ministry of Environment & Forests so that necessary observations could be offered after its study.

Sardar Sarovar Project

In respect of SSP, the surveys were still in progress by the GSI. Chairman desired that the GSI be requested to expedite the studies by GOG.

[15]

Item No.V-9(29): HEALTH ASPECTS

NARMADA SAGAR PROJECT

GOMP representative stated that on the basis of surveys undertaken it is predicted that the incidence of Malaria and Filaria will increase. Other water-borne diseases like guinea worm infection, Goitre are also expected to increase and appropriate action would have to be taken up for their control. Surveys conducted by National Institute of Communicable Diseases indicate however that Schistosomiasis is not expected to be a problem. The Project authorities should interact with the State Directorate^{of} Public Health to create necessary infrastructure for effective screening of the disease-carriers and control of these diseases. Necessary action plans will need to be expeditiously worked out.

SARDAR SAROVAR PROJECT

GOG representative indicated that work plan had been prepared covering:

- i. Surveillance and control of water related diseases and communicable diseases.
- ii. Surveillance and control of Malaria.

A provision of Rs.38.6 crore had been made in the project. A copy of the detailed report will be submitted for information and review.

The State representatives of GOG and GOMP were requested to send complete details of the action plans for the prevention and control of water borne and communicable diseases including preliminary screening of the labour force.

[16]

Item No.V-10(30): FISHERY DEVELOPMENT IN SSP/NSP RESERVOIR

Dr. Maudgal recounted that it had been emphasised in the past two-three years that detailed studies of aquatic life should be carried out in the Narmada Basin with the following objectives:

- i. Availability of migratory species, including fish, their migratory route and breeding grounds;
- ii. Incorporation of a mechanised lift in the dam design in case it became necessary to mechanically lift the migratory fish for their transport up or down stream of the dam;
- iii. Minimum regulated releases necessary to sustain aquatic life downstream and also to prevent salinity ingress problems;
- iv. Extent to which the micro-nutrient trapping in the reservoir will adversely affect the aquatic life down stream and in the estuary area which is rich in lobsters, prawns and other marine life on which the local economy depends;
- v. Best possible means of protecting the aquatic life and development of fisheries in the reservoirs.

B

[17]

Keeping these objectives in view, the project authorities should contact appropriate agencies and finalise the TOR of the studies and surveys needed. The question of developing commercial fisheries would come up later and the modalities for the management may be worked out through bilateral discussions.

[18]

**Item No.V-11(31): FOREST CLEARANCE IN RESPECT OF APPROACH ROAD
AND NARMADA MAIN CANAL**

Chairman, Environment Sub Group mentioned that he has written D.O. letters to Chief Secretaries of the States that no further destruction of forest would be desirable. Longer roads for approach to the projects would be preferable to avoid destruction of forest stretches and stability of hill slopes. Action for selection of alternative route for diverting heavy traffic is to be taken immediately by the Project Authority.

[19]

ANY OTHER ITEM

The Chairman enquired about the progress made for inducting Member (Environment) in NCA as decided in the last meeting. It was pointed out that a proposal had been sent to the Ministry of Water Resources but it was found necessary that a self contained detailed proposal be submitted. Chairman desired that the process should be expedited and the norms adopted by the Ministry of Environment & Forests for equivalent post could be made available, if so required.

It was also decided that Member (Civil), NCA will function as Member Secretary of the Environment Sub Group of NCA in place of Shri Dharam Rao who has gone back to his parent department.

The meeting ended with a vote of thanks to the Chair.

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Annex-I

LIST OF MEMBERS/INVITEES WHO PARTICIPATED IN THE 5TH MEETING
OF ENVIRONMENT SUB-GROUP OF NCA HELD ON 7TH MARCH, 1989 AT
PARYAVARAN BHAVAN, CGO COMPLEX, LODI ROAD, NEW DELHI-110 003.

Members

1. Shri K.P. Geethakrishnan, Secretary to the Govt. of India, Ministry of Environment & Forests.
2. Shri R.S. Khanna, Vice-Chairman, NVDA, Government of Madhya Pradesh.
3. Shri Vir Amar Parkash, Executive Member, NCA, Palika Bhavan, R.K. Puram, New Delhi.
4. Shri T.V. Krishnamurthy, Secretary (Rehabilitation), Narmada Development Department, Govt. of Gujarat.
5. Shri P. Subramaniam, Secretary (Environment), Govt. of Maharashtra.
6. Prof. R.K. Katti, Prof. Civil Engineer, IIT, Bombay.
7. Shri C. Mohan Ram on behalf of Shri Ashok Khosla, President, Development Alternative, New Delhi.
8. Shri N.K. Dikshit, Member (Civil), NCA, Palika Bhavan, R.K. Puram, New Delhi.

Invitees

9. Shri M.S. Billore, Member (Engineering), NVDA, Govt. of Madhya Pradesh.
10. Shri T.N. Maharishi, Member (E&F), NVDA, Government of Madhya Pradesh.
11. Shri T.J. Kachhia, Officer on Special Duty, Narmada Planning Group, Government of Gujarat.
12. Shri A.V. Gururaja Rau, Specialist (Environment), SSNNL.
13. Shri K.H. Vasavade, Research Officer, Narmada Planning Group.
14. Shri Gorakh Megh, Dy. Secretary, Revenue & Forest Deptt., Government of Maharashtra.
15. Shri M.D. Deshpande, Section Officer, Revenue & Forest Deptt., Government of Maharashtra.
16. Dr. A.C. Ray, Additional Secretary to the Government of India, Ministry of Environment & Forests.
17. Dr. S.C. Maudgal, Director, Ministry of E&F, Department of Environment.

[21]

18. Shri S.M. Pai, Secretary, NCA, Palika Bhawan, R.K. Puram, New Delhi.
19. Shri T.K. Mukhopadhyay, Specialist (Hydrology), NCA, Palika Bhawan, R.K. Puram, New Delhi.
20. Shri O.P. Saxena, Dy. Director(E), NCA, Palika Bhawan, R.K. Puram, New Delhi.

(22)

Annex - II(a)

NARMADA CONTROL AUTHORITY

....

Environmental aspects of Narmada Sagar Project -
review of action taken on the World Bank's Aide
Memoire (September 30 - October 17).

NARMADA SAGAR PROJECTI. Afforestation:

1. The mapping is to be completed by end of 1988 at which time the exact extent and location of afforestation areas under the project will be known.
2. Appointment of a community involvement Specialist in the planning, design of afforestation programme by NVDA; some interested NGOs will have to be involved; beneficiary plantation scheme to be reconsidered by GOMP.
3. Innovative cooking devices (biogas plants, solar cooker and fuel saving stoves) to be supplied to PAPs - efforts to be made to identify the sources of such equipments in India;
4. A comprehensive plan for a pilot area of 2500 hectares in the first year of the "treatment plan" to be finalised by NVDA by 31.12.1988.
5. NVDA to clearly define its responsibilities vis-a-vis the various line departments of GOMP.

II. Watershed Management:

1. NVDA should try to minimise the cost of watershed management and at the same time make it more effective particularly overhead charges need to be reduced. The mission requested that the vegetative treatment which is less costly should be applied as a standard treatment even as substitute for engineering measures.
2. Community participation Specialist should be employed to deal with the programme.

(23)

3. Some form of agreement will be required with each of the agencies involved outlining the various responsibilities for both afforestation and watershed programmes.
4. The cost of maintenance of watershed treatment works to be charged to the users of basin water facilities as regular O&M cost.
5. Pilot Watershed Management Project in Datuni Watershed to be ready by 31.12.1988.

III. Wildlife Management Study:

The 3-year period for the agreement for carrying out the study with Friends of Nature Society (Bhopal) was too long and need to be reduced. A copy of the final agreement with the Society was to be sent to the Bank.

IV. Monitoring of Water Quality:

This work was to be entrusted to three universities in the State and also coordinate with MP Water pollution Control Board.

V. Sediment Load Measurements:

NVDA was to review and revise its reservoir sedimentation model and provide new estimates for the useful life of NSP.

VI. Fisheries Studies:

Staffing details for the fishery scheme as presented by GOMP appeared somewhat generous and were to be reviewed with a view to cost saving and efficiency.

VII. Surveys^{of} Archaeological, historical and religious monuments.

Reports on the surveys carried out on these aspects were to be made available to the Bank.

...

(24)

Annex -II(b)



NARMADA VALLEY DEVELOPMENT AUTHORITY

Narmada Bhawan, Tulsinagar, Bhopal 462 003

H S Khanna
Vice-Chairman

D. O. No. NVDV/FC/001/12
Date: 6.1.89

Dear Dr Ray,

Sub: Diversion of forest land for Narmada Sugar Multi-purpose Project.

Ref: Your D.O. No. B-646/84-FC dated December 26, 1988 addressed to Shri K S Swaminathan, Secretary to GOMP Forest Department.

With reference to your D.O.No. B-646/84-FC dated 27th December, 1988, I would like to deal with your D.O. to Shri Swaminathan para-wise as follows:

Para 1 No comments.

Para 2 Since the DIG Forests (FC) has demiofficially referred the case pertaining to the Chief Secretary's certificate to the Addl. Secretary, NVDO, GOMP, it is being dealt with in the State Secretariat. I hope the reply shall be sent from there shortly.

Para 3 I am inclined to agree with you that the management of scattered blocks of less than 20 hectares in extent would present practical difficulties. Nevertheless, if such blocks are left out of our purview, the extent of non-forest lands required for compensatory afforestation would be further reduced. The following table indicates the extent of area which would thus have to be left out. If the Govt. of India can agree to such reduction in the already deficient non-forest area, I shall have no objection to the suggestion put forth by you.

District	Area of blocks of more than 20 ha in extent	Area of blocks of less than 10 ha in extent	Total area
Sehore	1,247.007	-	1,247.007
Dewas	484.061	317.678	801.739
Dhar	1,001.531	-	1,001.531
Indore	1,938.248	-	1,938.248
Khandwa	2,073.480	240.330	2,313.810
Hoshangabad	2,649.725	190.843	2,840.568
Total	9,394.052	748.851	10,142.903

(25)-

Para 4 You may be aware that we in Madhya Pradesh are acquiring private lands for various purposes. The situation in the Narmada basin area is particularly acute. Land is required for the settlement of a very large number of oustees of several projects in the valley and we are already facing difficulties. If, therefore, we start acquiring the strip of land along the banks of the Narmada also for compensatory afforestation purposes as suggested by you. We are liable to run into serious problems. Such acquisition may result in public agitations and cause avoidable tensions. The State Govt., therefore, are not likely to agree to this suggestion.

Para 5 It will take sometime before we are in a position to submit details of operational modalities of kisan nurseries/centralised nurseries in the area.

Para 6 We are quite conscious that the plantations raised shall have to be very effectively protected against various injuries including grazing and fires till the trees are large enough to fend for themselves. The Forest Department has provided for sufficient field staff for effectively guarding the afforested areas in the Action Plan of November, 1987 itself which has already been sent to the Ministry. Nevertheless the suggestion made by you is noted and would be adequately taken care of.

Para 7 We have started taking action to demarcate and survey the non-forest area blocks identified for compensatory afforestation. It is hoped that by the end of this financial year substantial progress in this regard would be made.

Para 8 In the Ministry of Environment & Forests letter of 7th Oct. '87 (para 2(ii)) it has been prescribed that a separate special 'non-voted fund' may be created for meeting the requirements of compensatory afforestation. In discussions with you during your last tour to MP I am told, you had pointed out that the creation of such a special fund was necessary when the compensatory afforestation work is to be carried out by the Forest Department on behalf of non-Governmental agencies. However, because the NVDA itself would be carrying out these plantations and it happens to be a regular Govt. Department, you were of the view that it would not be necessary to do so, and the requirement of creating the fund shall be deemed to have been met with if adequate funds as per requirement are provided in the budget at the beginning of each financial year. We will submit a copy of the budget for 1989-90 to the Ministry of Environment when it is passed. The provisions made in the budget for 1988-89 can be seen in the budget of 1988-89 (copy herewith).

Para 9 Para 2(ix) of Oct. '87 letter of the Ministry of Environment & Forests stipulated that a plan for the treatment of the catchment area will be prepared by 15th Dec. '87 and implemented at the cost of the project. Accordingly, a plan was prepared by the NVDA and submitted to the State Forest Department vide our letter No. NVDA/AGRI/42/87/143/3676 dated 9th December 87 (copy herewith for your information). We had thus met with the necessary requirement. The require-

ment of preparing a 'Plan of Work' is a new stipulation, which obviously would take sometime before we can furnish it to you.

The observation that the NVDA is still compiling data in respect of the catchment area treatment plan, has been made out of context. Data, no doubt, is being collected, and would continue to be collected until the project is fully implemented. That, however, may not be construed to mean that we have committed any violation.

Para 10 The rehabilitation plan as envisaged vide condition (v) under para 2 of Oct. '87 letter, was also duly submitted to the Ministry of Environment under MP Forest Department letter No. 5/111/84/10/3 of 18th Nov. '87. Shri Seshan in his letter to Shri M S Singh Deo, the then Chief Secretary MP had referred to it also. However, a copy of the Rehabilitation Plan submitted by us in Nov. '87 can be submitted again if desired.

Para 11 Necessary action is being taken.

Para 12 Whatever construction works have been started by the Project Authorities were commenced only after fulfilling the stipulations made under condition No. (i) and (v) of the clearance letter of 7-10-1987. Your observation that these provisions have been violated by us thus does not appear to be in consonance with the facts as brought out above.

With kind regards,

End.

Yours sincerely,

R. S. Khanna
(R. S. Khanna)

To

Dr A C Ray
Additional Secretary
Ministry of Environment & Forests
Paryavaran Bhawan, CGO Complex
Lodi Road
New Delhi - 11 0 003

Copt to:

1. The Addl. Chief Secretary, Harimada Valley Dev. Deptt., Govt. of Madhya Pradesh for information.
2. Shri K. S. Swaminathan, Secretary to Govt., MP Forest Department, Bhopal for information and necessary action.

(R. S. Khanna)

INDIRA SAGAR PROJECT

" Note on present Status of
Command Area Development "

Narmada Valley Development authority
Bhopal

(March 1989)

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NOTE ON PRESENT STATUS OF COMMAND AREA DEVELOPMENT

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**NOTE ON PRESENT STATUS OF COMMAND
AREA DEVELOPMENT**

1.0 INTRODUCTION

1.01 Project in Brief:

The Indira Sagar Project envisages construction of 92 m high concrete gravity dam across river Narmada near village Punasa in District Khandwa of Madhya Pradesh. The Dam site is 70 km. from Khandwa and 130 km. from Indore.

The project on completion will provide an annual Irrigation of 1.69 lakh hect. of cropped area over a net C.C.A. of 1.23 lakh ha. in District Khandwa and Kargone of Madhya Pradesh. The project would generate a firm power of 223 MW in initial stage and 118 MW in final stage with an installed capacity of 1000 MW. The project has been administratively approved by Govt. of M.P. for Rs. 1392.85 crores in Sept. 1984. The estimate has now been revised and updated at Dec. 1988 price level as Rs. 1993.67 crores as under :

			Rs. crore
Unit - I	Dam	:	832.32
Unit - II	Canals & distribution system	:	541.98
Unit - III	Power	:	619.37
Total			<u>1993.67</u>

The cost of other items which do not part of estimates are as follows :

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2

a) Rs. 124.00 crores for catchment area treatment.

b) Rs. 50.00 crores for command area development.

The project with this updated estimated cost has been submitted by C.W.C. to the T.A.C. to Planning Commission in Dec. '88. The project has been recommended to the Planning Commission, Govt. of India in the meeting of T.A.C. held at New Delhi on dated 11.1.89. The project has also been cleared from Ministry of Environment & Forest of Govt. of India.

It is proposed to complete the Dam & Power house by June 1997. The Irrigation system is proposed to be completed in three phases as given below:

<u>Phase of construction</u>	<u>Period</u>	<u>Area proposed for irrigation ha.</u>
<u>Phase-I</u>		
Zero to 81.59 km. of main flow canal along with distribution system.	1987-88 to 1997-98	36,100
<u>Phase-II</u>		
From 81.59 to 206.29 km of main flow canal along with distribution system	1992-93 to 2001-02	46,800
<u>Phase-III</u>		
From 206.29 to 249.65 km. main flow canal & zero to 83 km of Khargone lift canal along with distribution system.	1997-98 to 2006-07	40,100
Grand Total		<u>1,23,000</u>

It is planned to complete canal system including micro distribution net work systems under Phase-I in such a manner, that as soon as the work of main dam is completed upto crest level, (June 1996), Irrigation is provided in command area in its initial reach under Phase-I.

2.0 COMMAND AREA BRIEF:

2.01 Location & Topography:

The Project area lies in District Khandwa and Khargone in Madhya Pradesh. The command is located to the South of Narmada river and extents upto Satpura hill range.

Topography of the area is rolling and undulating with plain land patches along the river and in between ridges and hill . The command area details are as under :

<u>S.No.</u>	<u>Particulars</u>	<u>Area in lakh ha.</u>
1.	Gross command area	2.10
2.	Culturable command area	1.75
3.	Unculturable area	0.35
4.	Net cropped area	1.42
5.	Area proposed for irrigation.	1.23
6.	Annual Irrigation	1.69
7.	Intensity of Irrigation	138%

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2.02 Climate:

The climate of command area is semi arid and sub tropical monsoon type with average annual rainfall varies from 1015 mm on eastern portion decreasing to 760 mm towards western portion. The summer is quite hot with average temperature in May as 43° - 45° C. The relative humidity is very low in dry weather being 12% and maximum in monsoon season being above 87%.

2.03 Soil:

The soil in command area is predominantly B.C. soil and area near to river Narmada is mostly alluvium.

2.04 Drainage:

Though the command area is traversed by good net work of natural drainages thus natural surface drainage is good. However to avoid hazards of intensive irrigation and to remove surplus water from the command, the surface and sub surface drainage study in command area have also been got conducted through specialised agency M/s Consulting Engineering service Pvt. Ltd, New Delhi in Aug, '84. It is proposed to take up the work of surface & sub-surface drainage simultaneously with irrigation delivery system.

2.05 Ground Water & Conjunctive use:

Indian Institute of Science, Bangalore ^{has} done the study in April '85 to identify the scope for development of ground water in the command of Indira Sagar project. The I.I.Sc has recommended an average conjunctive use as 70% of surface water and rest 30% of ground water. This will facilitate in providing additional Irrigation facilities and also to avoid hazard of water-logging.

3. COMMAND AREA DEVELOPMENT PROGRAMME:

3.01 Objective:

The objectives of the command area development programme would be:

- optimum utilization of created potential of irrigation.
- Introduction of multiple cropping and increasing the levels of productivity and strengthening of Agriculture research activity.
- Creation adequate communication and storage facilities.
- Conservation management for integrated fisheries development.
- Intensification of dairy development
- Machineries for timely implementation of the prog. anne.

3.02 Main Components of Command Area Development programmes:

The main components of the Command area development programme are on Farm Development, Conjunctive use, Agro industries, Regulated market, ware housing facilities, roads etc.

3.03 . On Farm Development:

This includes land shapping, land levelling, drainage facilities, field irrigation channels and roads etc. The works on O.F.D. will be started 2 years in advance of the start of irrigation from canal system in phased manner in the entire command area.

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3.04 Conjunctive use of Ground Water:

To provide safe guards against excess use of water, conjunctive use of ground water to the extent of 30% is proposed as per study of Indian Institute of science, Bangalore. 27,000 Nos. additional wells are envisaged in N.S.P. command. However actual Nos. will depend on the progress of private wells before onset of canal irrigation.

3.05 Agro Industries:

The programme envisages provision of key, agro based industries in the command area on the basis of potential available. The report of study on industrial growth potential and perspective plan on industrialization (1985), conducted by Tata Consulting Services has been received.

3.06 Regulated Markets:

Provision has been made for strengthening the market system. A survey for agricultural marketing in Indira Sagar Project command area has already been conducted by M/s Dilip Swamy and Ashok Gulati of Society for study of economic disparities, New Delhi and their report of Feb. 1985.

3.07 Ware Housing facilities:

It is expected that there will be an increase in production to the extent of four to eight times due to development of Irrigation facilities. To handle this increased production store and Ware House facilities will be needed.

3.08 Roads :

The existing road density in the command area is 0.16 km/sq.km. which is very low. It is felt that road density should be 0.32 km/sq.km. The objective will be to connect all villages in the command area with O.D.R. or village roads as part of project development. Some O.D.R./ V.R. will be up graded to single lane black top M.D.R. & few such lanes may be constructed to achieve a density of 0.32 km/sq.km. The following measures will be necessary.

Construction of ODR/VR to village which do not have a connection	- 320 km.
Improvement of existing ODR/VR to single lane MDR with black top	- 84 km.
Construction of single lane MDR with black top	- 16 km.

The above are based on the report of M/s Dilip Swamy and Ahosk Gulati on Agricultural Marketing in Narmada Sagar Complex submitted by them after detailed studies.

The average cost of roads construction will be Rs. 500 per ha. Accordingly the cost of road construction in the command area of 1.23 lakh ha. work out to Rs. 6.00 crore.

3.09 Estimated cost of Command Area Development programmes

A tentative provision of Rs. 4000 per ha. is provided for CADA works of Indira Sagar Project in consultation with C.W.C. Out of this Rs. 2000 is for land shap-ing, Rs. 1000 for conjuctive use and Rs. 1000 per ha. for roads - communication and for O.F.D. works.

The tentative break up of the cost estimate is as follows:

<u>S.No.</u>	<u>Item</u>	<u>Total cost Rs.crores</u>
1.	On Farm Development	25.00
2.	Conjunctive use	12.00
3.	Others:	
	1) Agro industries	3.00
	ii) Regulated Markets	2.00
	iii) Ware Housing facilities	2.00
	iv) Roads	6.00
Total Rs.		<u>50.00</u> crores

4.0 IMPLEMENTATION OF COMMAND AREA DEVELOPMENT PROGRAMME:

4.01 Implementation of irrigation:

The construction of main canal, distribution and drainage system will be implemented in 3 phases as given below:

Phase-I

The project envisages irrigation of 36077 ha. and the construction of Phase-I project is scheduled to be completed in period of 11 years starting from 1988-89.

Phase-II

Project envisages irrigation of 46813 ha. The construction will be started in the year 1993-94 and completed in the year 2002-03.

Phase-III:

The Phase-III project after completion will irrigate 40092 ha. The construction period being 1998-1999 to 2006-07. Details of three phases are given in the enclosed statement No.1.

4.02 Irrigation Development:

Development of irrigation will start simultaneously with the construction of canal system and full potential will be achieved in 2007-2008 i.e. one year after the completion of canal system.

The year-wise development of the irrigation is given in Statement No.2.

4.03 Implementation of Command Area Development works:

The command area development works will be started two years in advance of irrigation from canal system. Survey for the command area development will be started in the year 1993-94 and completed by 2005-06. Physical phasing of O.F.D. works has been done to complete the work in the year 2006-07. Statement No.3 gives physical and financial phasing of command area development works.

5. PRESENT STATUS OF SURVEY FOR IRRIGATION AND COMMAND AREA DEVELOPMENT WORKS:

The alignment of main canal under Phase-I has been finalised. Survey of main canal under Phase-II and III will be completed by 6/92 and 6/94 respectively.

Survey for distribution and drainage system has been completed for the Phase-I command area and that of Phase-II and III will be complete by 6/92 and 6/94 respectively.

The detailed project report for command area development will be prepared and submitted by 1992 -1994 and the work will be started by 1993-94.

**Statement showing Phase wise details of construction
of Canal system and OFD works and Irrigation Development**

S.No.	Particulars	Phase-I	Phase-II	Phase-III
1.(a)	Reach	km. 0 to 81.59 of main canal and distribution & drainage system.	Km.81.59 to 206.29 of main canal i/c distribution & drainage system.	km.206.29 to 248.65 of main canal and Khar gone lift canal i/c distribution and drainage system.
(b)	Length of main canal km.	81.59	114.70	M.C. 42.36 K.L.C. 83.00
2.	No.of distributaries	8 Nos	14 Nos	8 Nos M.C. 42.36 K.L.L 83.00
3.	Area proposed for irrigation.(ha)	36100	46800	40100
4.	Estimated cost of distribution & drainage system (updated) Rs,millions.	3093.4	1297.2	1029.2
5.	<u>IRRIGATION</u>			
a)	Period of contrn.of of distribution & drainage system.	1988-89 to 1998-99	1993-94 to 2002-2003	1998-1999 to 2006-2007
b)	Period for irrigation development of the proposed area.	1995-97	1997-2004	2007-2008
c)	Period of contrn.of lined water course.	-do-	-do-	-do-
d)	Period of completion of survey of main canal	1998-89	1989-90 to 1991-92	1991-92 to 1993-94.
e)	-do- distribution and drainage system.	1989-90	-do-	-do-

O.F.D. works

S.No.	Particulars	Phase-I	Phase-II	Phase-III
1.	Area (ha)	36100	46800	40100
1)	O.F.D. works Period of completion of survey.	1993-94 to 1999-2000	1995-1996 2003-2004	2001-2002 to 2005-2006.
11)	Period of completion	1993-94 to 2000-2001	1995-1996 2004-2005	2001-2002 to 2006-2007.
3.	Soil survey	to be conducted by 1990-91	1991-92 to 1994-95	1995-96 to 1999-2000
4.	Water Management Pilot project.	1991-92 to 1996-97	1993-94 to 1998-99	1996-1997 2005-2006
5.	Ground Water, drainage forestry, Fishery, Animal husbandry, Agro industry, Regulated markets, Warehousing & roads.	1993-94 to 2000-2001	1995-96 2004-2005	2001-2002 to 2006-2006

Statement No.2

YEARWISE DEVELOPMENT OF IRRIGATION

Year	Area in Ha		
	<u>Yearwise</u>	<u>Cumulative</u>	
1995-1996	5000	5000)	Phase-I Area
1996-97	10000	15000)	
1997-98	10000	25000)	
1998-99	10000	35000)	
1999-2000	10000	45000)	Phase-II Area
2000-2001	10000	55000)	
2001-2002	10000	65000)	
2002-2003	10000	75000)	
2003-2004	10000	85000)	Phase-III Area
2004-2005	10000	95000)	
2005-2006	10000	105000)	
2006-2007	10000	115000)	
2007-2008	8000	123000)	

Statement No.3COMMAND AREA DEVELOPMENT - PHYSICAL PHASING OF WORKS

Phase	Year	Survey	OFD works
1	2	3	4
Phase-I	1993-94	5000	1000
	94-95	5000	3000
	95-96	5000	4000
	96-97	5000	5000
	97-98	5000	5000
	98-99	5500	6000
	99-2000	5600R	6000
	2000-2001	-	6100
	Total	36100	36100
Phase-II	1995-96	5000	3000
	96-97	5000	4000
	97-98	5000	5000
	98-99	5000	5000
	99-2000	5000	5000
	2000-2001	5000	5000
	01-02	5000	5000
	02-03	5000	5000
	03-04	6800	5000
	04-05	-	4800
	Total	46800	46800
Phase-III	1998-1999	5000	3000
	99-2000	5000	4000
	0-1	5000	4000
	0-2	5000	4000
	2-3	5000	5000
	3-4	5000	5000
	4-5	5000	5000
	2005-2006	5100	5000
	2006-2007	-	5100
	Total	40100	40100
	Grand Total	123000	123000

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STATUS OF SEISMIC INSTRUMENTATION FOR
NARMADA SAGAR COMPLEX PROJECTS

(MARCH 1989)

1. The Dam Review Panel (DRP), constituted to examine various aspects of Narmada Sagar Project, recommended in its fifth meeting, held during September 84 to establish a net-work comprising of 8 observatories for monitoring the seismic activities in Narmada Sagar Complex and study the concept of reservoir induced seismicity.
2. On request from NVDA, the Central Water and Power Research Station, Pune conducted noise survey and suggested to add two more units to give better coverage in the Umkareshwar-Maheshwar area. This was subsequently accepted by the DRP in September 87 and urged the need to establish the system as early as possible to determine a reference seismicity level for the region before any of the dams are built.
3. Accordingly, a comprehensive proposal for setting up a telemetered net-work for 10 stations around the reservoirs was obtained from CW&PRS and sent to Central Water Commission for examination. Old and used instruments were also borrowed from CW&PRS Pune and installed near the proposed 3 dams for recording the pre-filling seismic events, but , desired results could not be obtained owing to old conditions of the instruments.
4. Meanwhile, this aspect was also discussed in the 22nd meeting of the Standing Committee for recommendation of Design Seismic Parameters for River Valley Projects, held on 31-12-87 in CWC. It was decided by the high level committee that the work of

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installation of instruments, observations and interpretation of data, for the entire Narmada Valley as a whole, should be entrusted to a single national agency like Indian Meteorological Department. The relevant extract from the minutes of the meeting is reproduced in Annexure-I.

5. The IMD has necessary expertise, infra-structure facilities, and is also associated with the Sardar Sarovar Project in training the personnel, acquiring the data and its analysis. Therefore, NVDA sent a request to IMD to provide technical consultancy for establishing the seismic net-work in Narmada Sagar Complex also.

6. The IMD has formally accepted and examined the net-work planning submitted by NVDA. It also approved the locations of the observatories and furnished a list of instruments to be installed at various observatories in the system. (Annexure-II). With the help of following instruments, the seismic activities in the region is proposed to be closely monitored.

1. Short Period Seismometer (SPS)
2. Long Period Seismometer (LPS)
3. Seismic Data Analysis System (DAS)
4. Wood Anderson Seismometer (WAS)
5. Strong Motion Accelerograph (SMA)
6. Digital Event Recorder (DER)
7. Structural Response Recorder (SRR)

7. The details of the instruments and appliances proposed at all the units of the system are tabulated in Annexure-III.

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8. The IMD also agreed with the NVDA's opinion that the telemetry net-work will not be practicable at this stage due to paucity of technical^{and} scientific back up for such a complicated and sophisticated system. Comparatively a simple and reasonably accurate system as being adopted by Sardar Sarovar Project, has now been finalised. The system proposed now with the compatible instrumentation is quite economical, easy to maintain and can be co-related with other networks in the Valley (Annexure IV).

9. After the approval of instrumentation by IMD, tentative cost estimate (based on basic prices collected from Gujarat) is nearly Rs. 1.70 crores, for both indigenous and imported instruments and accessories. This involves foreign currency of 9.37 lakh U.S.Dollars and Indian Rupees 31.30 lakhs. This includes the installation, training of the personnel and 3 years guaranteed services for smooth running of the system.

10. Considering the urgency on environmental aspects, NVDA proposed to make use of Sardar Sarovar agreement of September 1986 to avoid delay in clearing the proposal at different levels and install the instruments as early as possible and requested the World Bank to agree to this method of procurement; however, the World Bank has not agreed to this method of Add-on procurement.

11. In view of the above, NVDA now proposes to procure the instruments through International Competitive Bidding (Indian firms so far have not developed technical capability and precision to produce the required excellent quality of instruments.). The

minimum time period required for the different stages of processing in the procurement is as given below:

1	Finalisation of specifications by IMD	3 months
2	Preparation of ICB documents and obtaining World Bank's acceptance	6 months
3	Pre-qualification of the firms	3 months
4	Tender invitation and evaluation	6 months
5	Negotiation and finalisation (including obtaining Bank's concurrence)	6 months
6	Clearance from Department of Economic Affairs, Deptt of Electronics, Deptt. of Science and Technology, Deptt of Commerce	6 months (Parallel activity.)

It is, therefore, obvious that about two years period will be required in processing the case.

Extracts from the minutes of the 22nd meeting of the Standing Committee on 31.12.87 in the committee Room of CWC.

...

22.00 OPENING REMARKS :

At the outset, Chairman welcomed all the members and participants and took up the agenda items. The following members were present:

- | | | |
|----|---|-----------|
| 1. | Sh.K.Madhavan, Member(D&R) | Chairman |
| 2. | Dr.H.N.Srivastava, Director
(Seismology) IMD | Member |
| 3. | Sh. A.B. Joshi, CE, (DSSO) | Member |
| 4. | Sh.S.S.Narang, Director(INST.) | Secretary |

Name of the other invitees and project officers who attended the meeting are given at Annex.1. Due to unforeseen circumstances Dr.Jaikrishna and Head of the Deptt. of Earthquake Engineering, University of Roorkee (DEQUOR) could not attend the meeting.

22.2.2 NEED FOR UNIFIED SEISMOLOGICAL STUDIES FOR NARMADA VALLEY :

In the 21st meeting of the Committee Dr.Jaikrishna had stressed the need for collecting adequate information about the seismic status of region during pre and post impoundment periods for evaluating the status of the region. He had specifically cited the case of Narmada

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Valley where a large number of major and medium projects are going to come up in a relatively short period of time.

Director(Seismology)IMD point out that monitoring and follow up is needed as a whole for all the projects lying in Narmada Valley so far as seismological instrumentation and observations are concerned. Multiplicity of the authorities may lead to lack of coordination and correlation of data for different sites may become difficult. To take care of this, a single national level agency should be fully entrusted with the work of seismological instrumentation and observation.

As IMD has got necessary expertise and infrastructure in this area by virtue of their being involved with seismological observations of Sardar Sarovar Dam,, they should be entrusted with the work of complete monitoring of all the projects in Narmada Valley. IMD as well as the project authorities of all the projects in Narmada Valley should be requested to take up this matter urgently.

Based on the discussion and views expressed by members Chairman agreed that this being a very vital issue, the work of instrument installation, observation and interpretation should be done by a single national agency like IMD. Necessary follow up action in this regard may be taken up by the concerned Departments. Director CMDD (NW&S) and Secretary Standing Committee were requested to take up the matter of proper level with Govt. of M.P.

and follow up the seismological observation programme for the Narmada Valley. This programme should cover Jobat project also.

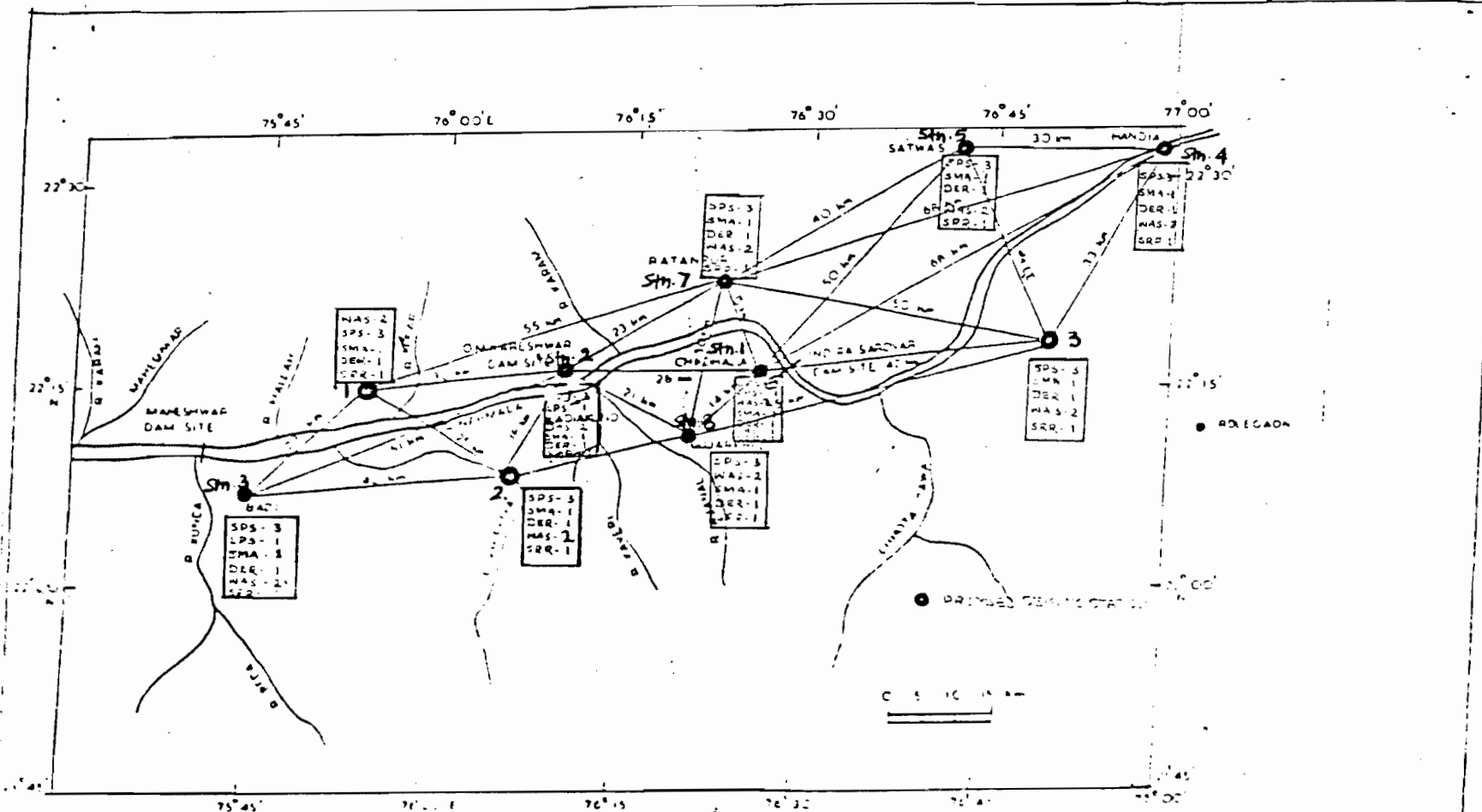
The map illustrates the geographical context of the Maheshwar Dam Site. It shows the confluence of several rivers: R. Kanam, R. Kunda, R. Malin, R. Kolar, R. Karkar, R. Rajan, and Chota Tawa. The Maheshwar Dam Site is located on the R. Kunda. Other significant locations include Ratapur, Chikhhalia, Indira Sagar Dam Site, and various smaller settlements like Badi, Kadiakhedi, and Guarkhedi. Distances between these locations are marked in kilometers. A scale bar at the bottom right indicates 0, 5, 10, and 15 kms.

GOVT OF INDIA
CENTRAL WATER AND POWER RESEARCH STATION
KHADAKVASLA PUNE - 411024
SEISMOLOGICAL NETWORK PROPOSED FOR
OMKARSWAR MAHESHWAR &
INDIRA SAGAR PROJECT AREAS, M.P.

DRN	FIG.	SADDR.
TRD RNI	SCALE	DATE 17-10-86
CND	BUNESS	

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ANNEXURE - II



TYPE OF SEISMOGRAPH TO BE INSTALLED

- SPS-3 SHORT PERIOD SEISMOGRAPH WITH VISUAL RECORDER (3 CHANNEL)
 SRR-1 STRUCTURAL RESPONSE RECORDER.
 LPS-1 LONG PERIOD SEISMOGRAPH WITH VISUAL RECORDER.
 WAS-2 WOOD ANDERSON SEISMOGRAPH WITH RECORDER (IN X & Y DIRECTION)
 SMA-1 STRONG MOTION ACCELEROGRAPH.
 DER-1 DIGITAL EVENT RECORDER.
 DAS-1 SEISMIC DATA ANALYSIS SYSTEM.

GOVT. OF MADHYA PRADESH

NARMADA VALLEY DEVELOPMENT DEPARTMENT BHOPAL-461005

SEISMOLOGICAL NETWORK PROPOSED FOR THE
 OMKARESHWAR, MAHESHWAR AND
 INDIRA NAGAR PROJECT AREAS, M.P.

DRN	SIG	APPD.
TRD-EMI	SCALE	DATE - 17.2.89
CND.	DWN. EER	DRG No.

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Annexure-III

Type of Seismic Instruments for 10 Stations of Narmada Sagar
Complex Projects

Sl. No.	Name of Station	Short period seismo- meter Complete Unit. (SPS) (3)	Short period seismo- meter only for digi- tal vane recorders (4)	Long period data Seismo- meter (LPS) (5)	Seismic data sis sys- tem (DAS) (6)	Wood Ander- son Sei- smometer (WAS-2) (7)	Strong motion accele- rograph (SMA) (8)	Digi- tal event recor- der (DER) (9)	Struc- tural respon- se re- corder (SRR) (10)	Magna- tic play back (in H.Q.) (11)	Oscillo- scope (in H.Q.) (12)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1.	NSP Dam site Narmadanagar	3	3	1	1	(X&Y axis) ²	1	1	1	2	
2.	Omkareshwar Dam site Omkareshwar	3	3	1	-	2	1	1	1	-	-
3.	Maheshwar Dam site Maheshwar(Badi)	3	3	1	-	2	1	1	1	-	-
4.	Handia	1	1	-	-	2	1	1	1	-	-
5.	Satvas	1	1	-	-	2	1	1	1	-	-
6.	Site No.3	1	1	-	-	2	1	1	1	-	-
	Ratanpur	1	1	-	-	2	1	1	1	-	-
8.	Guarkneci	1	1	-	-	2	1	1	1	-	-
9.	Site No.2	1	1	-	-	2	1	1	1	-	-
10.	Site No.1	1		-	-	2	1	1	1	-	-
	<u>Body of Dam</u>		-	-	-	-	4	1	-	-	-
	Stand by	2	-	-	-	-	-	-	-	-	-
Total:		18	16	3	1	20	14	11	10	2	

Notes: 16 Nos Short period Seismometers proposed to be used with Analog Recorder as and when the existing 18 Seismometers are connected to the Telemetry System.

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Annexure-IV

LIST OF SEISMIC INSTRUMENTS AND ACCESSORIES FOR 10 STATION
NETWORK IN NARMADA SAGAR COMPLEX (AS APPROVED BY INDIA
METEROLOGICAL DEPARTMENT).

Item No.	Description	Number
1.	2.	3.
1.	SHORT PERIOD SEISMOMETER moving coil (velocity) type 1 Hz, vertical or horizontal operation, built in electromagnetic calibrator, single and three channel with recording unit Drum drive type with seismic amplifier power supply, etc.	18 Nos
2.	SHORT PERIOD SEISMOMETER (S-7000 variable period seismometer 0.2-1.5 sec.) Horizontal or vertical operation with calibration coil. (These Seismometers will be used with Analog Recorders)	16 Nos
3.	LONG PERIOD SEISMOMETER vertical type, electromechanical transducer that converts long period vertical motion into electrical output having thermally stable case with all accessories such as recorders, amplifier power supply etc.	3 Nos
4.	SEISMIC DATA PROCESSING AND ANALYSIS SYSTEM Suitable for microearthquake studies and strong motion data analysis computer based system including CPU, memory, analog to digital convertor, playback unit, graphics display, printer/plotter etc. with necessary software modules.	1 Nos

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-
- | | | |
|----|----|----|
| 1. | 2. | 3. |
|----|----|----|
-
5. STRONG MOTION ACCELEROGRAPH 14 Nos
with digital cassette Micro-processor based recorder, triaxially mounted force balanced accelerator with preevent stroed in a solid state memory, automatic sine wave calibration and precision timing system.

 6. MAGNETIC TAPE PLAYBACK SYSTEM 2 Nos
Portable, Micro processor based low powered digital cassette recording medium with LCB display.

 7. DIGITAL TIME MARKING SYSTEM 15 Nos
Crystal controlled, temperature compensated low powered timing system, having short period and long period time mark programme outputs and contrain precission frequency regulated power output. module operated on both 230 v AC and 12 v or 24 v DC source including WV comparator, time code generator, power Amplifier DC power module and HF timing receiver.

 8. DIGITAL EVEN RECORDED low powered CMOS 11 Nos
microprocessor based digital recording system capable of recording microearthquake and strong motion earthquake data on four channels. Large recording capability and high dynamic range with ultra low noise (For item No. 1, short period seismometer and item No. 2, long period seismometer, Schedule of Quantities)

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-
- | | | |
|----|----|----|
| 1. | 2. | 3. |
|----|----|----|
-
9. PULSES CALIBRATOR capable of generating current pulses to a seismometer calibration coil having crystal controlled oscillator (For item No.1, Short period seismometer and item No.2, long period seismometer, Schedule of Quantities) 21 Nos.
 10. DIGTIZER capable of digitizing the analog data received by visual recorders into magnetic tapes for analysis by Data Processing and Analysis system low power, high accuracy and resolution. 1 Nos.
 11. DRUM RECORDER SPARES (For item No.1, Short period Seismometer, Schedule of Quantities) 4 Nos.
 12. TIME MARK PROGRAMME (For item No.6 Digital Time Marking system Schedule of Quantities) 3 Nos.
 13. COAXIAL CAELE 30 m Long (For Item No.1 Short Period Seismometer and item No.2, Long Period Seismometer, Schedule of Quantities). 30 Nos.
 14. CPU MODULE (For item No.4, strong motion accelerometer, Schedule of Quantities). 1 Nos.
 15. ANALOG MODULE (For item No. 4, strong motion accelerometer, Schedule of Quantities) 1 Nos.

(54)

1.	2.	3.
16.	POWER INTERFACE (For item No.4, strong motion accelerograph Schedule of Quantities)	3 Nos.
17.	POWER I/O MODULE (For item No. 4, Strong motion accelerograph, Schedule of Quarities)	1 Nos.
18.	MEMORY MODULE (For item No. 4, strong motion accelerograph, Schedule of Quantities)	1 Nos.
19.	FORCE BALANCE ACCELEROMETER (For item No.4, strong motion acceler- ograph Schedule of Quantities)	2 Nos.
20.	RECHARGERABLE BATTERY (For item No.4, strong motion accelerograph Schedule of Quantities)	15 Nos.
21.	FUSE 2A, 250V, BOX OF 5 EACH (For item No. 4, strong motion accelerograph Schedule of Quantities)	2 Nos.
22.	INTERNAL BATTERY CHARGES (For item No.4, strong motion accelerograph Schedule Quantity)	2 Nos.
23.	LED INDIVATOR (For item No. 4, strong motion accelerograph Schedule of Quantities)	3 Nos.
24.	CONNECTION SET (For item No.4, strong motion accelerograph Schedule of Quantities)	3 Nos.

(55)

1.	2.	3.
25.	MAGNETIC TAPE CASSETTE (For item No.4, strong motion accelerograph and Digital event recorder, Schedule of Quantities)	100 Nos.
26.	KEY BOARD (For item No.4, strong motion accelerograph Schedule of Quantities)	3 Nos.
27.	CASSETTE TAPE DRIVE (For item No.4, strong motion accelerograph Schedule of Quantities)	4 Nos.
28.	SYSTEM INTERFACE BOARD (For item No.4, strong motion accelerograph Schedule of Quantities)	2 Nos.
29.	LCD DISPLAY BOARD (For item No.4, strong motion accelerograph Schedule of Quantities)	3 Nos.
30.	OSCILIOSCOPE Suitable for testing Seismological instruments having high sensitivity large display, high light output and automatic TV triggering	1 Nos.
31.	PORTABLE FREQUENCY GENERATOR	2 Nos.
32.	6000 Mtrs. Cable for Sensor	6000 Mtrs.
33.	Installation Commissioning of Seismic instruments including data processing and analysis system and training the Buyer's technical personnel.	

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LIST OF INDIGENOUS SEISMIC INSTRUMENTS AND ACCESSORIES FOR
N.S.P. COMPLEX.

<u>S.No.</u>	<u>Description</u>	<u>Qty.</u>
1.	Wood-Anderson Seismometer	20 Nos
2.	Photographic Recorders	10 Nos
3.	Structural Response Recorders	10 Nos
4.	Oscilloscope	2 Nos
5.	Uninterruptable power supply (Mini Electronic Power Generator) Battery Driven.	10 Nos
6.	Voltage Stabilizers	20 Nos
7.	Battery Chargers	12 Nos
8.	Radio Receiver Sets (Four Band } Phillips Make or equivalent)	12 Nos
9.	Acid Storage Batteries	24 Nos
10.	Digital Multimeters - Phillips	10 Nos
11.	Stop Watch.	12 Nos
12.	Brinell Microscope Magnification 10x	10 Nos
13.	Soldering Iron	10 Sets
14.	Reading Glass	10 Nos
15.	Tool Box containing Nose Plier, cutting Plier, Screw Driver Set, Spanner Set, Allan Key Set, Scissors, Electrical Tester (Pockert)	
16.	Scientific Calculator (Pocket)	12 Nos
17.	Photographic Tray	40 Nos
18.	Torch (fourcell)	
19.	Table Lamps-folding range for Seismograph reading	12 Nos

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सरकारी प्रयोग के लिए
FOR OFFICIAL USE



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल
Environment Sub-Group
छठी बैठक की कार्यसूची
Agenda for Sixth Meeting

स्थान : पर्यावरण भवन नई दिल्ली.
Venue : Paryavaran Bhawan New Delhi

दिनांक : 7 अगस्त 1989
Date : 7th August 1989

नई दिल्ली
जुलाई 1989
NEW DELHI
JULY 1989

विषय - सूची

मद सं.	विषय	पृष्ठ सं.
उ:-1।32।	पर्यावरण उप-क्षेत्र नर्मदा नियंत्रण प्राधिकरण की पाँचवीं बैठक के कार्यकुशल की पुष्टि	1
उ:2।33।	कार्यक्षेत्र एवं अध्ययन सुनौदीकरण - सरदार सरोवर परियोजना तथा नर्मदा नगर परियोजना के पर्या- वरणीय पहलुओं संबंधी कार्यक्षेत्र एवं अध्ययन की स्थिति रिपोर्ट	2
उ:3।34।	आवाह क्षेत्र के प्रणय उपचार पर गहन विचार-विमर्श	5
उ:4।35।	परिवेशी क्षेत्र की गहन क्षमता पर गहन विचार-विमर्श	7
	अन्य कोई मद	9
	अगली बैठक की तारीख तथा समय	9

**मद सं. ४: १॥३२॥ पर्यावरण उप-दल नर्मदा नियंत्रण प्राधिकरण की
पांचवीं बैठक के कार्यवृत्त की पुष्टि**

नर्मदा नियंत्रण प्राधिकरण के पर्यावरण उप-दल की पांचवीं बैठक का कार्यवृत्त पत्र सं. डी३५/॥५॥/८९/ दिनांक..३.४.१९८९..... द्वारा सभी सदस्यों और आमंत्रित अधिकारियों को परिपत्रित किया गया था ।

कितनी सदस्य से कोई टिप्पणी प्राप्त नहीं हुई है । अतः पर्यावरण उप-दल की पांचवीं बैठक के परिपत्रित किए गए कार्यवृत्त की पुष्टि कर दी जाए ।

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मद सं. ४:-२॥३३॥ कार्यकलाप एवं अध्ययन पुनरीक्षण - तरदार
 तरावर परियोजना तथा नर्मदा सागर
 परियोजना के पर्यावरणीय पहलुओं संबंधी
कार्यकलाप एवं अध्ययन की स्थितिक रिपोर्ट

नर्मदा नियंत्रण प्राधिकरण की ११ अप्रैल, १९८९ को हुई ३१वीं बैठक में अध्यक्ष, नर्मदा नियंत्रण प्राधिकरण ने इच्छा व्यक्त की कि नर्मदा नियंत्रण प्राधिकरण द्वारा प्रत्येक मास एक रिपोर्ट तैयार की जाए और इसे पर्यावरण और वन मंत्रालय को भेजा जाए। नर्मदा नियंत्रण प्राधिकरण ने अप्रैल, मई एवं जून, १९८९ के लिए स्थितिक रिपोर्टें तैयार कर ली हैं। जून मास की प्रगति रिपोर्ट उपाबन्ध-एक ॥अंग्रेजी॥ पर संलग्न है। राज्यों के प्रति-निधि कृपया पर्यावरण महत्व के विभिन्न पहलुओं पर की गई प्रगति के बारे में बैठक में देने का कष्ट करें। उपाबन्ध-दो ॥अंग्रेजी॥ में अद्यतन निर्माण कार्यक्रम के अनुसार तरदार तरावर परियोजना की डूब-अनुसूची के संदर्भ में पर्यावरणीय पहलुओं की कुशलता का उल्लेख किया हुआ है जिस पर चर्चा की जाएगी।

उप-दल विशेषकर उन मदों पर विचार करने की कृपा करें जिनके बारे में अभिकरणों को अभिज्ञात किया जाना तथा पर्यावरण एवं वन मंत्रालय से मशविरा करके उनकी सेवा शर्तों को अंतिम रूप दिया जाना श्रेष्ठ है। ऐसी मदों का संक्षिप्त विवरण निम्न प्रकार है :

तरदार तरावर परियोजना

१. नृवंश विज्ञान सर्वेक्षण : नृवंश विज्ञान सर्वेक्षण के लिए राष्ट्रीय मानव संग्रहालय के साथ सेवा शर्तों को अंतिम रूप, मध्य प्रदेश सरकार द्वारा पर्यावरण एवं वन मंत्रालय के साथ परामर्श करके दिया जाना श्रेष्ठ है।

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2. वनस्पति और जीवजन्तु अध्ययन - बम्बई प्राकृतिक विज्ञान सोसाईटि के साथ सेवा शर्तों को अंतिम रूप मध्य प्रदेश सरकार एवं महाराष्ट्र सरकार द्वारा पर्यावरण एवं वन मंत्रालय के साथ परामर्श करके दिया जाना है ।

3. प्रतिवेशी क्षेत्र की वहन-क्षमता

सरदार सरोवर परियोजना से प्रभावित क्षेत्र में आवश्यक अध्ययन सम्पन्न करने के लिए किसी उपयुक्त अभिकरण को मध्य प्रदेश सरकार द्वारा अभी तक अभिज्ञात नहीं किया गया है । महाराष्ट्र राज्य में सरदार सरोवर परियोजना से प्रभावित क्षेत्र में प्रतिवेशी क्षेत्र की वहन-क्षमता के संबंध में उप वन संरक्षण व वन-प्राणीपुष्पों को तौंचे गए अध्ययन की सेवा शर्तों की सूचना महाराष्ट्र सरकार से अभी तक प्राप्त नहीं हुई है ।

4. मछली उपयोग

पूरे सरदार सरोवर परियोजना क्षेत्र के जल-प्राणियों के सर्वेक्षण एवं अध्ययन के संबंध में केन्द्रीय अन्तर्देशीय अभिग्रहण मात्स्त्रिकी अनुसंधान संस्थान बारकपुर, पश्चिमी बंगाल के साथ सेवा-शर्तों को भागीदार राज्यों द्वारा आपस में परामर्श करके अंतिम रूप अभी तक नहीं दिया गया है ।

नर्मदा सागर परियोजना

1. सूचक-विज्ञान

नर्मदा सागर परियोजना के डूब क्षेत्र में सूचक विज्ञान अध्ययन

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के लिए राष्ट्रीय मानव संग्रहालय, भोपाल के साथ सेवा शर्तों को अंतिम रूप देने के मामले में अब तक हुई प्रगति की सूचना मध्य प्रदेश सरकार से प्राप्त नहीं हुई है ।

2. परिवेशी क्षेत्रों की वहन क्षमता

नर्मदा सागर परियोजना से प्रभावित क्षेत्र के परिवेशी क्षेत्र में वहन क्षमता पर अध्ययन के संबंध में प्रकृति-मित्र सोसाईटि भोपाल के साथ सेवा शर्त की सूचना मध्य प्रदेश सरकार से अभी तक प्राप्त नहीं हुई है ।

3. मत्स्य उद्योग

नर्मदा सागर परियोजना क्षेत्र में जल प्राणियों से सम्बद्ध अध्ययन के संबंध में मध्य प्रदेश सरकार द्वारा केन्द्रीय अन्तर्-देशीय अ अभिग्रहण मत्स्य उद्योग अनुसंधान संस्थान के साथ विचार-विमर्श किया जाना था परन्तु इस बारे में हुई प्रगति की कोई सूचना उनसे अभी तक प्राप्त नहीं हुई है ।

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मद तं. उ: 3॥34॥ आवाह क्षेत्र के श्रृणवद्ध उपचार पर गहन विचार-विमर्श

इस उपपदल की पिछली बैठकों में विचार-विमर्श के लिए उठाए गए सामान्य मामलों में एक मामला भागीदार राज्यों के बीच इन कार्यों की लागत के बंटवारे के सम्बन्ध में था। पाँचवीं बैठक के कार्यपुस्तक की मद तं. पाँच-3॥23॥ तथा नर्मदा निर्बंधन प्राधिकरण की 3।वीं बैठक के कार्यपुस्तक की मद तं. उ: 7॥343॥ के अन्तर्गत सूचित किया गया था कि प्रत्येक परियोजना के लिए परियोजना की लागत पर उपचार किए जाने वाले वाह क्षेत्र के विस्तार पर एक प्रबंध तैयार करने हेतु जल ^{संसाधन} मंत्रालय द्वारा कार्यवाही की जा रही है, ताकि यह एक मार्गदर्शी सिद्धांत का रूप ले सके। जल संसाधन मंत्रालय के प्रतिनिधि कृपया इस सम्बन्ध में वर्तमान स्थिति से अवगत कराने का कष्ट करें।

स. त. परि. एवं. न. ता. परि. के सम्बन्ध में राज्य सरकारों द्वारा श्रृणवद्ध वाहक्षेत्र उपचार के बारे में अध्ययन/कार्यान्वयन की प्रगति उपाबंध-रक पर संलग्न "पर्यावरणीय पहलुओं पर स्थितिक रिपोर्ट - जून 1989" में दिखाई गई है। राज्य सरकारों द्वारा निम्नलिखित सूचना उपलब्ध कराई जानी अपेक्षित है :-

तरदार तरौवर परियोजना

1॥ मान नदी के जल विभाजक में मुख्य परियोजना के सम्बन्ध में विस्तृत कार्य योजना, प्रस्तावित उपचार प्रास्य, भौतिक एवं वित्तीय वर्षवार लक्ष्यों के ह्योरे मध्य प्रदेश सरकार द्वारा उपलब्ध कराए जाने हैं।

2॥ महाराष्ट्र की सीमाओं में आने वाले क्षेत्रों के लिए उपचार अपेक्षित लघु जल विभाजकों को अभिज्ञात करने के लिए किए जाने वाले अध्ययन की प्रगति का ह्योरा महाराष्ट्र सरकार द्वारा दिया जाए।

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नर्मदा नागर परियोजना

1। उपचार किए जाने वाले क्षेत्र के वार्षिक लक्ष्य एवं उनके अनुस्यू परिष्कृत तथा बाह क्षेत्र उपचार के कार्यान्वयन के सभी तीनों चरणों की विस्तृत योजनाएं तैयार करने सम्बन्धी वर्तमान स्थिति के द्वारा मध्य प्रदेश सरकार से अभी तक प्राप्त नहीं हुए हैं।

2। दातूनी एवं गोदापूर के बाह क्षेत्रों में मध्य प्रदेश सरकार द्वारा हाथ में ली गई। मुख्य परियोजनाओं के लिए वित्तीय तथा भौतिक लक्ष्यों एवं उपलब्धियों के सम्बन्ध में वार्षिक प्रगति / कार्यक्रम के द्वारा उपलब्ध कराए जाने अपेक्षित हैं।

कार्यक्रम पर गहराई से विचार करने हेतु पक्षवार राज्य कृपया विस्तृत प्रस्ताव प्रस्तुत करें।

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मद सं. ४:-४३५॥ परिवेशी क्षेत्र की पहचान क्षमता पर गहन

विचार-विमर्श

अध्ययनों के संबंध में वर्तमान स्थिति का हवाई उपाबन्ध-रक
 [अंग्रेजी] [स्थितिक रिपोर्ट - जून, 1989] [अंग्रेजी] में संलग्न है जिसका
 संक्षिप्त उल्लेख नीचे किया जाता है :

सरदार सरोवर परियोजना

- ॥१॥ मध्य प्रदेश सरकार ने राज्य में स्थित सरदार सरोवर परियोजना प्रभावित क्षेत्र में आवश्यक अध्ययन कराने हेतु किसी उपयुक्त अभिकरण को अभी तक अभिज्ञात नहीं किया है ।
- ॥२॥ महाराष्ट्र में स्थित सरदार सरोवर परियोजना से प्रभावित क्षेत्र के संबंध में उप वन संरक्षक [वन्य प्राणी] पुणे को सवि गुरु अध्ययन की सेवा-शर्तों को महाराष्ट्र सरकार द्वारा प्रस्तुत की जानी है ।
- ॥३॥ गुजरात सरकार ने रम. इत. विश्वविद्यालय के साथ सेवा-शर्तों को पर्यावरण एवं वन मंत्रालय के साथ मशविरा करके अंतिम रूप दे दिया है । हाल ही में विश्व बैंक के एक दल ने राज्य का दौरा किया था और उनकी टिप्पणियाँ प्राप्त हुई थीं । इस संबंध में सेवा - शर्तों आदि को संशोधित करने हेतु बम्बई प्रकृति विज्ञान सोसाईटी, प्रकृति हेतु विश्व निधि, मद्रास प्रकृति — आदि की सलाह ली जानी प्रस्तावित है । इस संबंध में वर्तमान स्थिति से गुजरात सरकार द्वारा अवगत कराया जाना अपेक्षित है ।

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नर्मदा सागर परियोजना

प्रतिवैशी क्षेत्र की वहन क्षमता संबंधी अध्ययन को प्रकृति मित्र सोसाइटी, भोपाल को सौंपने के लिए सेवा-शर्तों को अंतिम रूप देने के संबंध में हुई प्रगति का ब्यौरा मध्य प्रदेश सरकार से अभी तक प्राप्त नहीं हुआ है ।

इन अध्ययनों पर गहराई से विचार-विमर्श करने हेतु भागीदार राज्य कृपया विस्तृत प्रस्ताव प्रस्तुत करें ।

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अन्य कोई मद

अगली बैठक की तारीख तथा स्थान निर्धारण

I N D E X

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Item No. VI-1(31): CONFIRMATION OF THE MINUTES OF THE FIFTH MEETING OF
ENVIRONMENT SUB-GROUP OF NCA

The minutes of the 5th Meeting of the Environment Sub-group of NCA were circulated to all members and invitees vide Letter No.D-34(5)/89/387 dated 3.4.89.

No comments have been received from any member, as such the circulated minutes of the 5th meeting of Environment Sub-group may be confirmed.

Item No. VI-2(33): REVIEW OF THE ACTIVITIES AND STUDIES -STATUS REPORT OF STUDIES AND ACTIVITIES REGARDING THE ENVIRONMENTAL ASPECTS OF SSP AND NSP. JUNE 1989

During 31st meeting of NCA held on 11.4.89 Chairman, NCA desired that a report would be prepared by the NCA Secretariat every month and forwarded to the Ministry of E&F. NCA had prepared status report for the month of April, May & June, 1989. Progress report for the month of June is appended at Annex.1. Further progress made on various aspects of Environment concerns may be indicated by State representatives. Annexure-II shows the criticality of Environmental aspects with reference to the Submergence schedule of SSP as per latest construction programme which would be discussed.

Sub-group may consider in particular those items for which agencies are yet to be identified and Terms of Reference (TOR) to be finalised in consultation with Ministry of E&F. Such items are briefly mentioned below.

Sardar Sarovar Project

1. Anthropological Survey - GOMP has yet to finalise the TOR for anthropological Survey with Rastriya Manava Sangrahalaya in consultation with Ministry of E&F.

2. Flora & Fauna studies - GOMP and GOM have to finalise the TOR with Bombay Natural History Society in consultation with Ministry of E&F.

3. Carrying Capacity of Surrounding Areas

GOMP has not yet identified appropriate agency for carrying out studies needed in SSP impact areas. GOM has not yet indicated the TOR of the study entrusted to the Dy. Conservator of Forest (Wild Life), Pune on carrying capacity of surrounding areas in SSP impact areas of Maharashtra.

4. Fisheries

The TOR regarding surveys and studies of aquatic life of entire SSP area has yet to be finalised with Central Inland Capture Fisheries Research Institute (ICAR), Barrackpore, West Bengal by mutual consultation between the participating States.

Narmada Sagar Project

1. Anthropological Studies:

GOMP has not indicated the progress made regarding finalisation of TOR with Rastriya Manava Sangrahalaya (RMS), Bhopal for anthropological studies in NSP submergence areas.

2. Carrying Capacity of Surrounding Areas:

GOMP has not yet indicated any progress of finalisation of TOR with Friends of Nature Society, Bhopal regarding studies on carrying capacity of surrounding areas under NSP impact areas.

3. Fishries Development:

GOMP was to discuss with Central Inland Capture Fisheries Research Institute for entrusting the work on studies related to aquatic life in NSP areas but no progress has yet been reported.

Item No.VI-3(34) INDEPTH DISCUSSION ON PHASED CATCHMENT AREA TREATMENT

One of the general issue that came up for discussion in the earlier meetings of the Sub-group was regarding sharing of cost of works by party States. As indicated in the minutes of 5th meeting under item No.V-3(23) and minutes of 31st meeting of Narmada Control Authority under Item No.XXXI-7(343), the Ministry of Water Resources is taking action for preparation of paper on the extent of catchment area to be treated at project cost for each project so that this becomes a national guideline. The present position may be indicated by the representative of Ministry of Water Resources.

The progress of studies/implementation on phased catchment area treatment by the State Governments in respect of SSP and NSP is indicated in Status Report regarding Environmental aspects of June '89 is appended at Annex-1. The following information needs to be furnished by the State Governments.

Sardar Sarovar Project

- i) GOMP has to furnish the detailed plan of action, type of treatment proposed yearwise physical and financial targets in respect of the pilot project in the water shed of river Man.
- ii) Progress on studies to be carried out for identification of micro-water sheds needing treatment for areas lying in Maharashtra may be indicated by GOM.

Narmada Sagar Project

- i) The yearwise targets of area to be covered and corresponding outlay and also the present position of preparation of the detailed plan of all the three phases of implementation of the CAT is awaited from GOMP.
- ii) The yearwise progress/programme in respect of both financial and physical targets and achievements for the pilot projects taken up by GOMP in catchments of Datuni and Godapachar needs to be indicated.

The participating States may give a detailed presentation for in-depth discussions on the programme.

Item No VI-4(35) INDEPTH DISCUSSION ON CARRYING CAPACITY OF SURROUNDING AREA

The present position on the studies is indicated in Annexure-I (June, 1989-Status Report) which is briefly mentioned below:

Sardar Sarovar Project

- i) GOMP has yet not identified the appropriate agency for carrying out the studies needed in SSP impact areas lying in Madhya Pradesh.
- ii) GOM has to furnish the TOR of the study entrusted to Dy.Conservator of Forest(Wild Life)Pune, in SSP impact areas lying in Maharashtra.
- iii) GOG has finalised TOR with MS University, Vadodara on 20.3.89 in consultation with Ministry of E&F. Some comments were received from World Bank Mission which visited the State recently. In this connection, it was proposed to seek the advice of Bombay Natural History Society, World Wide Fund for Nature, Madras Nature Park etc. for revision of TOR etc. The present position needs to be indicated by GOG.

Narmada Sagar Project

Progress indicating the finalisation of TOR with Friends of Nature Society, Bhopal for entrusting the studies on carrying capacity of surrounding areas has not been reported by GOMP.

The participating States may give a detailed presentation for in-depth discussion on the studies.

Any other Item

Date and Venue of next meeting

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STATUS REPORT OF STUDIES AND ACTIVITIES REGARDING THE
ENVIRONMENTAL ASPECTS OF SARDAR SAROVAR PROJECT (SSP)
JUNE 1989

At the time of environmental clearance of SSP the Ministry of Environment & Forest stipulated certain conditions for implementation of environmental safeguard measures alongwith the construction of engineering works under the project. Before implementation of these measures, studies were to be carried out by the participating States of Gujarat, Maharashtra and Madhya Pradesh on the various environmental aspects and action plans were to be prepared and submitted to the Ministry of E&F before actual implementation. Similarly, at the time of signing of the agreement with the World Bank by the participating States and the Govt. of India, the Bank also stipulated that "a work plan for the environmental effects anticipated regarding implementation of the project would include suitable training programmes for responsible staff of the participating States, including plans, schedules, syllabi and provision of funds, and studies and implementation therefore, covering fish and fisheries, forest and wildlife and public health aspects and, thereafter, the participating States should implement the approved work plan and training programmes."

2. The present status of studies/preparation of action plan and implementation in respect of environmental safeguard measures is indicated in the following paragraphs in respect of following environmental concerns:-

- (1) Phased catchment treatment.
- (2) Compensatory afforestation
- (3) Command Area Development.
- (4) Archaeological and Anthropological studies.
- (5) Flora and Fauna.
- (6) Carrying capacity of surrounding areas.
- (7) Seismicity and Rim stability of reservoirs.
- (8) Health aspects.
- (9) Fisheries.

3. Phased Catchment Area Treatment

GOMP

The Catchment area of SSP in Madhya Pradesh is 26358 Sq.km. GOMP has entrusted the surveys for preparation of catchment area works to the Govindram Seksaria Institute of Technology and Science, Indore. The institute has so far completed the work of

interpretation of the land-sat data. The remaining work is expected to be completed by the end of June, 1989. Thereafter the work of prioritisation at the sub-watershed level would be undertaken for drawing up the final action plans.

The State has also undertaken the preparation and implementation of a pilot project in about 10000 ha. area in the watershed of the river Mann, a tributary of the Narmada in the Lower Narmada basin zone. The works envisaged under the pilot Project are expected to be completed by 1994.

COMP is to furnish detailed plan of action, type of treatment proposed, yearwise physical and financial targets in respect of pilot project.

GOM

GOM had submitted a preliminary action plan in February '88 which indicated that an area of 40,000 ha. requires intensive treatment. Out of this area, about 7,725 ha is under forest and the remaining is under cultivation. Since the preliminary plan was not based on the detailed survey, the State has now proposed detailed survey which will include study of sedimentation on the basis of the silt analysis and identification of priority micro watershed needing treatment. The State Forest and Agriculture Departments have initiated these studies. The action plan would be prepared after completion of cce study. GOM is to complete the prioritisation work for Catchment Area in Maharashtra state, on the basis of methodology followed by COMP & GOG for which a Joint meeting will be held by the three states.

GOG

A work plan following the recommendations of Dewan Committee was prepared and submitted in 1986. The Catchment area of Sardar Sarovar lying in Gujarat is 423 Sq. Km.(42300 ha). The Catchment area treatment measures have been planned separately for forest area and non-forest area as under:

Forest Area:	31797 ha.(including forest area under submergence)
Non-forest area	5483 ha.
Total:	<hr/> 37190 ha.

Present Status of progress is as under :-

Forest Area

1. 19386 ha have been identified for priority treatment.
2. For 7798 ha. stock mapping survey is being undertaken.
3. A nursery has been set up .

4. The entire work planned to be completed in 5 years from 1987-88.

5. Fence building and Nala bunding planned for 6657 ha.

Implementation

Treatment in Forest areas

Time frame of Catchment Treatment plans is 5 years.

Particulars	Years	Targets	Progress achieved	Remarks
1) Soil and moisture conservation works and afforestation in forest areas in the density less than 0.4	1987-88 1988-89 1989-90 1990-91 1991-92	250 ha. 2000 ha. 2000 ha. 2000 ha. 2001 ha.	250 ha.	Advance works are in progress. Plantation will be done in monsoon.
		8251 ha.		
2) Soil and Moisture conservation works and afforestation in forest areas in density between 0.4 & 0.6	1987-88 1988-89 1989-90 1990-91 1991-92	278 ha. 1050 ha. 1050 ha. 1050 ha. 1050 ha.	278 ha	Advance work are in progress. Plantation will be done in monsoon.
		4478 ha.	-	
3) Fence building and nala plugging in forest areas with density above .6	1987-88 1988-89 1989-90 1990-91 1991-92	1330 1330 1330 1330 1337	700 ha	

Expenditure upto 1988-89 - Rs.71.49 lakhs

Outlay for 1989-90 is Rs.155.0 lakhs

Non-forest Area

Action Plan has been prepared for treatment of 5483 ha as stated below:

i) Contour bunding	1586 ha
ii) Terracing	600 ha
iii) Nala Plugging	100 ha
iv) Pasture development	364 ha
v) Afforestation	2933 ha.

GOG has undertaken thematic mapping of the catchment area of SSP lying in Gujarat State by photo-interpretation of Satellite imageries through ISRO, Ahmedabad. The Catchment

Treatment plans for forest area and non-forest area in the catchment area lying within Gujarat State will be reviewed after the densitywise maps are received from ISRO, Ahmedabad. This work will take 3 to 4 more months, as a few satellite imageries have to be obtained from the French Satellite SPOT.

4. Compensatory Afforestation

GOMP

The State Forest Department has already submitted to the Ministry of E&F the action plan of compensatory afforestation for 8737 ha. covering 6547 ha. of forest land and 2190 ha. of non-forest land. The Ministry of E&F may indicate the present position of its consideration.

GOM

The preliminary plan was submitted by the State Govt. in June, 1988. The total area to be covered would be 19,205 ha of which 6,205 ha are in non-forest land and the remaining area under degraded forest land. In respect of non-forest land the State Forest Deptt. has taken over possession of land from Revenue Deptt. in Akrani Tahsil. Declaration of this as forest land is to be given by the State Govt. A detailed project is being formulated. As regards degraded forest land, suitable proposals for getting the concurrence of the Ministry of E&F are being submitted shortly. Present position is awaited from GOM.

GOG

A work plan prepared and submitted to GOI in 1986 is under implementation.

- i) Total Forest area diverted for the project = 4523 ha.
- ii) Compensatory afforestation is planned for 4650 ha of non-forest land in Kutch District.
- iii) Implementation is spread over a period of 3 years from 1987-88 including advanced preparatory work.
- iv) Reserve fund has been created by GOG and new sub-head for deposit of funds has been sanctioned.
- v) During the 5th Environment Sub-group meeting it was decided that Dr. Sharma, Ministry of E&F, GOI would visit the areas selected for compensatory afforestation to ascertain suitability of lands for plantation work. This has not been done so far. Present position needs to be indicated by Min. of E&F.

vi) The present progress is as under:

- a. Plantation in 500 ha has been completed.
- b. Targetted plantation in ensuing monsoon is 2050 ha.
Advance preparatory works +-progress.
- c. Outlay for 1989-90 is Rs. 143.0 lakhs

Expenditure upto 1988-89 is Rs.23.21 lakhs

A 7 km long PVC pipe line system with pumping arrangement has been installed in one of the Compensatory plantation sites at a cost of Rs.3.55 lakhs for irrigated plantation.

Afforestation Programme in the Dam vicinity has been planned for 235 ha, as follows :

Rainfed Plantation	110 ha
Irrigation Plantation	125 ha

Progress achieved	Plantation done	Advance works in progress
Rainfed Plantation	30 ha	40 ha
Irrigation plantation	5 ha	35 ha

For watering the saplings in the large nursery at Kevadia Colony, a special perfospray system is being installed at a cost of Rs.45,000/-

5. Command Area Development:

GOG

- i) Soil surveys and ground water studies as well as drainage studies have been completed in the command area upto the Mahi river crossing.
- ii) For the areas beyond Mahi river crossing, proposals received from Consultants are under scrutiny.

6. Archaeological and Anthropological Studies:

GOMP

Archaeological Survey

The State Archaeological Department was entrusted the survey work for cataloging the artifacts, monuments etc. The Archaeological Survey of India (ASI) would be responsible for the protected monuments coming under submergence in SEP. The time frame for completing the studies would be reported by Govt. of M.P.

The Archeological Survey of India (ASI) had demanded a certificate about the total submergence of protected national monuments being affected by the submergence. The necessary certificate was issued by the State in January 1988. The monuments were:

- | | |
|--------------------------|------------|
| 1. Sidheswar Temple | Nemawar |
| 2. Joga Fort | Joga |
| 3. Bagi Rao Peshwachatri | Kawarkhadi |
| 4. Choubes Aitar Temple | Mandhata |

A sum of Rs. 3.00 lakhs were placed at the disposal of the A.S.I in 12/1987. The State Department of Archaeology and Museum was allotted a sum of Rs. 7.53 lakhs in 3 instalments.

The joint inspection had been done by ASI Officers & NVDA regarding Sidheswar Temple, Baji Rao Temple on 7.1.89 and Joga fort on 8 & 9 January 1989.

Time frame, physical and financial Targets and the actual progress made expenditure incurred by ASI and State Department of Archaeology is to be reported by State Government.

Anthropological Survey

In view of the recent finding of fossilised hominid skull cap from the Narmada Basin, Archaeological Survey of India (ASI) had decided to form a working group involving institutions like Anthropological Survey of India, A.S.I., Z.S.I., Rashtriya Manav Sangrahalaya (R.M.S) and the concerned state Govt., to decide the plan of action and working modalities. The representative of ASI had a meeting with RMS, wherein it was mentioned that Pre-historic branch of ASI have already carried out exploration survey of about 150 villages and excavated an achulian site at Balwarah village. The State Govt has to expedite finalisation of the TOR for Anthropological survey with Rashtriya Manava Sangrahalaya (RMS). Copies of the finalised TOR may be sent to NCA.

GOM

GOM has stated that only Shoolpaneshwar temple in the border of Maharashtra and Gujarat States, which is the property of Gujarat is coming under submergence. GOG has agreed to relocate the temple which has, however, requested to ascertain the wishes of Maharashtra oustees in the matter of relocation site.

GOG

a) From the list of the protected monuments obtained from Directorate of Archaeology it is seen that no protected monuments are located in submergence area of SSP in Gujarat. However, the Director of Archaeology of GOG has undertaken a inventory survey of 19 vilages coming under submergence of SSP in Gujarat. Report of the survey is likely to be received in 2 months time.

b) There are two ancient temples at Hanfeshwar and Shoolpaneshwar which come under submergence. GOC has reported that sites for these have been finalised in consultation with the Trustee of these temples. Approval of the State Govt. for implementation was awaited.

7. Flora and Fauna Studies:

GOMP

The State has proposed to assign the work to Bombay Natural History Society. The matter was to be discussed with Bombay Natural History Society. GOMP is to make necessary effort to finalise the T.O.R. etc. as reported in the meeting held on 20.6.89 in the NCA office.

GOM

The preliminary plan prepared by the State Forest Deptt., in 1988 was not based on any detailed studies. It was originally envisaged that MS University, Vadodara would carry out the studies for all the three States of Sardar Sarovar submergence area. Since MS University has now declined to take up the study in Maharashtra area, GOM has now proposed to entrust the study to Bombay Natural History Society for which necessary effort is to be made to finalise T.O.R.etc. as requested in the meeting held in NCA Office on 20.6.89.

GOG

This study has been entrusted to M.S. University, Vadodara. TOR has been finalised in the meeting held on 20.3.89 with the officers of Ministry of E&F, Govt. of India. It was agreed that M.S. University will carry out flora/fauna studies in catchment area of project. The study is planned to be completed in two years from 1989-90.

Senior Ecologist of World Bank mission again reviewed the TOR's and suggested a number of changes. The Deptt. of Botony M.S. University has now sent the modified proposal, which is under consideration of GOG.

8. Carrying Capacity of Surrounding Areas

GOMP

GOMP is still in process of identifying the appropriate agency for carrying out the studies needed in SSP impact areas. In the meeting held on 20.6.89 in NCA office, GOMP was requested to expedite the same.

GOM

The State Forest Deptt., has indicated that the area adjoining the reservoir will be capable of absorbing Wild life

which will migrate from the submergence area. This indication needs to be supported by the Studies. GOM has proposed to entrust these studies to the Dy. Conservator of Forests (Wild life), Pune. The T.O.R. as finalised with the Min. of E&F may be sent to NCA.

GOG

As a part of the flora and fauna studies in submergence of SSP in Gujarat entrusted to MS University, Vadodara, phytosociological studies will be conducted in the adjoining forest, which will help in determining the carrying capacity, of forest with a view of assessing impacts of inevitable wild life transfer following the project implementation. Also the measures needed to release the pressure on the carrying capacity of adjoining forest will be suggested. TORs are finalised in the meeting held on 20.3.89 in the Ministry of E&F. This study would cover the submergence area in Gujarat State. In this connection it is proposed to take the advice of institutions like Bombay Natural History Society, World Wide Fund for Nature, Madras Nature Park etc.

Wildlife Conservation Measures

The area of the Sloth Bear Sanctuary, (called Dumkhal Sloth Bear Sanctuary), has been enlarged from 151 Sq.km. to 448 Sq.km. and the extended limits reach upto the Shoreline of the reservoir. This will ensure free access to the water front for the animals. Providing stone wall fencing and other conservation measures such as check dams, habitat improvement measures and firelines have been undertaken in the enlarged Shoolpaneshwar Wildlife Sanctuary to foster the flora and fauna of the area.

The development plans of Shoolpaneshwar Wild life Sanctuary are as under :

- | | |
|----------------------------------|---------------|
| 1. Fencing and Barricades | - 100 KM |
| 2. Habitat Improvement | - 2000 Metres |
| 3. Water Facility | - 8 Nos. |
| 4. Construction of quarters | - 14 Nos. |
| 5. Improvement of communications | - L.S. |

Progress achieved is as under :-

- | | |
|--|----------|
| 1. Fencing | - 3 KM |
| 2. Habitat Improvement
(Fire lines) | - 15 KMS |
| 3. Water facilities Check dams | - 2 Nos. |

Expenditure incurred upto 1988-89 is Rs.2.01 lakhs; outlay for the year 1989-90 is Rs.7.40 lakhs. The plan is phased for completion in 5 years.

Besides this sanctuary adjoining the reservoir area, the following three sancturies are located in the command area of the project.

1. Nal Sarovar - A sweet water lake famous for attracting 120 to 150 species of migratory birds from far off lands.
2. Wild Ass Sanctuary in the Rann of Kachchh.
3. Black Buck Sanctuary at Velavadar.

These sancturies would also benefit from copious sweet water availability in the command area.

9. Seismicity and Rim Stability of Reservoir

Reservoir Induced Seismicity:

GOG have identified locations for instrumentation at 9 stations. GOG has received the concurrence of GOM for release of land for one station located in Shahada in Maharashtra. The representative of GOMP and GOM confirmed that the posting of the staff to man the stations in remote areas in their respective states will be made well in time for the commissioning of the seismological instruments. GOG is implementing the programme for setting up of seismic instruments in Madhya Pradesh also. The progress regarding implementing the programme for setting up of the seismic instruments in Madhya Pradesh is awaited from GOG.

Reservoir Rim Stability:

Geological Survey of India (Nagpur Division) has already started the work in the areas of Maharashtra and Madhya Pradesh and propose to complete in 3 years. GSI has already completed the work in the Gujarat state 3 years ago.

10. Health Aspects:-

GOMP

The State Director of Health Services has conducted detailed surveys during 1982-84 and according to the data collected, diseases like malaria, guinea worm, goiter, gastro-enteritis and worm infections have been found in the districts falling under the submergence area. With the construction of the dam, the incidence of malaria is likely to increase and suitable control measures will have to be adopted by the Health Department. The State Director of Health Services has agreed to monitor at intervals the incidence of water borne diseases and NVDA would keep in touch with the Directorate of Health Services to ensure implementation of preventive measures.

GOM

The preliminary health plan prepared by GOM was examined by Environment Sub-group of NCA. The plan did not cover the villages around the periphery of the reservoir. The State Public Health Deptt. has been asked to revise the plan suitably and submit to Min. of E&F and NCA.

GOG

The work plan has been prepared by the State Health Department in respect of:

i) Surveillance and control of water related and communicable diseases.

Total implementation will take about 17 years time as and where irrigation under the canal system developed. The programme also covers the villages on the periphery of reservoir. Two studies relating to schistosomiasis had been carried out in 1985 by the National Institute of communicable diseases and concluded that there was no risk to the project on account of this. Subsequently a team led by Chief of Schistosomiasis Division WHO, Scientist from British Council London and Environment Advisor, World Bank carried out investigations. The analysis revealed that the project area did not have any risk of Schistosomiasis entering the area. The report (work plan) has been furnished to Min. of E&F & World Bank.

ii) Surveillance and Control of Malaria.

Outlay for 1989-90 is Rs. 7.0 lakhs

The operation of the reservoir itself inhibits the proliferations of malaria larvae, while the reservoir builds up the storage during the monsoon rains, the larvae, which prefer to stay around the periphery, get drowned and thus are destroyed. On the contrary when the water is with drawn for power generation and irrigation the larvae are stranded and destroyed.

11. FisheriesGOMP

The Central Inland Capture Fishery Research Institute (ICAR) Barrackpore, W.B. has been approached to undertake the study of the environmental impacts of the dam on the aquatic life of the middle and lower Narmada Basin. Action to establish a Research-cum-Monitoring Cell at Barwani to undertake pre-impoundment investigations has also been taken by the NVDA. Sanctions for the purchase of apparatus and equipments and the appointment of staff have been issued. The State has, however, suggested that all surveys and studies relating to aquatic life of SSP should be entrusted to a single agency and

TOR should be finalised by mutual consultation between the participating States. GOMP reported that a meeting is proposed on 28.6.89 at Bhopal with Dr. Jhingaran of ICAR. The outcome would be intimated by GOMP.

GOM

A similar study in Maharashtra is proposed to be entrusted to some agency in consultation with the Director of Fisheries of the State Government.

GOG

Central Inland Capture Fisheries Research Institute, Barrackpore, Calcutta (Local Office at Vadodara) has undertaken the studies in respect of aquatic life upstream and down stream of Sardar Sarovar in Narmada River in Gujarat State. Report of the first phase of pre-impoundment survey has been received.

The design plans and estimates for the 10-ha Fish farm and Fish Hatchery complex have been finalised. The plan to be implemented in 9 years includes.

1. Hydrobiological studies
2. Establishment of Fish hatchery and fish farm
3. Training of Fisherman
4. Establishing and assisting primary fishermen's co-operatives
5. Establishing and assisting an Inter-state Fisheries Development Board.
6. Cell at Directorate for monitoring

The outlay proposed for 1989-90 is Rs.42.0 lakhs.

STATUS REPORT OF STUDIES AND ACTIVITIES REGARDING THE
ENVIRONMENTAL ASPECTS OF NARMADA SAGAR PROJECT (NSP)
JUNE, 1989

a) Phased Catchment Area Treatment:

The total Catchment Area of NSP is 61648 Sq.Km divided into 53 watersheds. GOMP has identified 13 high and very high priority watersheds in the vicinity of reservoir covering an area of 11022 Sq.Km (forest 3006 Sq.Km, non-forest 8016) in phase I. Prioritisation at Sub-watershed level in case of 7 out of 13 watersheds covering an area of 2420 Sq.Km has already been completed. Prioritisation exercise in the remaining six watersheds is presently going on. It is expected to be completed by the end of June, 1989. Thereafter detailed treatment plans for the actual affected areas of each watershed will be prepared separately and implemented so as to ensure that it is completed pari-passu with the progress of reservoir impoundment.

A plan for the treatment of the Catchment Area was prepared by the NVDA and submitted to the State Forest Deptt. vide letter No. NVDA/AGRI/42/87/143/3676 dt. 11th Dec. 1987 (Its copy was also sent to the Ministry of Env't. & Forest, GOI enclosed with NVDA letter No. FOR/001/12 dt. 6.2.89). It is estimated that an expenditure of Rs. 124 crore shall be incurred on the treatment of these 13 'very high and high' priority watersheds of phase-I. The year-wise targets of area to be covered and corresponding outlay and also the present position of preparation of the detailed plan of the three phases for implementation of the catchment area treatment is awaited from GOMP.

Based on the Dewan Committee's recommendation of 1985, Pilot studies have been taken up in two catchments namely Datuni and Godapachar. The treatment work of these pilot projects is expected to be completed by the end of 1994. The year-wise progress/programme in respect of both financial and physical targets and achievement needs to be intimated by GOMP.

For implementation of the catchment treatment works in the forest areas 9 compensatory afforestation division already created will also handle the work of catchment treatment works. As regards such works in non-forest area 3 catchment area treatment divisions having 15 sub-divisions have already been created in NVDA by transfer of staff on deputation from the State Agriculture Department. During the current year these staff will undertake preparation of detailed project reports for such works.

b) Compensatory Afforestation:

GOMP has identified 10142 ha of non-forest and 70800 ha of degraded forest land in Dewas, Hoshangabad, Harda and Khandwa forest division for compensatory afforestation. Ministry of E&F raised certain objections regarding size of blocks and distribution of areas. It was indicated that 2000 ha non-forest land has been transferred and 67762 ha degraded forest land was available subject to the approval by Ministry of E&F. A meeting was held in the Ministry of E&F in this regard. The present position may be intimated by the Ministry of E&F.

As regards the progress of afforestation of work, it may be stated that NVDA has already formed nine compensatory afforestation divisions with headquarters at Hoshangabad (one), Harda (one), Khandwa (one), Dewas (two) & Bhopal (one) and two Conservators Circles for the execution, control and supervision of the work.

c) Command Area Development:

GOMP had submitted command area development plan. The project on completion will provide an annual irrigation of 1.69 lakh ha of cropped area over a net C.C.A. of 1.23 lakh ha. The implementation of the plan would be taken up in three phases covering construction of main canal, distribution and drainage system. The proposal for irrigation in Phase-I, Phase-II and Phase-III are to cover an area of 36100 ha, 46800 ha and 40100 ha respectively. Time frame for completion for Phase-I is 10 years from 1988-89. For Phase-II it will start in 1993 and would be completed by 2002-2003. Phase-III would be taken up after completion of the project i.e. in 1977-98 and would be completed by 2006-2007. The detailed project report for CAD would be completed by 1992 and the work will be started by 1993-94. GOMP has to furnish information on command area surveys with year-wise target(both financial and physical) and achievements.

d) Flora and Fauna:

ZSI had completed fauna studies and the report was submitted to Ministry of E&F. Regarding flora studies, GOMP were to finalise the TOR for entrusting the studies to Natural History Society, Bombay in consultation with the Ministry of E&F. A meeting was proposed to be held at Bombay shortly. The present position needs to be indicated by GOMP.

e) Archaeological and Anthropological Studies:

GOMP has indicated that State Archaeological Deptt. and Archaeological Survey of India(ASI) were involved in conducting surveys and listing out monuments affected by submergence. The ASI would be responsible for the survey of 167 villages of Khandwa District while the department of Archaeology, Govt. of M.P. would survey the 48 villages in Hoshangabad district and 39 villages in Dewas district.

The ASI would epute 3 teams to take up the survey of villages which will be completely submerged. GOMP is to furnish the time frame for the studies and also the year-wise financial and physical targets in respect of both ASI and State Department of Archaeology.

The Rashtriya Manav Sangrahalaya(RMS) would support the work in the area of palaeoanthropology including prehistory for effective role in the multi-disciplinary research programme. In this way RMS would be able to acquire the possible human fossil and lithic remains that may be retrieved from the excavation in Narmada Basin. Progress made regarding finalisation of TOR with Rashtriya Manav Sangrahalaya, Bhopal for Anthropological studies is awaited from GOMP.

f) Carrying Capacity of Surrounding Areas

These studies are being entrusted to Friends of Nature Society, Bhopal for which TOR was to be finalised in consultation with Ministry of E&F. GOMP had a meeting with Friends of Natures Society. The present position needs to be indicated by GOMP.

The DFOs shall attend to the compensatory plantations/Compensatory Afforestation works together with the Catchment Area Treatment works within their territorial jurisdictions. Five of these nine DFOs are already in position and the Forest Department is finalising the posting of the remaining DFOs. One conservator and one Chief Conservator have already joined NVDA during May, 1989.

Following plantations in non-forest lands have already been raised by the NVDA during 1987-88 and 1988-89.

1. Limbaditya (near Meheshwar) - 50 ha
2. Maked Kheda (Opposite Maheshwar) - 50 ha
3. Hoshangabad - 10 ha
4. Rudrasegar (near Ujjain) - 22 ha

Total: 132 ha

The field forest divisions already in position had started preparation of plantation sites in the last financial year, and it is hoped that plantations to the extents shown in the following table would be raised in the coming rainy seasons.

(Area in ha)

District	Name of compensatory Afforestation Division	Area prepared for affn./plantation in		
		Degraded forest lands	Non-forest lands	Total
Khandwa	Kaveri	1.833	175	2.008
Khandwa	Chodapachhad	1.119	638	1.757
Hoshangabad	Harda	363	-	363
Dewas	Khatagaon	600	400	600
Total:		3.515	1.213	4.728

Nurseries have been/are being presently established as follows:

1. A two hectare nursery in Comptt. No.126 of Khatagaon Compensatory Afforestation Division of district Dewas.
2. Three nurseries of two hectares each are being established at Mordad, Awaliya-1 and Awaliya-2 in Chodapachhad Compensatory Afforestation Division
3. Two nurseries of two hectares each are also being established in Kaveri Compensatory Afforestation Division one at Panali Comptt. 242 and another at Singhaji.
4. Two nurseries of two hectares each are being established at Mangrol and Khardana of Harda Compensatory Afforestation Division.

g) Seismicity and Rim Stability:

GOMP representative in the last meeting of Environment Sub-group explained that ten instruments have to be set up on the basis of studies carried out by CW&PRS for NSP and Maheshwar. NVDA had proposed the instrument as is being adopted on SSP and fresh bids for the instruments is being called for, which is to be done in consultation with IMD. The present position on seismic instrumentation may be indicated by GOMP.

Regarding rim stability, NVDA promised to furnish detailed report of GSI to the Ministry of E&F. The present position needs to be confirmed by Ministry of E&F and GOMP.

h) Health Aspect:

NCA has forwarded a copy of note on Health Aspects of Narmada Sagar Project given by GOMP on 20.6.89 to the Ministry of E&F for their study and comments. The position needs to be indicated by Ministry of E&F.

i) Fisheries Development:

GOMP has to identify appropriate agency/organisation for the studies regarding migratory routes, breeding places of fish and nutrient flow downstream. GOMP had proposed a meeting on 28.6.89 with Dr. Jhingaran of Central Inland Capture Fishery Research Institute at Bhopal. The present position needs to be indicated by GOMP.

PRESENT STATUS OF STUDIES AND ACTIVITIES ON ENVIRONMENTAL ASPECTS OF SSP

Construction programme (Submergence Schedule)

1. Raised upto RL 93 m - January, 1993
2. Raised upto RL 111 m - June, 1993
3. Complete upto top RL 146.5 m with gates - June, 1995

1. Environmental Aspects

Present status giving the time frame.

How critical it is with respect to construction activities

2.

3.

4.

Phased Catchment Area Treatment

GOMP: Govind Ram Seksaria Institute of Technology & Science, Indore has taken up the work.. This work is expected to be completed by June, 1989. GOMP will furnish detailed action plan. GOMP has already taken up a pilot project in 10,000 ha area, expected to be completed by 1994.

GOM : The State Forest and Agriculture Deptt. has initiated the studies. No final date of completion is committed.

GOG : GOG has undertaken thematic mapping of the catchment area. The studies will be completed by October, 89. Out of 42300 ha, GOG has already planned CAT programme for 37190 ha, to be completed in 5 years from 1987-88.

The filling of the reservoir will not affect this activity. Catchment area treatment work may continue along with the construction of the project.

Compensatory Afforestation

GOMP: The State Forest Deptt. has submitted to Ministry of Environment & Forest the action plan of afforestation for 8737 ha (6547 ha - forest and 2190 ha - non-forest)

GOM : GOM has already identified 19205 ha of forest area. Out of which 6205 ha are in non-forest land and the remaining area under degraded forest land. The concurrence of MOE&F not yet obtained.

GOG : GOG submitted work plan to GOI in 1986 which is under implementation. The implementation is spread over a period of 3 years from 1987-88.

The filling of reservoir does not have direct effect on compensatory afforestation.

1.	2.	3.	4.
3.	Command Area Development	Soil surveys and ground water studies as well as drainage studies have been completed in the command area upto the Mahi River crossing. For the areas beyond Mahi River crossing, proposals received from consultants are under scrutiny.	The work is taken up satisfactorily and to be completed before the actual use of irrigation water in the command area, (1993 to 2009) schedule for canal development.
4.	Archaeological and Anthropological Surveys	<p>GOMP: The State Archaeological Department and ASI have already undertaken the work for cataloging the monuments and artifacts etc. There are 4 protected monuments. Time frame for salvaging the monuments has not been framed.</p> <p>GOMP has to expedite finalisation of TOR for Anthropological survey with 'Rashtriya Manav Sangrahalaya.</p> <p>GOM : There is only one temple (Shoolpaneshwar) in the border of Maharashtra and Gujarat. GOG will take necessary action for relocation of the temple.</p> <p>GOG : The Directorate of Archeology of GOG has undertaken the inventory survey coming under submergence of SSP in Gujarat. Report is expected by August, 1989. There are two ancient temples (Hamfeshwar & Shoolpaneshwar). The sites for relocation of these temples have been finalised. Implementation is awaited.</p>	As the studies are related to the submergence area, the works must be completed before the submergence of the proposed reservoir area.
5.	Flora & Fauna Studies	<p>GOMP: GOMP is to make necessary effort to finalise TOR with Bombay Natural History Society.</p> <p>GOM : GOM has proposed to entrust the studies to Bombay Natural History Society. TOR yet to be finalised.</p> <p>GOG : Work entrusted to MS University, Vadodara. TOR finalised. The studies planned to be completed by 1991-92.</p>	Appropriate action to be taken for relocation of the Flora & Fauna before reservoir is filled up. Hence, the work has to keep pace with the filling of the reservoir.

1.	2.	3.	4.
6.	Carrying capacity of the surrounding areas	<p>GOMP: Agency for carrying out the work is not finalised.</p> <p>GOM : Dy. Conservator of Forests (Wild Life), Pune has taken up the work. TOR to be finalise..</p> <p>GOG : Work entrusted to MS University, Vadodara. TOR finalised.</p>	This study also must be completed and appropriate action must be taken before filling of the reservoir.
7.	Reservoir induced Seismicity	Nine locations have been identified for instrumentation. Work of installation of the equipment is in progress.	Instrumentation has already been done and implemented well in time so that the changes in the seismic behaviour can be monitored during and after completion of the dam and filling of the reservoir.
8.	Reservoir rim stability	Geological Survey of India, Nagpur Division has already started the work. Work in Gujarat area has been completed and rest of the work is expected to be completed in 3 years time.	Reservoir filling has got effects on rim stability of the reservoir. After the completion of the study, appropriate action will be taken, if required, before filling of the reservoir.
9.	Health aspects	<p>GOMP: GOMP has already submitted the work plan on control measures for health aspects.</p> <p>GOM : GOM is preparing the revised health plan for implementation.</p> <p>GOG : Work plan has been prepared by the State Health Deptt.</p>	The appropriate safeguard measures for public health must be taken during and after the filling of the reservoir. An action plan must be finalised with all related studies before starting of the filling of the reservoir.
10.	Fisheries	Central Inland Capture Fishery and Research Instt., Barrackpore, WB is being entrusted for undertaking the studies and surveys related to Aquatic life. TOR to be finalised jointly by the three State Governments.	This study must be completed before filling of the reservoir so that appropriate safeguard measures can be taken for preservation of the aquatic life in the river.

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पर्यावरण उपदल
Environment Sub-Group
छठी बैठक का कार्यवृत्त
Minutes of the Sixth Meeting

7 अगस्त, 1989 को
नई दिल्ली में हुई
Held at New Delhi
7th August. 1989

नई दिल्ली
अगस्त 1989
New Delhi
August, 1989

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Item No.VI-1(32) CONFIRMATION OF THE MINUTES OF THE FIFTH
MEETING OF ENVIRONMENT SUB-GROUP OF NCA

At the outset, the Member Secretary and Member(C),NCA welcomed the new Chairman of the Sub-group and Secretary(E&F) and mentioned that NCA would like to place on record the service rendered by Shri K.P.Geethakrishnan, former Chairman of the Sub-group during the period of his association with the Sub-group.

Shri Mahesh Prasad, Secretary, Ministry of Environment & Forest & Chairman of the Sub-group welcomed the Members and Invitees to the 6th meeting of Environment Sub-group and requested the participants to give the self-introduction. A list of the participating Members and Invitees is enclosed at Annex-VI-Min.1. Since no comments on the minutes of the 5th meeting of the Sub-group were received from any of the Members, the minutes as circulated earlier were confirmed.

Item No VI-2(33) REVIEW OF THE ACTIVITIES AND STUDIES-STATUS
REPORT OF STUDIES AND ACTIVITIES REGARDING
THE ENVIRONMENTAL ASPECTS OF SSP AND NSP
JUNE, 1989

Member(Civil),NCA mentioned that the progress of studies indicated in Annex I of the Agenda and the criticality of environmental aspects listed in Annex. II may be reviewed and the State members may indicate further progress on the various aspects. He also explained that the criticality mentioned in Annexure II was with respect to relocation of such objects which will go under submergence and will have to be rehabilitated before submergence actually takes place, i.e., the action plans for such rehabilitation will have to be closely linked with the submergence schedule according to the revised construction programme. Members expressed that aspects other than those mentioned above are equally important as environmental safeguard measures are to be implemented pari-passu with the construction activities on the main project. The progress on the various aspects was reviewed as under:

1. CATCHMENT AREA PROGRAMME

This has been discussed under separate agenda item No. VI-3(34).

2. COMPENSATORY AFFORESTATION

Sardar Sarovar Project:

GOMP representative stated that NVDA has finalised the organisational set up for implementing the programme. As per the plan sent to the Ministry of E&F, the State has to cover an area of 8737 ha (2190 ha of non-forest land and 6547 ha of degraded forest land). A detailed note giving the progress on the programme is at Annex-VI-Min.2. The cost of implementation of the programme is estimated at Rs.1,600 per hectare.

With regard to NSP, GOMP representative stated that the programme covers 10,143 ha of non-forest land and 70802 ha of forest land. The progress so far is given in Annexure Min.II.

GOG representative stated the afforestation work over 4650 ha of non-forest land in Kutch District (against 4523 ha of diverted forest land in SSP) based on their proposal submitted to the Ministry of E&F in 1986 has been taken up for implementation. It was pointed out that during the 5th meeting of the Environment Sub-group of NCA it was decided that Dr. Sharma from Ministry of E&F would visit the areas selected for compensatory afforestation to ascertain suitability of lands for plantation work. Chairman wanted to know regarding the visit of

Dr. Sharma as proposed earlier. It was informed that Dr. Sharma has been transferred from Delhi and the Chairman would look into the matter.

Shri Shekhar Singh representative of Development Alternatives expressed that the purpose of compensatory afforestation programme for preservation of the environment will be defeated if the afforestation programme is allowed at a distant place like Kutch which is not within the project impact area. Shri Koshy of GOG explained that Kutch is very much within the command area of the Sardar Sarovar irrigation canal system, hence the proposal is justified.

GOM representative stated that an area of 19205 ha of which 6205 ha are non-forest land and the balance under degraded forest land is to be covered. While non-forest land has been taken possession from Revenue department, the case for degraded forest land is yet to be submitted. It was also pointed out that the State wanted some forest land for rehabilitation also. The latter was a major issue for consideration of the extension of SSP credit agreement for Unit-II of Sardar Sarovar project by one year which has been recently agreed to by World Bank. Unless GOM takes urgent action to locate land for rehabilitation and compensatory afforestation and send suitable proposals to Ministry of E&F for clearance, the implementation is likely to be delayed and the World Bank may again raise objection for continuation of the credit. Chairman stated that a telex may be sent by the Ministry of E&F to Chief Secretary, GOM followed by a D.O letter from him to State Chief Secretary for expediting the matter so that the State submits proposals by the end of August, 1989 to the Ministry.

3. COMMAND AREA DEVELOPMENT

Shri Shekhar Singh expressed that since long there is no progress on survey and studies beyond Mahi river crossing on the Narmada Main Canal. This is a vital part of the study to know the actual position on anticipated water logging problem and to identify the remedial measures and needs to be expedited.

Shri Koshy, GOG replied that the proposals received from the Consultants are still under scrutiny and will be finalised shortly.

4. At this stage, the items for which agencies are yet to be identified and Terms of Reference (TOR) to be finalised were discussed by the Sub-group as stated below.

Sardar Sarovar Project

1). Anthropological Survey

GOMP representative stated that earlier it was proposed to entrust the work to Kastriya Manava Sangrahalaya. Detailed

discussions have taken place and the TOR is expected to be finalised by 1st week of September, 1989.

2). Flora and Fauna

GOMP representative stated that Bombay Natural History Society has finally expressed their inability to take up the work for surveys on flora and fauna. Now they are negotiating with Sagar University and State Forest Research Institute for entrusting the survey work and it is expected that the TOR will be finalised by 31st August 1989.

GOM representative agreed to entrust the work for flora and fauna studies for the SSP submergence area in Maharashtra also with the same terms and conditions to the Sagar University and State Forest Research Institute, Madhya Pradesh with the same TOR as finalised by GOMP.

3). Fisheries

GOMP representative stated that NVDA has taken a basin wise approach for the study of pre and post impoundment investigation of the entire Narmada basin and have planned to entrust these studies to following three Universities.

i) Rani Durgavati University, Jabalpur

For Upper Narmada zone, Bargi Reservoir (Post impoundment)

ii) Barkatullah University, Bhopal

Middle Narmada zone, Barna, Tawa, and Kolar Reservoir (Post impoundment)

iii) Vikram University, Ujjain

Lower Narmada zone (pre impoundment survey) Indira Sagar Chotta Tawa, Omkareshwar, Maheshwar and Sardar Sarovar proposed site.

MOU (copy enclosed at Annex-VI-Min.3) have been already signed with Vikram and Baraktullah Universities. The matter is under correspondence with Rani Durgavati University, Jabalpur.

In order to involve the Central Inland Capture Fisheries Research Institute, Barrackpore, a meeting was held at Bhopal on 1.7.89 which was attended by Dr. Jhingran, Director of the aforesaid institute. An approach paper is being prepared by the above institute wherein both short term and long term study programmes would be finalised. The NVIA has also moved the Director General, ICAR to incorporate specific research

programmes in the Narmada basin during 8th Plan.

Narmada Sagar Project

1). Anthropological Studies:

GOMP representative stated that for finalisation of the TOR with Rastriya Manava Sangrahalaya(RMS), Bhopal a meeting has been fixed in the first week of September, 1989 alongwith Shri K.S. Singh, Director General, Anthropological Survey of India.

5. Regarding carrying capacity, separate discussions are noted in Item No.VI-4(35).

Chairman mentioned that copies of TOR finalised may be circulated to Members by NCA and the State Members were requested to send these to NCA and Ministry of E&F as and when they are finalised.

Item No.VI-3(34) INDEPTH DISCUSSION ON PHASED CATCHMENT AREA TREATMENT

Sardar Sarovar Project:

Shri Maharishi, Member(E&F), NVDA stated that the work for surveys for prioritisation is under progress by Govindram Seksaria Institute of Tech.& Science, Indore. The work was expected to be completed by June,1989 but now the institute has taken 3 months extension and the detailed report will be available by September,1989. The action plan for total phased catchment area treatment of the SSP in M.P will be ready by September 1990. A detailed note presented by GOMP is at Annex-VI-Min.4.

2. Shri R.S. Khanna, Vice-Chairman. NVDA stated that the question of charging the cost of the catchment area treatment for SSP on the project has been brought up only in January,1989. The decision on cost of catchment area treatment to be debited to the project is still a open question. It was decided in the earlier 5th meeting of the Sub-group that Ministry of Water Resources will come out with a paper for the formulation of a National policy in this regard but the case is still pending with them. On a query from the Chairman the representative of Ministry of Water Resources (Shri G.E. Bhandari, S.E.(WM), MOWR) stated that only a week back a paper had been received from Central Water Commission and it is under consideration with the MOWR.

3. Dr. Maudgal, Advisor, Ministry of E&F expressed that:

i) A time frame with respect to the construction schedule and the time of filling of the reservoir should be kept in view and within this period the catchment area treatment works must be completed pari-passu with construction activities, otherwise, the engineering works may have to be postponed.

ii) Environment Sub-group had five meetings during the last 2 years but action plans are not yet ready.

4. Shri R.S.Khanna agreed that the catchment area treatment works must be completed ahead of the filling of the reservoir but he didn't agree with the comments of the Ministry of E&F that the progress of work is behind the schedule of construction of the dam. He also stated that as per the Ministry of E&F clearance letter dated 8th September,1987 there was only one condition for preparation of action plans by 30.11.1987 and was not binding on the project authorities to complete the work much ahead, as the Environment clearance of June,1987 letter clearly states that the environmental safeguard measures are to be planned and implemented pari-passu with progress of work on projects. Further in the SSCAC meeting held in May, 1989 it was stated by SSP authorities that the revised construction schedule will be upplied within 3 months i.e. by September, 1989. He further

added that at the time of finalisation of the National Water Policy document, in the meeting of the National Water Resources Council presided over by the Prime Minister held in September, 1987, it was mentioned that the cost of catchment treatment borne by the project need not be included for computation of cost benefit ratio for the project. In this connection, it has to be pointed out that item 4.4 of National Water Policy document finalised did not mention about the charging the cost of catchment treatment to the main project, but only emphasised integrated approach to planning, formulation, clearance and implementation of projects including catchment treatment and command area development.

5. Shri C.K. Koshi, Secretary, GOC stated that the revised construction schedule of SGP will be supplied shortly. He also stated that the question of cost sharing of the catchment treatment programme chargeable to the project must be resolved immediately. In Gujarat, catchment area programme for SGP is being implemented as a part of the normal programme and if this cost is added to the project cost, the BC ratio will have to be re-worked.

6. At this point, Chairman strongly expressed his view that the catchment area treatment works must be implemented in time, no matter where from the fund is provided. Otherwise, Ministry of E&F will have to assert its Authority against the implementation of the project under the relevant Acts. He also felt unhappy about the delay on the part of the Ministry of Water Resources for finalising the paper in respect of the sharing of cost of catchment area treatment works by the project. If these are not implemented in time even after completion of the project, Ministry of E&F will not allow the filling of the reservoir. He said that he would write to Secretary (WR) in the matter to expedite finalisation of the paper by end of August, 1989.

7. Shri Shekhar Singh, representative of Development Alternatives expressed that preparation of the work plan for implementation of the environmental safeguard measures are very important and must keep pace with construction or should be implemented much ahead of the construction schedule of the dams. Studies must be taken up without further delay. Prof. Ramaseshan also expressed that a clear schedule for implementation of catchment area treatment must be prepared and the work to be planned in such a way that it is completed before filling up of the reservoir.

8. Dr. Maudgal stated that Ministry of E&F does not have any construction schedule/schedule for reservoir filling from the project authorities. When the schedule for CAT works from Gujarat, Madhya Pradesh and Maharashtra are settled the construction schedule might have to be revised with respect to the implementation of CAT schedule. Prof. Ramaseshan raised a query that GOMP has just started 3 pilot projects for CAT. These will be completed by 1994 and the reservoir will be filled by 1996. In that case how can GOMP use the experience gained in the

1996. In that case how can GOMP use the experience gained in the pilot projects for implementation of the actual CAT programme and if they utilize how long it will take to complete the entire work. Shri.R.S. Khanna, clarified that the pilot projects are taken in different phases and the experience gained in the initial phases of 2000 ha will be utilised for total catchment area treatment which will also progress concurrently. For example Shri Khanna further explained that they are also experimenting with Khus plantation and Khus nurseries in three pilot projects are being set up.

9. Shri Koshy stated that work plan for Gujarat has already been prepared and submitted in 1986. Gujarat is having a total of 42300 ha area of Narmada catchment, out of which 31700 ha have been planned for forest area and 5485 ha for non-forest area giving a total area of 37190 ha to be treated. Shri Maharishi,VDA wanted clarification about the balance area out of 42300 ha. Shri Koshy stated that actual figures will be supplied by him shortly.

10. GOM representative stated that survey works for about 40000 ha will be completed by the end of October,1989 by the All India Soil and Land Use Survey organisation and preparation of action plan will take another six months. After the above discussions, Chairman gave the following decisions.

i) Ministry of Water Resources will finalise the policy paper on sharing of cost of catchment area treatment by the party States and chargeable to the project by end of August,1989 and circulate to all Central Ministries concerned including Planning Commission. Secretary(E&F) will write to Secretary MOWR to expedite the matter.

ii) GOMP will submit the action plan by September,1990 and completed report of the study by Govindram Seksaria Institute of Science & Technology,Indore by September,1989 in respect of SSP.

iii) GOM will submit action plan by March 1990 and the report of the studies by October,1989 in respect of SSP.

Item No VI-4(35) INDEPTH DISCUSSION ON CARRYING CAPACITY OF
SURROUNDING AREAS

GOG stated that they have already finalised TOR with MS University and entrusted the work as part of the flora and fauna studies. The TOR has been revised keeping in view the comments of the Ministry of E&F., and the comments of World Bank expert.

GOMP stated that they want to entrust the work to Sagar University and State Forest Research Institute with the same TOR finalised between GOG and MS University.

Chairman expressed that as GOM could not find any agency for carrying out these studies, the work for these studies in Maharashtra area of JSP also should be entrusted with Sagar University and State Forest Research Institute, GOMP. For this purpose a firm proposal should come from Government of Maharashtra and GOMP will persue with the institutes for taking up of the work.

Shri Shekhar Singh mentioned that the survey work for carrying capacity itself is a very wide subject and these works should be entrusted to some other organisation instead of overburdening the agencies who are involved in flora and fauna studies. Chairman stated that the nature of studies are more or less same, hence, there is no harm in entrusting the work with the same institute for carrying out both these studies as the number of institutes for undertaking such works are also limited.

Item No VI-5(38) SETTING UP OF AN ENVIRONMENT DEVELOPMENT CENTRE

Starting the discussion Shri R.S. Khanna stated that the object of setting up of such a Centre is not very clear. If it is to set up a data base and standardise the environmental safeguard measures, NCA is already doing such work and the same work may be reorganised to meet the objectives, there is no necessity of setting up of such a separate centre. Prof. Katti and Prof. Ramaseshan in their deliberations explained how and what type of data to be managed by such a centre. They explained that not only the environmental data, but hydrological, hydrometeorological, ground water, socio-economic aspects, vegetation, soil conditions etc. are to be stored in an interactive relational data base. This will help in planning for integrated development of the basin.

After some discussion, it was decided that Prof. Katti and Prof. Ramaseshan would present a joint paper in this regard by middle of October, 1989 for consideration by the Sub-group at its next meeting.

List of Action points arising from the minutes

The list is enclosed at Annex-VI-Min.5 for necessary action.

NEXT MEETING

The next meeting will be held in the first week of November, 1989.

A N N E X E S

Annex No.	Agenda item in which referred to	Page No.
VI-Min.1	VI-1(32)	1-2
VI-Min 2	VI-2(33)	3-12
VI-Min 3	VI-2(33)	13-23
VI-Min 4	VI-3(34)	24-29
VI-Min 5	VI-5(36)	30-32

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LIST OF MEMBERS/INVITEES WHO PARTICIPATED IN THE 6TH MEETING OF ENVIRONMENT SUB-GROUP OF NCA HELD ON 7TH AUGUST, 1989 AT PARYAVARAN BHAWAN, CGO COMPLEX, LODI ROAD, NEW DELHI-110 003.

MEMBERS

1. Shri Mahesh Prasad, Secretary to the Government of India, Ministry of Environment & Forests.
2. Shri R.S. Khanna, Vice-Chairman, NVDA, Government of Madhya Pradesh.
3. Shri Vir Amar Parkash, Executive Member, NCA, Palika Bhawan, R.K.Puram, New Delhi.
4. Shri C.K. Koshy, Secretary, Narmada Development Department, Government of Gujarat.
5. Prof. R.K. Katti, Retd. Prof. of Civil Engineering, IIT, Bombay.
6. Shri Shekhar Singh, Representative, Development Alternative New Delhi.
7. Prof. S. Ramaseshan, I.I.T., Kanpur.
8. Shri N.K. Dikshit, Member (Civil), MCA, Palika Bhawan, R.K.Puram, New Delhi.

INVITEES

9. Shri K.S. Singh, Director General, Anth. Survey of India.
10. Shri C.V. Sarma, Member (Power), NCA.
11. Shri T.N. Maharishi, Member (E&F), NVDA, Government of Madhya Pradesh.
12. Dr. S.C. Maudgal, Advisor, Ministry of E&F, New Delhi.
13. Shri S.M. Pai, Secretary, NCA.
14. Shri T.K. Mukhopadhyay, Specialist (Hydrology), NCA.
15. Shri G.S. Bhandari, Superintending Engineer (WM), MOWR, New Delhi.
16. Shri Gururaja Rao, Specialist (Environment), Govt. of Gujarat.
17. Shri R.S. Nagi, Dy. Secretary (Revenue), Govt. of Maharashtra.

18. Shri D.R. Thapliyal, Chief Conservator of Forest, NVDA, Bhopal.
19. Mrs. Neelam Kapur, Information Officer, MOWR, New Delhi.
20. Shri O.P. Saxena, Dy. Director(Env.), NCA.

JULY 1989

COMPENSATORY AFFORESTATIONINDIRA SAGAR PROJECTGENERAL

1. The Ministry of Environment and Forests, Government of India, vide letter No.8-646/84-FC dated 7th October 1987 accorded approval under Section 2 of the Forest (Conservation) Act, 1980 for the diversion of a total of 41,111.97 ha of forest land for ISP, subject to various conditions (Annexure-I).

2. District-wise details of forest lands that would come under submergence of the Indira Sagar Reservoir are as follows:

(Area in ha)					
District	Forest Division	Total forest area	Legal status of the forest area involved		
			Reserved forests	Protected forests	Unclassed revenue forests
Hosangabad	Harda	3,267	188	3,040	450
Khandwa	Khandwa	32,126	20,692	7,428	4,006
Dewas	Dewas	4,528	3,977	-	551
Total		40,332	24,857	10,468	5,007

3. The forests are southern tropical dry deciduous (Champion and Seth's type Sub-Group 5A) Cla-very dry teak, Clb-dry teak and C3-southern dry mixed deciduous types. The degradation types DS1-dry deciduous scrub and DS2-dry savannah types are also intimately mixed up. Occasionally edaphic types E2-Boswellia and E4-Hardwickia are also met with very occasionally, E9-dry bamboo breaks are also found.

These forests are functionally classified in the respective working plans as follows:

(Area in ha)

Division	Total forest land to be sub-merged	Tree clad area under			Tree less forest area under		
		Teak for-est	Mixed misc. for-est	Total tree clad area	River/ nala beds/ forest villages etc.	Revenue forest	Total tree less area
Harda	3,678	2,087	277	2,364	864	450	1,314
Khandwa	32,126	18,751	4,895	23,646	4,474	4,006	8,480
Dewas	4,528	3,321	5	3,326	651	551	1,202
Total	40,332	24,159	5,177	29,336	5,989	5,007	10,996

4. In addition to the above mentioned 40,332 ha of forest lands that would come under submergence, 779.97 ha of forest lands have further been permitted to be diverted for the construction of a residential colony, the power-house complex, dam-seat, saddle dam, approach roads, etc. Thus a total of 41,111.97 ha of forest lands have been permitted to be utilised for the construction of the ISP.

STATUS OF COMPLIANCE OF THE CONDITIONS OF CLEARANCE :

5. The first condition is that the State Govt. of MP would intimate by 31st December, 1987, complete details of equivalent non-forest lands identified for raising compensatory plantations preferably in the project impact zone. The GOMP, however, could find and identify only about 10,143 ha of non-forest lands in the project impact districts and in a few other neighbouring districts as indicated in the following table :

TABLE

Extent of non-forest lands identified for compensatory afforestation.

District	No. of villages	No. of blocks	Area of blocks		Total area ha
			20 ha and more	Less than 20 ha	
Hoshangabad	20	39	2,649.725	190.843	2,840.568
Khandwa	49	49	2,073.480	240.380	2,313.810
Khargone	38	40	1938.248	-	1,938.248
Dhar	31	31	1,001.531	-	1,001.531
Dewas	33	39	484.061	317.678	801.739
Sehore	27	27	1,247.007	-	1,247.007
Total :	198	235	2,394.032	748.851	10,142.903

6. It may be stated that due to non-availability of non-forest lands it has not been possible to find such lands to the extent required for compensatory afforestation. There was thus a short fall of 30,970 ha of non-forest lands (41112 - 10,142 = 30,970). Recourse therefore, had to be taken to meet the requirement of balance area by identifying lands to double the extent of the balance area in degraded and denuded forest in accordance with condition (ii) of GOI letter of 7.10.87. Accordingly, degraded forest area to the extents indicated below had been identified in Dewas, Hoshangabad, Harda and Khandwa forest divisions:

Forest division	No. of compts	Degraded forest area identified
Hoshangabad	70	9,387.697
Harda	91	13,351.730
Dewas	80	17,491.110
Khandwa	118	30,571.873
Total :	5	70,802.410

7. Thus, in lieu of the balance 30,970 ha of non-forest area a total of 61,940 ha of degraded forest area was required to be identified for compensatory afforestation. As against this, 70,800 ha of degraded forest area has been allocated for compensatory afforestation. It would be seen that this area is in excess of the actual requirement, meet with the requirements of afforestation prescribed under condition (iii), and further to serve as cushion against an eventually undertaking plantation/afforestation work.

8. As per condition (i) read with condition (ii), it was required that the details of land identified be reported to the GOI by 31st December 1987, and that a detailed scheme of plantation and afforestation also be prepared. Accordingly an Action Plan for Compensatory Afforestation was prepared and sent to Govt. of India vide COMP Forest Department No. 5/111/84/10/3 dated 18.11.87. No comments thereon, however, have been received from the Govt. of India despite reminders.

9. Under condition (ii) it had been prescribed that a separate special 'non-voted fund' may be created for meeting with the requirement of compensatory afforestation. Detailed discussions with the Finance and Forest Departments of the State Govt. indicated that such 'non-voted fund' cannot be created by a Govt. Department. The Ministry of Env't. & Forests, therefore had been approached to indicate the procedure for the creation of such a fund. The Ministry, however, has not yet responded.

10. Condition (iv) envisaged that the non-forest lands identified for compensatory plantations will be surveyed, demarcated and declared protected forests. The concerned district Collectors and the Divisional Forest officers have been entrusted with this task. 3147 ha (see Annexure II) of the non-forest areas identified in the above mentioned districts have so far been transferred to the NVDA. These areas have been demarcated, and by and large, have also been enclosed by a cattle-proof trench fencing. Survey work is in progress. As soon as the survey work would be over, action to declare them protected forest shall be taken.

11. As regards the progress of afforestation work, it is stated that nine compensatory afforestation division, one each with headquarters at Harda and Hoshangabad, four with headquarters at Khandwa, two with headquarters at Dewas and one with headquarters at Bhopal, and two Conservators Circles (with headquarters at Khandwa and Bhopal) have been formed for the execution, control and supervision of work.

12. The Compensatory Afforestation DFOs shall attend to both, the compensatory plantations/afforestation and the Catchment Area Treatment works within their territorial jurisdictions. Five of these nine DFOs are already in position and the Forest

Department has already issued posting orders for the remaining DFOs. They, however, have yet to join. One Conservator and one Chief Conservator have also joined in the NVDA during May 1989.

13. Following plantations in the non-forest lands were raised with the NVDA funds during 1987-88 and 1988-89 under the Narmada Shudhikaran Programme.

1.	Limbadiya (near Maheshwar)	-	50 ha.
2.	Maked kheda (Opp. Maheshwar)	-	50 ha.
3.	Hoshangabad	-	10 ha.
4.	Rudrasagar (near Ujjain)	-	22 ha.

TOTAL			132 ha.
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14. Five compensatory afforestation divisions under Narmada Valley Development authority have already started functioning from last financial year. Preparation of afforestation area on 4313 ha of degraded forest lands and 1,650 ha of non-forest lands has already been done. Out of the area so prepared, afforestation work has been carried out in July '89 on 1,229 ha of forest lands and 622 ha of non-forest lands. Apart from this pasture development work on 210 ha of forest lands and 150 ha of non-forest lands has also been done. The details of works done in different divisions is shown in Annexure III.

15. Nurseries for raising planting stock have been/are being established as follows:

1. A two hectare nursery in Comptt No.126 of Khategaon Compensatory Afforestation Division of district Dewas.
2. Three nurseries of two hectares each are being established at Mordad, Awaliya-1 and Awaliya-2 in Ghodapachhad Compensatory Afforestation division.
3. Two nurseries of two hectares each are also being established in Kaveri Compensatory Afforestation division - one at Panali Comptt. 242 and another at Singhaji.
4. Two nurseries of two hectares each are also being established at Mangrol and Khardana of Warda Compensatory Afforestation Division

16. It has been planned that in the year 1989-90 not only the above said eight nurseries of two ha. each would become functional, but also at least 8 more nurseries would be created to meet the massive requirement of planting stock.

17. As per condition (v) the state Govt. were to intimate detail of the non-forest lands identified for the rehabilitation of the non-forest lands identified for the rehabilitation of the oustees and draw up by 15th Dec. 1987, a rehabilitation plan to the satisfaction of the Govt. of India. The plan was submitted to the Ministry of Env't. & forests, GOI under COMP Forest Department letter No.5/111/84/10/3 dated 18.11.87. An additional copy was again submitted with NVDA letter No. FOR/001/12 dated 6.1.1989. The comments received thereon are under examination in the NVDA.

18. As per condition (vii) the Ministry desired that only 50 ha of forest lands should be used for the construction of the Power House. This, however, was a unilateral decision arrived at without reference to the actual requirement of the project. We have moved the Govt. of India to reconsider it and allow us sufficient land as per our minimum absolute requirement.

19. As regards sand quarry and approach roads to sand quarry, we have accepted the directions of the GOI as laid down in condition (Viii).

20. As desired by the Ministry of Env't. & Forests vide condition (is), a Wild-life Committee for the conservation and management of wild-life has been constituted by the State Forest Department vide order No.F-5/111/84/10/3 dated 8th January 1988. A copy of the order issued was duly endorsed to the Ministry of Env't. and Forests.

21. Condition (xi) stipulates that a plan for treatment of the catchment area will be prepared by 15th Dec. 1987 and implemented at the cost of the project. Accordingly, a plan was prepared by the NVDA and submitted to the State Forest Department vide letter No.NVDA/AGRI/42/87/143/3676 dated 11th Dec. 1987. (Its copy was also subsequently sent to the Ministry of Env't. and Forests, GOI vide NVDA letter No.FOR/001/12 dated 6.1.1989). Detailed surveys of the catchment area of ISP have been carried out and a project costing Rs.124 crores, is being implemented at the cost of the Indira Sagar Project.

22. Condition (xii) and (xiii) shall be implemented at the appropriate time. It is premature to expect any progress about those at this time.

23. Condition (xiv) envisages that fuel-wood depots would be setup by the project authorities who would also arrange alternate fuels like coal, kerosine, bio-gas, LPG, electricity, etc., and that the supply shall be free of cost to the labourers and free or at subsidised rates to the other staff as may be determined by the project authorities. Accordingly, one fuel-wood depot was opened at Narmada Nagar during March 1989 with an initial stock of 500 quintals of fire-wood. The fire-wood is being issued to labourers free of cost from this depot as per the directive of the GOI. Alternative fuels like kerosine, LPG and electricity, etc., are also being supplied to the staff and others as per their needs.

24. Condition (xv)-No comments.

25. Condition (xvi) - envisages that the legal status of the forest land will remain unchanged. Where as this condition should be made applicable to the forest lands coming under submergence the Project Authorities feel that it should not have been applied to the forest lands approved to be diverted for the construction of the colony, roads, power-house, dam and lands bearing such other structures for obvious reasons. These lands would remain under the control of the civic and civil authorities and should be administered under the laws applicable to the urban areas rather than under the Indian Forest Act.

26. Condition (Xvii) prescribes that no forest land will be utilised for the rehabilitation of the oustees. The Project Authorities have not used any forest land for the rehabilitation or resettlement of the oustees.

SARDAR SAROVAR PROJECT

27. Compensatory afforestation action plan has been prepared and submitted to the Ministry of Environment and Forests, GOI for approval. Lands identified for afforestation, against the submergence of 2,732 ha MP forest area, are located in the following districts:

District	Forest Division	Forest block	Non-forest area (in ha)	Forest area (in ha)	Remarks
Jhabua	Jhabua	Alirajpur Jhabua Jobat Petlawad etc.	995.000	1990.000	
Dhar	Dhar	Dhar Sardarpur Dhammod etc.	Nil	1083.820	Non forest lands in this distt. are not available hence twice the area involved is identified in degraded forests.
Khargone	Barwani Barwaha	Barwani Rajpur	1194.798 Nil	1083.820 2389.596	-
TOTAL			2189.798	6547.236	8737.034

28. The excess area selected is in accordance with the conditions laid down by GOI in the letter of clearance under Section 2 of the Forest Conservation Act, 1980.

29. Inspite of the fact that the NVDA/State Forest Department has received no comments or directive to start the afforestation work, the NVDA is going ahead with the implementation of the Plan. The organisational set up to undertake the work has already been finalised. The work in Jhabua district has been entrusted to the Jhabua territorial forest division and that of Barwani to the Kaveri forest division of the NVDA. The work in Barwaha will be carried out by the Khategaon forest division of the NVDA. There is no physical progress so far. The project authorities, however, would be in a position to show adequate progress at the end of the current financial year, i.e. active work would commence in the forthcoming open season.

ANNEXURE-IINon-FOREST LANDS TAKEN OVER BY NVDA DFOS BY THE END OF JULY '89

District	Kaveri Dn.	Ghoda P. chhad Dn.	Daulat pur Dn.	Sukha Tawa	Ichhawar Dn.	Total
Sehore	-	-	-	-	48	48
Kharagone	735	-	-	-	-	735
Khandwa	485	1126	-	-	-	1611
Dewas	Nil	Nil	719	-	-	719
Hosangabad	-	-	-	24	-	24
Total	1220	1126	719	24	48	3137

ANNEXURE IIIPROGRESS OF AFFORESTATION WORK (END OF JULY 1989)

	Item of work	Kaveri Dn.	Ghoda Pachhad	Daulat Pur Dn.	Sukh-tawa	Iehha-war Dn.	Total
Preparation of Aff. Area	Forest Lands	2033	1119	300	181	680	4313
	Non-forest Lands	550	700	400	-	-	1650
	Total	2583	1819	700	181	680	5963
Area Planted	Forest Lands	1175	-	44	10	-	1229
	Non-forest Lands	550	68	4	-	-	622
	Total	1725	68	48	10	-	1851
Pasture	Forest	-	200	-	10	-	210
	Non-forest	-	150	-	-	-	150
	Total	-	350	-	10	-	360

MEMORANDUM OF UNDERSTANDING BETWEEN THE NARMADA VALLEY DEVELOPMENT AUTHORITY ACTING ON BEHALF OF GOVERNOR OF MADHYA PRADESH AND THE BARKATULLAH UNIVERSITY, BHOPAL, RANI DURGAVATI UNIVERSITY, JABALPUR AND VIKRAM UNIVERSITY, UJJAIN FOR PRE AND POST IMPOUNDMENT LIMNOLOGICAL STUDIES IN SOME RESERVOIRS OF NARMADA BASIN.

This Memorandum of Understanding has been arrived at between the Narmada Valley Development Authority (acting on behalf of Governor of Madhya Pradesh) on the one hand and the Universities of Bhopal, Jabalpur and Ujjain on the other for conducting pre and post impoundment limnological studies in some reservoirs of Narmada Basin.

BACKGROUND OF STUDIES

2. A number of dams have been and are likely to be constructed in the Narmada Basin, most important upcoming ones being Sardar Sarovar Project in Gujarat and Indira Sagar Project, Omkareshwar Project and Maheshwar Project in Madhya Pradesh. Amongst those already constructed are Barna, Bargi and Tawa. Since such damming projects always bring about environmental, ecological and limnological changes affecting the flora, fauna and the human population in different ways, it is considered necessary to have limnological studies in the pre and post impoundment phases of the projects with a view to assessing and monitoring the good and bad effects of damming on the quality of river water at different stages. These studies would help in the management programme of the multipurpose reservoirs. The proposal thus covers detailed limnological monitoring of pre and post impoundments in the Narmada River (which flows across the State of Madhya Pradesh in East-West direction over a length of more than 1312 kms.) Basin. The studies will provide meaningful information with regard to the maintenance of healthy metabolism in these reservoirs. Since the project zones on the river Narmada in Madhya Pradesh have been divided into the Upper, Central and Lower Zones, the limnological studies have been agreed to be carried out by the University of Jabalpur in the Upper Narmada Zone, by the Barkatullah University, Bhopal in the Central Zone and by the Vikram University, Ujjain in the Lower Narmada Zone. The three Universities will conduct studies on the following reservoirs also in addition to the river stretches where dams are proposed to be constructed.

<u>S.NO.</u>	<u>UNIVERSITY</u>	<u>ADDITIONAL AREAS OF STUDY</u>
1	R.D. University, Jabalpur	Bargi reservoir.
2.	Barkatullah University, Bhopal	Barna, Tawa and Kolar reservoirs.
3.	Vikram University, Ujjain	Pre-impoundment Survey of riverine stretches in the Lower Narmada zone.

OBJECTIVES

3. The following are the main objectives of the study:-
- i) Evaluation of limnological status and fisheries by systematic collection of data from the field from time to time;
 - ii) Assessment of the impact of impoundment on river water quality;
 - iii) Monitoring changes (in selected parameters of importance) indicative of eutrophication and identification of trends; and,
 - iv) Designing corrective measures to curb degradation of the environment.

SCOPE OF STUDIES

4. The studies in the riverine stretches, where the construction of dams are yet to be taken up or where the projects are still in the construction phase, will be termed as pre-impoundment studies. The Vikram University, Ujjain will undertake pre-impoundment studies at the following sites:-

(a) Pre-impoundment Studies:

- i. Punasa Dam site (Indira Sagar)
- ii. Chhota Tawa (Near Harsood)
- iii. Kaveri (Omkareshwar)
- iv. Narmada Ghat (Omkareshwar)
- v. Maheshwar Dam site
- vi.- Sardar Sarovar Reservoir (Three sites).
- vii.

(b) Post-impoundment Studies:

Bhopal and Jabalpur Universities will undertake studies in the following existing reservoirs by fixing suitable observation stations after preliminary surveys:-

- i) Bargi reservoir (Jabalpur University-Upper Zone).
- ii) Barna (Bhopal University - Central Zone).
- iii) Tawa (Bhopal University - Central Zone).
- iv) Kolar reservoir (Bhopal University - Central Zone).

DETAILS OF STUDIES TO BE TAKEN UP

5. With a view to maintaining uniformity and facilitating compilation of the observations, all the three contracting Universities will undertake the studies on the following lines:-

(a) Morphometric Characteristics:

(b) Physico-Chemical Characteristics:

1. Temperature
2. p^H
3. Retention time
4. Density
5. Turbidity
6. Transparency
7. Dissolved solids
8. Suspended solids
9. Depth ranges
10. Dissolved O_2
11. Alkalinity
12. Free CO_2
 CO_2
 HCO_3

13. Conductivity
14. Hardness
15. Chloride
16. Fluoride
17. $\text{PO}_4\text{-p}$
18. $\text{NO}_3\text{-N}$
19. $\text{NO}_2\text{-N}$
20. SiO_2
21. SO_4
22. NO
23. K
24. Mg
25. Fe
26. Mn
27. Ca
28. H_2S
29. BOD
30. COD

(c) Biological Characteristics:

- i) Phytoplankton: Total (standing crop), seasonal and vertical distribution of various groups.
- ii) Chlorophyll 'a' (Phytoplankton biomass).
- iii) Rates of primary production.
- iv) Zooplankton: Standing crops by direct microscopic count.
- v) Benthic flora and fauna: Collected from different parts of the lake, their relationship with other factors and zonation.
- vi) Macrophytic vegetation: Collection, identification, distribution, zonation of dominant macrophytes in different seasons.

vii) Fish production: Fish catch data will be collected, samples will also be collected for identification.

viii) If possible migration routes and growth rate will be estimated by tagging.

ix) Bacteriological studies (SPC & MPN):

Bioassay experiment: will be carried out, as and when required.

The NVDA may delete or modify or include any specific study or parameter at any stage if the situation so warrants and the investigators would be bound by the decision. No additional fee would be payable for any additional parameter or specifications for study.

DURATION OF STUDIES

6. The studies shall be conducted over a period of 3 years from the date of the release of the first instalment of fee to the concerned Universities.

PROCESSING/COMPILATION OF DATA AND SUBMISSION OF REPORT

7. Dr. G.P. Bhatnagar, Professor & Head of Deptt. of Limnology, Barkatullah University, Bhopal will act as the Chief Investigator of the Project and shall compile the quarterly physical and financial progress reports of all the 3 Universities and submit the consolidated report to the NVDA within a month of the expiration of each quarter. The reports would be submitted for the quarters ending June 30, Sept. 30, Dec. 31 and March 31 and shall also incorporate the details of the studies taken up, results obtained and recommendations for corrective action, if any necessary.

8. The investigators of Ujjain and Jabalpur Universities will submit their progress reports to Dr. G.P. Bhatnagar of Barkatullah University, Bhopal with a copy to NVDA within 15 days of the expiry of each quarter.

REMUNERATION

9. The total remuneration payable to the investigators over the period of 3 years for the studies would be the actual expenditure limited to the following ceilings:-

Bhopal University	-	Rs. 9.35 lakhs
Vikram University	-	Rs. 4.94 lakhs
Jabalpur University	-	Rs. 4.61 lakhs
TOTAL	-	<u>Rs. 18.90 lakhs</u>

Details of the estimated expenditure are given in Annexure I to III. Remuneration would be payable to the Investigators through the Registrars of their Universities. The first instalment of the remuneration will be released immediately as soon as possible after signing of this Memorandum of Understanding for meeting expenditure for the first six months and subsequent instalment would be released in six-monthly instalments i.e. twice a year on receipt of satisfactory progress reports for the previous six months but the last instalment shall be paid only after ten copies of the report as finally accepted are presented to NVDA.

OBLIGATIONS OF THE INVESTIGATORS/UNIVERSITIES CONCERNED

- (a) The studies would be conducted as per details enumerated and as per schedule;
- (b) The Principal Investigator and Coordinator of the studies would present to NVDA ten copies of the final consolidated report as accepted by NVDA within 15 days of such acceptance;
- (c) As the remuneration would be for the specific project(s) mutually agreed to be conducted no portion of the amounts thus released would be utilised by the Investigators/Universities on any item not authorised by NVDA;
- (d) The Investigators (including the Principal Investigator) would not seek (and utilise) funds from any other organisation, person or body for those very studies which they have agreed to conduct for the NVDA;
- (e) Any unspent balance of the amounts released by NVDA to the Investigators shall be refunded in cash to NVDA within a month of the conclusion of the period of study;
- (f) The Investigators shall furnish audited statements of accounts of the amounts released to them by NVDA within 2 months of the completion of each period of one year from the date of taking up the study;

- (g) All the assets including equipment and proto-types acquired out of the amounts released to the Investigators by NVDA shall be the property of the NVDA and shall not be disposed off or encumbered or utilized for any purpose other than that for which the amount has been released, without the prior sanction of NVDA in writing. The jeep and boat for the project work, which would be provided to the Principal Investigator by the NVDA, shall remain the property of NVDA but the running and maintenance cost thereof shall be met by the Principal Coordinator from the amount released to him by the NVDA from time to time. At the conclusion of the project, the NVDA shall be free to sell or otherwise dispose off all such assets which would essentially be the property of NVDA.
- (h) The staff that may be employed for the Project by the Investigators/Universities concerned shall be subject to administrative control and service rules of the University concerned and the NVDA shall have nothing to do with them.
- (i) The Investigators of the project shall ensure that the work covered under the proposal is completed to the satisfaction of NVDA and in case the services of Principal Investigator are not available for any reason whatsoever, the Co-Investigator will be responsible to look after the project work and will have to submit the necessary reports from time to time as specified above till the project is completed.
- (j) The Investigators would not be free to make use of any data collected while conducting the studies stipulated, conclusion arrived at after the studies, for publication in any form or through any media or to pass on such information to any person or body without the specific consent, in writing of NVDA.
- (k) In case any of the three contracting Universities namely Jabalpur, Bhopal and Ujjain; fail to initiate the studies as stipulated, within a month of the date of the release of the first instalment of the remuneration, the concerned University shall be liable to refund the amount released to it in this behalf in one instalment to the Narmada Valley Development Authority within two months of the release of the first instalment. In case of their failure to refund the amount the State Government can adopt any legal means for effecting such recoveries.

- (l) In case the Investigators fail at any stage to fulfill their obligations stipulated in this MOU the Universities shall be liable to compensate the NVDA to the extent determined by an Arbitrator who may be appointed by the State Government in this behalf and the decision of such Arbitrator shall be final and binding on all parties concerned.
- (m) The decision of Narmada Valley Development Department, Govt. of Madhya Pradesh on any point of dispute shall be final and binding on all parties concerned.

CONTACT OFFICIALS

11. The Chief Engineer (Environment) and Director of Fisheries, NVDA would be the main contact officials in NVDA who would clarify any point or communicate with the Investigators on behalf of NVDA.

12. Dr. G.P. Bhatnagar, Professor, Department of Limnology, Barkatullah University, Bhopal would be the Principal Coordinator/Principal Investigator for the studies to be conducted by the three contracting Universities.

Signed this

of April, 1989.

(i) For and on behalf of Barkatullah University,

(G.P. Bhatnagar)
Prof. Deptt. of Limnology Registrar
BARKATULLAH UNIVERSITY, BHOPAL

(ii) For and on behalf of Vikram University ,

(K.S. Rao)
Reader in Zoology Registrar
VIKRAM UNIVERSITY, UJJAIN

For and on behalf
of the Governor of
M.P.

(iii) For and on behalf of Rani Durgawati
University.

(P.K. Singhal)
Lecturer in Bio-Sciences Registrar
RANI DURGAWATI UNIVERSITY, JABALPUR

Secretary
Narmada Valley -
Dev. Authority,
Madhya Pradesh.

BUDGET ESTIMATES FOR BHOPAL UNIVERSITY, BHOPAL

S. No.	Head of Expenditure	No.	1st yr. (Rs)	2nd yr. (Rs)	3rd yr. (Rs)	Total (Rs)
A. SALARIES OF STAFF						
1.	Research Associate @ Rs. 2200/- p.m. with annual increment of Rs. 100/-	1	26400	27600	28800	82800
2.	HRA + Medical allowances		4500	4650	4800	13950
2.	Junior Research Fellows @ Rs. 1800/- p.m. with an increment of Rs. 100/- in the Third year.	6	129600	129600	152200	410400
	HRA + Medical allowances		18600	18600	21300	58500
3.	Field Attendant @ Rs. 800/- p.m.	1	9600	9600	9600	28800
4.	H.R.A. + Allowances		2400	2400	2400	7200
4.	Driver	1	12000	12000	12000	36000
5.	Honorarium to Investigators		6000	6000	6000	18000
6.	Chief Investigator	6000	6000	6000	6000	18000
B. CONTINGENCIES						
1.	Chemicals & Glasswares	40000	40000	30000	10000	80000
2.	Stationery, Postage and Report preparation etc.		6000	7000	10000	23000
3.	Photography	2000	2000	2350	3000	7350
4.	Unforeseen expenditure (Repairs, fabrication etc.)		10000	5000	5000	20000
C. TRAVEL						
	(Sampling, Literature consulting etc.)		55000	40000	35000	130000
Total			328100	300800	306900	935800

BUDGET ESTIMATES FOR VIKRAM UNIVERSITY, UJJAIN

S.	Head of Expenditure	No.	1st yr. (Rs)	2nd yr. (Rs)	3rd yr. (Rs)	Total (Rs)
A. SALARIES OF STAFF						
1.	Research Associate @ Rs. 2200/- p.m. with annual Increment of Rs. 100/-.	1	26400	27600	28800	82800
	HRA + Medical allowances		4500	4650	4800	13950
2.	Junior Research Fellows @ Rs. 1800/- p.m. with an Increment of Rs. 300/- in third year.	2	43200	43200	50400	136800
	HRA + Medical		7800	7800	8700	24300
3.	Field Attendant @ Rs. 800 p.m.	1	9600	9600	9600	28800
	HRA + Medical allowances	2	2400	2400	2400	7200
4.	Honorarium to Investigators		6000	6000	6000	18000
B. CONTINGENCIES						
1.	Chemicals and Glasswares		20000	20000	10000	50000
2.	Stationary, Postage & Report preparation		3000	3000	5000	11000
3.	Photography		1500	1500	1500	4500
4.	Unforeseen expenditure		5000	3650	3000	11650
C. TRAVEL						
			40000	40000	25000	105000
Grand total			169400	169400	153200	494000

BUDGET ESTIMATES FOR RANI DURGAWATI UNIVERSITY, JABALPUR

S. No.	Head of expenditure	No.	1st yr. (Rs)	2nd yr. (Rs)	3rd yr. (Rs)	Total (Rs)
A.	SALARIES OF STAFF					
1.	Research Associates @ Rs. 2200/- p.m. with annual increment of Rs. 100/-.	1	26400	27600	28800	82800
2.	Junior Research Fellows @ Rs. 1800/- p.m. 1st and 2nd year and Rs. 2100/- p.m. in 3rd year.	2	43200	45600	48000	136800
	HRA + Medical allowances HRA @ 12.5%, Medical allowances @ Rs. 100/- p.m.		12100	12750	13200	38050
3.	Field Attendant @ Rs. 800/- p.m.	1	9600	10200	10800	30600
	HRA + Medical allowances		2400	2475	2550	7425
4.	Honorarium to Investigators		6000	6000	6000	18000
B.	CONTINGENCIES					
1.	Chemicals & Glasswares		40000	30000	10000	80000
2.	Stationary, Postage and Report preparation etc.		5000	5000	4000	14000
3.	Photography		1000	1000	1000	3000
4.	Unforeseen expenditure (Repairs, fabrication etc.)		4000	4000	2000	10000
C.	TRAVEL (Sampling Literature consultation etc.)		15000	15000	10000	40000
	Grand total		164700	159625	136350	460675

CATCHMENT AREA ATTREATMENT

GENERAL

The Narmada river drains a total catchment area of 98,796 sq. km. up to its confluence with the Arabian Sea, of which the largest part 85,859 sq. km. is in Madhya Pradesh. The catchment area of the Narmada in Maharashtra and Gujarat States is 1,538 and 11,399 sq. km. respectively.

2. On the basis of a decision taken by the Planning Commission in 1984, an Inter-Departmental Committee was constituted to examine the present condition of the catchment and to suggest soil conservation and afforestation measures to protect and maintain the health of the catchment. The Committee recommended that the treatment measures may have to be taken in the entire catchment upto Sardar Sarovar Project (SSP) covering the common catchment of both the Narmada Sagar and the Sardar Sarovar Projects. The Committee also recommended short-term treatment measures to be taken up after identifying the critical areas upstream of these projects so that this work is completed in tandem with, if not paripassu with, the completion of the two projects. The first phase was to cover free draining areas excluding the areas intercepted by major, medium and minor projects already in existence or under implementation. The cost of this treatment was estimated at Rs. 515 crores. In the long term, it was estimated that about 42 per cent of the total area covering the individual catchments of the various projects shall have to be treated at the total investment of Rs. 1,392 crores.

INDIRA SAGAR PROJECT: (M.P.)

3. The total area of the Narmada catchment above the Indira Sagar Project (ISP) dam is estimated at 61,648 sq. kms. This area is covered in 82 watersheds. However, a major dam on the main stem of the river at Bargi has already been constructed. Since this dam would effectively intercept all the water coming from within its own catchment and act as silt trap for that part of the catchment, no coarse ingradients of the silt are liable to get across it to shorten the life of the ISP reservoir. For the protection of the interests of the ISP reservoir, therefore, it has not been considered incumbent to deal with the catchment upstream of Bargi dam. The catchment area above the Bargi dam is comprised in 29 watersheds and is estimated to be 14,589 sq. km. The catchment area between the Bargi dam and the ISP dam thus works out to $(61,648 - 14,559) = 47,089$ sq. km, comprised in 53 watersheds. The ISP authorities are required to take care of these 47,089 sq. km of the catchment only.

4. Now because a number of dams (e.g. the Tawa, the Barna, the Kolar, the Sukta etc.) have also been constructed on the tributaries of the Narmada upstream of the ISP dam, the treamtment of the catchment of these projects as also of the several other minor dams can also be ignored to work out the net

area that should be given attention to for ensuring the longevity of the ISP reservoir. The catchment area draining free into the ISP reservoir, i.e., after ignoring the areas intercepted by all the tributary (major, medium and minor) dams already constructed upstream of the ISP, thus works out to 24,587 sq. kms. Nevertheless, the entire catchment area of the ISP lying below the Bargi dam has now been surveyed in details with the help of multi-dated, multi-spectral thematic-mapper data on the scale 1:250,000 by involving agencies like the All India Soil and Land Use Survey, New Delhi (AISLUS), the Space Application Centre, Ahmedabad (SAC), the Madhya Pradesh Council of Science and Technology (MAPCOST), Bhopal and the Madhya Pradesh Agriculture Department. Of course, the independent catchments of the tributaries of the Tawa, the Kolar, the Barna and the Sukta upto the points where dams are already constructed have not been included.

5. It has been found that out of the 53 watersheds having 39,000 sq. km area, just about 21, watersheds covering 15,049 sq. km come under the categories "very high" and "high" priority, i.e. these watersheds have "high" or "very high" intensities of erosion. Out of these 21 watersheds, 7 watersheds are located for upstream of the rim of the ISP reservoir, and therefore, would not be contributing substantial silt load immediately to the ISP reservoir. Therefore, it is proposed to treat these 7 priority ranking watersheds in the second phase of catchment area treatment. Out of the balance 14 watersheds, one lies totally in the command of the Tawa project. Since the treatment of this watershed from soil and water conservation point of view is to be attended to by the Command Area Development Authority of the Tawa dam, it has been considered appropriate to leave it also out of consideration from the ISP reservoir point of view. We are thus left with 13 watersheds of "very high" and "high" priority categories which are in immediate need of catchment area treatment. The free draining area to be treated in Phase I, therefore in these 13 watersheds is 11,022 sq. km.

6. The break-up of these 11,022 sq. km. into forest and non-forest areas is 3,00,673 ha and 8,01,567 ha respectively. The area of these "very high" and "high" priority watersheds to be treated in Phase I has been arrived at on the basis of data obtained through prioritization at sub-watershed level of 7 out of the 13 "very high" and "high" priority watersheds. Although this estimate is based on the trend indicated by the detailed data of 7 fully surveyed watersheds at sub-watershed level, but the prioritization exercise in the remaining six watersheds is progressing, and when completed, would provide the actual figures for all the 13 watersheds.

7. It is estimated that an expenditure of Rs. 124 crores shall be incurred on the treatment of these 13 "very high" and "high" priority watersheds of Phase I. The estimated area expected to be in need of the catchment area treatment in Phase I, duly split into forest and non-forest areas, has worked out to 66,000 ha and 1,76,000 ha respectively.

8. As already indicated, prioritization at sub-watershed level in case of 7 out of the 13 watersheds has already been done. Prioritization work at sub-watersheds level in the remaining six watersheds is presently going on. It is expected to be completed by the end of September, 1989. Thereafter a detailed separate treatment plan for the actual affected area of each watershed will be prepared and implemented so as to ensure that it is completed with the progress of the reservoir impoundment.

9. Apart from undertaking protective measures of soil and water conservation in the "very high" and "high" priority sub-watersheds, it is proposed to take to simple vegetative contour bunding in a big way and to adopt extension measures so as to ensure that the cultivators form the habit of contour cultivation. It is proposed to attempt this in the medium priority areas to begin with and this would extend to about 2.6 lakh hectares.

10. For the implementation of the catchment area treatment plans in non-forest parts of the prioritised areas of the 13 watersheds of Phase I, three catchment area treatment divisions, having 15 sub-divisions, have already been created by obtaining staff on deputation from the State Agriculture Department. As most of this staff is in position, and those who have not yet joined are likely to be in position by the end of August, 1989, the project is now poised during the year 1989-90 to undertake preparation of detailed project reports. The work in the forest area would be handled by the 9 compensatory afforestation divisions already created, five of which are now in position and the remaining four are also expected to come into existence shortly, that is, as soon as the staff by the State Forest Department is made available.

11. In addition to the commencement of catchment area treatment works, for which plans as stated above are already under preparation, the Project Authorities have also undertaken the preparation and implementation of 4 pilot Projects of about 10,000 ha area each in districts Khandwa (Shodapachhar), Dewas (Datuni) and Dhar (on river Man) the last named in the Sardar Sarovar Project part of the catchment, i.e. down stream of the ISP catchment. These pilot projects would provide necessary experience and information regarding the characteristics of the watersheds in the Narmada Basin so that effective treatment measures are designed. Work in these pilot projects is going on in full swing. The treatment work of these 3 Pilot projects will be finished by the end of 1994.

**STATEMENT SHOWING THE PHYSICAL AND FINANCIAL PROGRESS
FOR THE YEAR 1988-89 & 1989-90**

(ending 30th June, 1989)

Name of Pilot Project

S. No. Name of work Ghorapachhar Datuni Man Remarks

PHYSICAL PROGRESS

1.	Contour survey			
	1988-89	4131.610 ha	2246.190 ha	1703.397 ha
	19889-90	1855.110 ha	12.00 ha	1102.912 ha
	(ending 30th June, 1989)			

Total 5986.720 ha 2258.190 ha 2806.209 ha

2.	Gully survey			
	1988-89		65575	30560
	1989-90	106.297	3700	94452
	(ending 30th June, 1989)			

Total 106.297 Rmt. 69275 Rmt. 125012 Rmt.

FINANCIAL PROGRESS

1.	Contour survey			
	1988-89	47,393	31,201	26,111
	1989-90 (Ending 30th June, 1989)	37,770	180	16,615

Total Rs. 65,163 Rs. 31,381 Rs. 42,726

2.	Gully survey			
	1988-89		9,930	2,585
	1989-90 (Ending 30th June, 1989)	17,910	675	7,303

Total Rs. 17,910 Rs. 10,614 Rs. 9,888

Soil survey:

Soil surveys have been completed in all the three Pilot Projects.

Apart from the above, 1,079 ha non-forest area in Kannod, Khategaon and Nasrulla, Ganj Soil Conservation Sub-division has been covered under topographic surveys, of which about 800 ha area would also be covered under vegetative bunding programme during the current monsoon season.

SARDAR SAROVAR PROJECT (Madhya Pradesh part)

12. The total catchment area that shall drain through Sardar Sarovar dam would be around 88,000 sq. km. The break-up is as follows:

In Madhya Pradesh	85,916 sq km.
In Maharashtra	1,538 sq km.
In Gujarat	603 sq km.

13. However, the catchment lying between Narmada Sagar and Sardar Sarovar dams would be required to be treated to prevent premature siltation of Sardar Sarovar. This indeed would be the catchment area between the ISP and the SSP which is estimated to be around 24,200 sq km. in MP. An action Plan for the treatment of this area was drawn up in 1985 and submitted to the Ministry of Environment and Forests, Govt. of India for perusal and further necessary action. A copy of that plan was also sent to the Sardar Sarovar Authorities, Govt. of Gujarat with the request to make necessary funds available for its implementation. However, the Sardar Sarovar Authorities did not agree to share the cost of treatment of the catchment area lying in MP territory. The matter had, therefore, to be brought to the notice of the Ministry of Water Resources and the Ministry of Environment and Forests, Govt. of India for resolving the issue. The Ministry of Environment and Forests have now ordered (vide letter NO. 8-372/83-FC dated 6th Jan., 1989) that the catchment area treatment works shall be implemented at the cost of the project. Madhya Pradesh has thus been assured that it would be properly reimbursed the cost of this work.

14. The Narmada Valley Development Authority (NVDA) has entrusted the survey work of watershed prioritization of the catchment of the Sardar Sarovar lying down stream of ISP in all the three States to the Govindram Seksaria Institute of Technology and Sciences, Indore (GSITS). This Institute, by now, has completed the work of interpretation of the land-sat data. Joint discussions among collaborating agencies with a view to finalise the findings are in progress. The final report is expected by 30th September, 1989. Thereafter, the work of prioritization at sub-watershed level would be undertaken and final action plans drawn up.

15. Apart from the aforementioned prioritization survey, and as has already been mentioned above under the ISP, the NVDA has undertaken the preparation and implementation of a Pilot Project also in about 10,000 ha area in the watershed of the river Man, a

केवल सरकारी प्रयोग के लिए
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नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल
Environment Sub-Group
सातवीं बैठक की कार्यसूची
Agenda for Seventh Meeting

स्थान : पर्यावरण भवन नई दिल्ली
Venue : Paryavaran Bhawan New Delhi

दिनांक : 19 दिसम्बर, 1989
Date : 19th Dec., 1989

नई दिल्ली
दिसम्बर, 1989

New Delhi
December, 1989

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Item No. VII-1(37): CONFIRMATION OF THE MINUTES OF THE 6TH MEETING OF ENVIRONMENT SUB-GROUP.

The minutes of the 6th meeting of Environment Sub-group of NCA were circulated to all members and invitees vide letter No. D-34(6)/89/1191 dated 21.8.1989.

Comments received from Shri Shekhar Singh, Indian Institute of Public Administration are placed at Annex-1.

Item No. VII-2(38) - REHABILITATION MASTER PLAN

GOM had submitted a proposal in December, 1988 for diversion of about 2583 ha of forest land for the rehabilitation of oustees of SSP. This matter was discussed in the 5th meeting of the Environment Sub-group held on 7th March, 1989 and subsequently also in the 6th meeting of Environment Sub-group in August, 1989. It was decided by the Chairman of the Sub-group that the State should submit the detailed proposal by the end of August, 1989 to the Ministry for its consideration. A telex to the Chief Secretary followed by the D.O. letter from Secretary, E&F was also sent in this regard. Secretary, Ministry of Water Resources has also sent a DO letter to the Chief Secretary of Maharashtra on October 20th, 1989, copy enclosed at Annex-2.

GOM in their DO letter dated 10th November, 1989 to the Secretary, E&F requested for diversion of 2583 ha of forest land. This letter is placed at Annex-3. The findings of field survey are that barely 156.50 from 6205 ha of non-forest land and 104 ha from 13,000 ha denuded and degraded forest land will be available and that too in a scattered manner. Maps on the basis of remote sensing data are under preparation and would be submitted when ready.

Ministry of E&F may indicate their views.

Item No. VII-3(39) - PHASED CATCHMENT AREA TREATMENT

Sharing of cost of catchment treatment of SSP by Party States

In the last meeting of the Sub-group., it was decided that Ministry of Water Resources would finalise the policy paper for sharing of cost of catchment treatment and chargeable to the project by 31.8.1989 and will circulate the same to all the Central Ministries concerned including Planning Commission. Secretary (E&F) has already written a DO letter to the Secretary, Water Resources on 10.8.1989. The present position may be intimated by the representative of MOWR.

/// The present status of studies and activities and various environmental aspects of SSP and NSP is indicated in the Annex-3.

Annex - IX - 3

NARMADA SAGAR PROJECTGovernment of Madhya Pradesh

June, 1990

The progress of work undertaken so far is indicated in the status report of October, 1989 at Annex-3. Further progress made in implementation may be indicated.

Two pilot studies in Datuni and Godapachar have been undertaken as a part of the programme. GOMP was requested to send a detailed write up on the pilot studies giving the year-wise programme of financial and physical targets and achievements together with a detailed map of the area. The note would cover the type of programme attempted in the pilot studies. These may be supplied by the State Government and the present position may be indicated.

SARDAR SAROVAR PROJECTGovt. of Madhya Pradesh

The present position regarding completion of the studies by Govindram Seksaria Institute of Technology and Science (GSITS) which was to be completed by September, 1989 may be indicated together with the position regarding preparation of action plan. The State has also undertaken the preparation and implementation of Pilot Project in the water shed of the river Mann. The State Government was requested to furnish detailed plan of action, type of treatment proposed, year-wise physical and financial target in this respect. The present position needs to be indicated by GOMP.

Govt. of Gujarat

The work plan submitted by GOG is under implementation. Catchment Area Treatment measures have been planned separately for forest area and non-forest area in the catchment lying within the Gujarat State. These plans were to be reviewed after the density-wise maps are received from ISRO, Ahmedabad. GOG may indicate the present position.

Govt. of Maharashtra

GOM was to plan the prioritisation work for catchment area in Maharashtra State on the basis of methodology followed by GOMP. It was reported that survey work for about 40,000 ha would be completed by the end of October, 1989 by the All India Soil and Land Use Survey Organisation. The present position may be indicated by GOMP.

Item No.VII-4(40) - COMPENSATORY AFFORESTATION

Narmada Sagar Project

GOMP has identified 10143 ha of non-forest and 70800 ha of degraded forest land. It was indicated that 2000 ha non-forest land has been transferred and 67762 ha degraded forest land was available subject to the approval by the Ministry of E&F. A meeting was held in the Ministry of E&F in this regard. The present position may be intimated by MOE&F.

NVDA has set up nine compensatory afforestation divisions and two conservator circles for the execution, control and supervision of the work. Five of these nine DFOs are already in position and one conservator and one Chief Conservator have already joined NVDA during May, 1989. Plantation has been raised in 132 ha of non-forest area. The afforestation work in July, 1989 was carried out on 1229 ha of forest and 622 ha of non-forest land. Pasture development work on 219 ha of forest land and 150 ha of non-forest land has been done. Further progress may be indicated by GOMP.

Sardar Sarovar ProjectGovt. of Madhya Pradesh

The State Forest Department has already submitted to the MOE&F the action plan of compensatory afforestation for 8737 ha covering 6547 ha of forest land and 2190 ha of non-forest land. The MOE&F may indicate the present position of its consideration.

Govt. of Gujarat

The work plan submitted by GOI in 1986 is under implementation. During the 5th meeting of Sub-group held in March, 1989, it was decided that an officer of MOE&F would visit the area selected to ascertain suitability for plantation. In the 6th meeting of the Sub-group, Chairman agreed to look into the matter. The present position may be indicated by MOE&F.

Govt. of Maharashtra

GOM was to send suitable proposals for utilisation of degraded forest land for the purpose by the end of August, 1989. The present position may be indicated.

Item No. VII-5(41) - COMMAND AREA DEVELOPMENT

Narmada Sagar Project

GOMP was to furnish information on command area surveys with year-wise targets (both financial and physical) and achievements. The present position may be indicated.

Sardar Sarovar Project

In the earlfier meeting, GOG indicated that proposals for the areas beyond Mahi river had been received from the consultants and were under scrutiny. The present position may be indicated.

Item No. VII-6(42) - SURVEY OF FLORA AND FAUNA AND ARCHAEOLOGICAL STUDIES

Narmada Sagar Project

Zoological Survey of India had completed fauna studies and the report was submitted to Ministry of E&F. MOE&F observed the report to be too sketchy. NVDA had approached the Wildlife Institute, Dehradun to take up this study. The present position regarding finalisation of TOR etc. is to be indicated by GOMP.

Archaeological Studies

State Archaeological Deptt. and Archaeological Survey of India (ASI) are involved in conducting the surveys and listing out monuments affected by submergence. GOMP may furnish the time frame for the studies and also the year-wise financial and physical targets in respect of both ASI and State Department of Archaeology.

Anthropological Survey

GOMP representative stated that for finalisation of TOR with Rashtriya Manava Sangrahalaya (RMS), a meeting was arranged in the 1st week of September, alongwith the Director General, Anthropological Survey of India. The present position in this regard may be indicated.

Sardar Sarovar Project

Flora and Fauna

GOMP stated that TOR for survey of flora and fauna in SSP submergence with Sagar University and State Forest Research Institute would be finalised by 31st August, 1989. The present position may be indicated.

GOM was to entrust such studies to Sagar University and State Forest Research Institute, Madhya Pradesh with the same TOR as finalised by GOMP. Further progress needs to be indicated.

A copy of TOR for Eco-environmental and Wildlife Management Studies incorporating the suggestions of World Bank and Ministry of E&F is placed at Annex-5. Members may like to discuss.

Archaeological Studies

GOMP stated that archaeological surveys have been undertaken by State Archaeological Department and ASI. The time frame for completion of the studies was to be intimated. The present position would be discussed.

GOM has stated that only Shoolpaneshwar temple at the border of Maharashtra and Gujarat is coming under submergence. GOG has agreed to relocate the temple ascertaining the wishes of Maharashtra oustees.

GOG representative indicated in the 5th meeting of Environment Sub-group that Director of Archaeology of GOG has undertaken a inventory survey of 19 villages coming under submergence of SSP in Gujarat. Report of the survey was expected in two months. It was reported that sites for relocation of two ancient temples at Hamfeshwar and Shoolpaneshwar have been finalised in consultation with the trustees of these temples. Approval of the State Govt. for implementation was awaited. Present position may be indicated.

Anthropological studies

GOMP

TOR for survey was to be finalised with Rashtriya Manav Sanghralayas, Bhopal, by 1st week of Septemfber, 1989. The present position needs to be indicated.

Item No. VII-7(43) - CARRYING CAPACITY OF SURROUNDING AREAS

Narmada Sagar Project

GOMP

In the earlier meeting, GOMP stated that they wanted to entrust the work to Sagar University and State Forest Research Institute. The present position may be intimated.

Sardar Sarovar Project

GOMP

GOMP was to entrust the work to Sagar University and State Forest Research Institute with the same TOR finalised by GOG with MS University Baroda. The present position may be discussed.

GOM

In the 6th meeting of Environment Sub-group, Chairman suggested that similar study could be entrusted to the same institute. For this, firm proposal should come from GOM and GOMP would pursue with the institutes for taking up the work. Further progress may be reported.

GOG

GOG stated that they have already finalised TOR with MS University and entrusted the work as part of the flora and fauna studies. The copy of the revised tor is placed at Annex-5.

Item No. VII-8(44) - SEISMICITY AND RIM STABILITY OF RESERVOIR

A. Reservoir Induced Seismicity

NARMADA SAGAR PROJECT

GOMP was to process the case of import of seismicity instruments as has been done by GOG for SSP. The present position needs to be indicated.

SARDAR SAROVAR PROJECT

GOG has identified location for instrumentation at nine stations in the States of Gujarat, Maharashtra and Madhya Pradesh. They have received the concurrence of GOM for release of land for one station located in Shahada in Maharashtra. GOG is implementing the programme for setting up of seismic instruments in MP also for which the progress has to be indicated.

Regarding posting of necessary staff for seismological station in the respective State, it was informed by GOMP that the action to recruit staff was on hand and the staff is expected to be made available in two months' time. Present position may be indicated.

GOM stated that staff is being obtained from Maharashtra Engineering Research Institute (MERI). The construction of building was to be completed within two months' time. The present position may be indicated.

B. Reservoir Rim Stability

NARMADA SAGAR PROJECT

GOMP was to furnish a copy of the detailed report of GSI to Ministry of E&F for comments. The present position would be discussed.

SARDAR SAROVAR PROJECT

GSI has already stated the work in the areas of Maharashtra and Madhya Pradesh. GOG may like to indicate the progress made so far and the likely date of completion of the work.

Item No.VII-9(45) - HEALTH ASPECTS

Naramda Sagar Project

The comments of Ministry of E&F on the note submitted by GOMP were conveyed to the State Govt. for modifying the report. The present position may be indicated by GOMP.

Sardar Sarovar Project

In the 6th meeting of Sub-group, Chairman desired that the State representatives of GOG, GOM and GOMP should send complete details of the action plan for the prevention and control of water borne and communicable diseases including preliminary screening of labour force. The State Governments may report the present position in this regard.

Further progress on the position indicated in the status report of October, 1989 at Annex-4 may also be indicated.

Item No. VII-10(46) - FISHERIES DEVELOPMENT IN SSP/NSP RESERVOIR

Narmada Sagar Project and Sardar Sarovar ProjectGovt. of Madhya Pradesh

It was intimated by the GOMP representative in the 6th meeting that they have planned to entrust these studies to the three Universities namely Rani Durgawati University, Jabalpur, Barkatulha University, Bhopal and Vikram University, Ujjain. The memorandum of Understanding was signed with Vikram and Barkatulha University and the matter was under correspondence with Rani Durgawati University, Jabalpur and an approach paper was being prepared by the above institutes. The NVDA has also moved the Director General, ICAR to incorporate specific research programme in the Narmada Basin during the 8th Plan. Further progress in the matter may please be indicated.

Govt. of Maharashtra

GOM was to find out the agency in consultation with the Director of Fisheries of the State Government to carry out such study in Maharashtra. The present position is to be intimated.

Govt. of Gujarat

Central Inland Capture Fisheries Researchs Institute (Baroda office) has undertaken the studies in respect of aquatic life upstream and down stream of Sardar Sarovar on Narmada River in Gujarat State. The outlay proposed for 1989-1990 is Rs. 42 lakhs. The plan of implementation is spread for nine years. A short note on the action taken so far is appended at Annex-6. This would be discussed.

Item No. VII-11(47) - SETTING UP OF AN ENVIRONMENT DEVELOPMENT
CENTRE

In the last meeting of Sub-group, it was decided that Prof. Katti and Prof. Ramaseshan would prepare a joint paper in this regard by middle of October, 1989 for consideration by the Sub-group at its next meeting. Prof. Katti has intimated that he has started work on the paper. The present position may be intimated by them.

Any other item

Date and Venue of next meeting

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Annex-6	Item VII-10(46)	35-39

ANNEX.1

दूरभाष : 3317309 (9 लाइन)



भारतीय लोक प्रशासन संस्थान

इन्द्रप्रस्थ एस्टेट, रिंग रोड, नई दिल्ली-110002

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION

INDRAPRASTHA ESTATE, RING ROAD

NEW DELHI-110002

TELE [GRAMS : ADMNIST
PHONES : 331-7309
(9 LINES)

Shekhar Singh

3318554

4 December, 1989.

Dear Shri Dikshit,

Please find enclosed a revised abbreviated version of my comments on the minutes of the last meeting of NCA sub-group on environment.

I would be grateful if necessary action is taken on them.

With regards,

Yours sincerely,

(Shekhar Singh)

Shri N.K. Dikshit,
Member (f), Narmada Control Authority,
7th Floor, Palika Bhawan,
Sector XIII, R.K. Puram,
New Delhi-110066.

Proposed Corrections in Draft Minutes of
Sixth meeting of NCA Environment Sub-Group

1. Add after para 2, page 3, item No. VI-2(33), section 3 concerning compensatory afforestation:

"The Chairman had also pointed out, during the Fifth meeting of the Environmental Sub-group, that the land for compensatory afforestation should be selected in the project impact area and the plan modified accordingly. These remarks were recorded in the minutes of the said meeting.

It was, therefore, suggested that experts from the Ministry of Environment and Forests should review the work plan in the light of these observations."

2. Add after para 3, page 3, item VI-2(33), section concerning compensatory afforestation:

"The question of releasing forest land for rehabilitation of oustees in Maharashtra was also taken up. The Chairman clarified that the Ministry of Environment and Forests has given no undertaking to clear such a proposal, but only to consider such a proposal, if it was submitted by GOM. In any case, the Chairman informed the group that since then GOM had indicated availability of adequate revenue land for rehabilitation and, as such, the question of releasing forest land did not arise."

3. Add after para 6, page 7, item No. VI-3(34) on Catchment Area Treatment:

"The Chairman expressed the view that important environmental activities like catchment area treatment and compensatory afforestation should be carried out on schedule, and should not be delayed even if construction works are delayed. The Chairman stated that if found necessary, the condition of pari passu could be dropped after taking the matter up at the appropriate level."

4. Add after second sentence and before third sentence, starting "Prof. Ramaseshan raised a query____", para 7, page 7, item No. VI-3(34) on Catchment Area Treatment:

"It was stressed that even after the completion of Catchment Area Treatment it takes a few years before the catchment stabilises. Therefore, the schedule of water impoundment would have to be determined keeping in mind the progress of CAT and the time required for it to become effective."

5. Add after last para, page 9, item No. VI-4(35) concerning carrying capacity:

"Regarding the need to evaluate the carrying capacity of areas chosen for rehabilitation, the Chairman ruled that as and when these areas are finalised, a study should be carried out to determine whether they have the carrying capacity to support the proposed rehabilitation".

6. Agenda item No. VI-4(35) and also p.8 of annexure I, for inclusion in the minutes at an appropriate place.

"Regarding action taken for wildlife management, it was pointed out that it is essential to build up detailed management plans of the concerned areas indicating scientifically how the wildlife population and habitat would benefit".

7. I suggest we add the following at an appropriate place:

"It was pointed out that the drainage studies for NSP command area have not taken into consideration the impact, if any, of the SSP reservoir on the drainage pattern. The GOMP representatives agreed to look into this matter."

8. Also add:

"A reference was made by some members to the impact of back water buildup, especially in NSP catchment. GOMP representatives reported that this aspect was being studied and promised to circulate TOR of study to all members."

& Chairman, Narmada Control Authority

D.O. No. D-34(7)/89

October 20, 1989.

My dear Sukthankar,

As you are aware, the Government of Maharashtra is required to take action on the various environmental aspects of Sardar Sarovar Project by initiating studies and preparing action plans for implementation. The progress made in this regard is reviewed from time to time by the Environmental Sub-group of NCA which is headed by Secretary, Ministry of Environment and Forest. It was observed from the minutes of the Environmental Sub-group meeting held on 7.8.1989 that a number of studies are yet to be initiated by the Government of Maharashtra for preparation of action plans and their subsequent implementation. The Sub-group at its last meeting had laid down the revised time-frame for action in this regard, as the time limit earlier fixed by the Ministry of Environment and Forest for submission of action plans was not fulfilled. The present status of various studies in respect of Maharashtra is given in the annexure to this letter.

I would like to mention that at the time of extension of the credit agreement for Unit II of SSP by one year in June last by the World Bank one of the pending issues was with regard to acquisition of forest/degraded forest land for rehabilitation of oustees in Maharashtra. Unless Government of Maharashtra takes urgent action to find alternative land for the above purpose and for preparation of Environmental action plans for implementation, this might again become an issue with the World Bank when the question of further extension of credit agreement of Unit II of SSP is considered in June, 1990.

I shall be grateful if you could kindly personally look into the matter urgently and intimate the time-frame for completion of the above works to the Ministry of Environment and Forest and Narmada Control Authority.

With kind regards,

Yours sincerely,


(M.A. Chitale)

Encls: As above.

Shri D.M. Sukthankar,
Chief Secretary,
Government of Maharashtra,
Bombay.

PRESENT STATUS OF ENVIRONMENTAL STUDIES OF SSP BY MAHARASHTRA
(As discussed in the 6th meeting of the Environmental Sub-group
of NCA held on 7.8.1989).

Sr. No.	Environmental aspect	Time frame (As fixed by Sub-group in Aug.1989)
1.	<u>Catchment Area Treatment</u>	
	The catchment area survey of about 40,000 ha. was to be carried out by All India Soil and Land Use Organisation. The present position of the survey needs to be indicated.	Completion of the survey by October, 1989 and preparation of action plan to be submitted to Ministry of E&F by March, 1990.
2.	<u>Compensatory Afforestation</u>	
	GOM was to submit the proposal for clearance of forest land for both rehabilitation of oustees and land required for compensatory afforestation. As decided in the Sub-group meeting, the Ministry of E&F was to issue a d.o. letter to the Chief Secretary, Maharashtra which has already issued. No further progress has been reported and proposals do not seem to have been submitted to Ministry of E&F by 31.8.1989. This needs to be expedited.	31.8.1989
3.	<u>Flora and Fauna</u>	
	GOM was to jointly entrust the study for the submergence area in Maharashtra and Madhya Pradesh with GOMP to the Sagar University and MP State Forest Research Institute by 31.8.1989, No further progress has been made. This needs to be reported immediately.	31.8.1989
4.	<u>Carrying capacity of surrounding areas</u>	
	GOM has to cooperate with GOMP to entrust the study to the Sagar University and MP State Forest Research Institute. Further progress has not been reported. This needs to be expedited.	As early as possible.
5.	<u>Health Aspects</u>	
	GOM was to prepare the health plan for the villages around the rim of the reservoir. This plan is long over due. The progress made in this regard needs to be reported and the submission of the plan expedited.	As early as possible.
6.	<u>Fishries</u>	
	GOM was to entrust the study on the fishries aspects to some agency in consultation with the Director of Fishries of the State Government. Further progress has not been reported by the State and this needs to be expedited.	As early as possible.

IMMEDIATE

D.O.No.RPA 3189/CR-88/89/R-5, (R&FD).
General Administration Department,
Mantralaya, Bombay 400 032,

10th November 1989.

Chief Secretary

Subject : Sardar Sarovar Project
Rehabilitation and resettlement of
oustees of -
in Maharashtra - Diversion of forest land for

Dear *Shri Mahesh Prasad,*

Please refer to the D.O. letter No.FLD 1688/CR-329/F-10, dated 27.6.1989, from our Secretary (Forests) addressed to the Inspector General of Forests, regarding the diversion of forest land for rehabilitation of Sardar Sarovar Project affected persons from Dhule district of Maharashtra State.

2. It would be recalled that about 1655 tribal families are affected due to the construction of Sardar Sarovar Project.. Of these, about 1393 families have expressed their desire to resettle in Maharashtra State. A total area of about 2583.42 Ha. of land will be required for the rehabilitation and resettlement of these oustees.
3. The Narmada Water Disputes Tribunal Award and the World Bank Agreement stipulate that the relocation land shall be of the choice of the oustees and they should be relocated in such a way that their village, social and ethnic culture is not disturbed. This has narrowed the scope of identifying the relocation land. The oustees have unanimously asked for the forest land from Akkalkuwa, Taloda, Shahada and Akrani Talukas. They are not prepared to take any other land in Dhule District, because of (i) their apprehension of losing their social and ethnic culture and (ii) their traditional dependency on forests.
4. All the efforts to identify the relocation land from Government waste land, grazing land and/or command lands from other projects in Dhule District have failed. In view of this position, as a last resort, this Government forwarded on 28.12.1988 a proposal to the Government of India to disforest about 2583.42 Ha. of forest land from Taloda and Akkalkuwa ranges in Dhule district. The Government of India, however, did not approve the proposal.
5. In the meeting convened by Hon. Shri B.Shankaranandaji, Minister-in-charge of Water Resources on 9.5.1989, in New Delhi, the request of this Government for diversion of forest land was discussed. The Union Minister in charge of Water Resources had then informed that the Government of India would reconsider the issue since all alternatives to resettle the oustees on non-forest land had been exhausted. Minister (Rehabilitation) of this State had also then stated in that meeting that the oustees are not willing to move out of their cultural, ethnic and marriage circles. In fact, to shift them on non-forest land against their wishes would amount to denial of qualitative and proper resettlement of tribals. Any measure of such type would create a feeling of injustice and that would also be contrary to the provisions of Sec.3.02 of Article III of the Agreement executed by the Government of India with the World Bank.

6. In June 1989, this issue came into sharp focus when the World Bank threatened to discontinue the credit facility. The matter was discussed by the Secretary (Forests) of this Government with the Ministry of Environment and Forests. Our Secretary (Forests) had then suggested that a fresh exercise would be carried out to find out whether the land required for resettlement could be carved out from out of 19,205 Ha. of land from Akrani Taluka and disforestation of Taloda forest land could be avoided. In paragraph 3 of his D.O. letter, dated 27.6.1989, referred to above, our Secretary (Forests) had also made it clear that if the exercise proved to be infructuous, then the Government of India may have to reconsider the request for disforestation of 2583.42 Ha. of forest land from Taloda and Akkalkuwa Forest ranges.

7. Accordingly, the entire area of 19,205 Ha. was got surveyed through a field party consisting of local officers drawn from the Forest Department, Agriculture Department, Soil Conservation Department and Ground Water Survey Department and also through the Maharashtra Remote Sensing Application Centre, Nagpur. The findings of the field Survey are that barely about 56.50 Ha. of land from 24 villages is available in a scattered manner from 6205 Ha. of non-forest land. Similarly, from out of 13,000 Ha. of denuded and degraded forest land, a meagre area of 104 Ha. is available from 20 villages. Thus about 156.50 Ha. of land will be available in 44 villages and that too in a scattered manner. It will neither meet the entire requirement of 2583.42 Ha. of land nor will it be possible to fulfill the MWDI and World Bank requirement to relocate the oustees after taking into account the village as a unit.

8. The Director, Maharashtra Remote Sensing Agency has carried out detailed survey of the 19,205 Ha. of land from Akrani Taluka. He also carried out the survey, through Remote Sensing, of Taloda Forest Range. Presently, he is busy in preparing final maps after incorporating his field observations, discussion inputs and consulting the latest available satellite data. This will take further three weeks from now. However, in his report containing preliminary observations about the denuded and degraded forest, the Director has opined that this land is situated in the hilly ranges. The terrain is highly undulated, with steep slopes. Large parts of this area have poor soil mantle. There is also no sufficient ground water table to take care of irrigation facilities to be provided to the lands of the oustees. On the other hand, lands from Taloda and Akkalkuwa forest ranges are reported to be reasonably good for cultivation, with reasonable ground water potential. This land is considered suitable for rehabilitation if compact blocks are available. The final maps are awaited and will be forwarded as soon as possible.

9. Considering the above situation and also in view of the fact that about 9 villages will be submerged by the middle of next year, I shall feel obliged if you will kindly move the Government of India to reconsider favourably the request of this Government to disforest for resettlement about 2583.42 Ha. of forest land from Taloda and Akkalkuwa ranges.

With regards,


Yours sincerely,


(D.M. Sukthankar)

Shri Mahesh Prasad,
Secretary to the Govt. of India,
Ministry of Environment of Forests,
Paryavaran Bhavan, Lodi Estate,
New Delhi 110 003.

Copies forwarded w.cs. to : 1. Secretary to the Govt. of India, Ministry of Water Resources, Shram Shakti Bhavan, New Delhi 110001.

✓ 2. The Secretary, Karmada Control Authority, Palika Bhavan, Sector XIII, R.K. Puram, New Delhi 110 066.


Chief Secretary to Government.

**STATUS REPORT OF STUDIES AND ACTIVITIES REGARDING THE
ENVIRONMENTAL ASPECTS OF SARDAR SAROVAR PROJECT (SSP)
OCTOBER, 1989**

At the time of environmental clearance of SSP the Ministry of Environment & Forest stipulated certain conditions for implementation of environmental safeguard measures alongwith the construction of engineering works under the project. Before implementation of these measures, studies were to be carried out by the participating States of Gujarat, Maharashtra and Madhya Pradesh on the various environmental aspects and action plans were to be prepared and submitted to the Ministry of E&F before actual implementation. Similarly, at the time of signing of the agreement with the World Bank by the participating States and the Govt. of India, the Bank also stipulated that "a work plan for the environmental effects anticipated regarding implementation of the project would include suitable training programmes for responsible staff of the participating States, including plans, schedules, syllabi and provision of funds, and studies and implementation therefor, covering fish and fisheries, forest and wildlife and public health aspects and, thereafter, the participating States should implement the approved work plan and training programmes."

2. The present status of studies/preparation of action plan and implementation in respect of environmental safeguard measures is indicated in the following paragraphs in respect of following environmental concerns:-

- (1) Phased catchment treatment.
- (2) Compensatory afforestation
- (3) Command Area Development.
- (4) Archaeological and Anthropological studies.
- (5) Flora and Fauna.
- (6) Carrying capacity of surrounding areas.
- (7) Seismicity and Rim stability of reservoirs.
- (8) Health aspects.
- (9) Fisheries.

3. Phased Catchment Area Treatment

GOMP

The Catchment area of SSP in Madhya Pradesh is 26358 Sq.km. GOMP has entrusted the surveys for preparation of catchment area

works to the Govindram Seksaria Institute of Technology and Science, Indore. The institute has so far completed the work of interpretation of the land-sat data.

The remaining work was expected to be completed by September, 1989. The latest position is yet to be intimated. Action plan for the total phased treatment of SSP catchment area in MP will be ready by September, 1990. The State Government has not yet reported about the completion of the work.

The State has also undertaken the preparation and implementation of a pilot project in about 10000 ha. area in the watershed of the river Mann, a tributary of the Narmada in the Lower Narmada basin zone. The works envisaged under the pilot Project are expected to be completed by 1994.

GOMP is to furnish detailed plan of action, type of treatment proposed, yearwise physical and financial targets in respect of pilot project.

GOM

GOM had submitted a preliminary action plan in February '88 which indicated that an area of 40,000 ha. requires intensive treatment. Out of this area, about 7,725 ha is under forest and the remaining is under cultivation. Since the preliminary plan was not based on detailed survey, the State has now proposed detailed survey which will include study of sedimentation on the basis of the silt analysis and identification of priority micro watersheds needing treatment. The State Forest and Agriculture Departments have initiated these studies. The action plan would be prepared after completion of the study. GOM is to complete the prioritisation work for Catchment Area in Maharashtra state, on the basis of methodology followed by GOMP & GOG for which a Joint meeting will be held by the three states. It was reported that survey works for about 40,000 ha will be completed by the end of October, 1989 by the All India Soil and Land Use Survey Organisation and action plan would be submitted by March, 1990.

GOM is to confirm about the completion of the studies and to furnish detailed plan of action.

GOG

A work plan following the recommendations of Dewan Committee was prepared and submitted in 1986. The Catchment area of Sardar Sarovar lying in Gujarat is 423 Sq. Km. (42300 ha). The Catchment

area treatment measures have been planned separately for forest area and non-forest area as under:

Forest Area:	31707 ha. (including forest area under submergence)
Non-forest area	5483 ha.
Total:	37190 ha.

Present Status of progress is as under :-

Forest Area

1. 19386 ha have been identified for priority treatment.
2. For 7798 ha. stock mapping survey is being undertaken.
3. A nursery has been set up .
4. The entire work planned to be completed in 5 years from 1987-88.
5. Fence building and Nala bunding planned for 6657 ha.

Implementation

Treatment in Forest areas

Time frame of Catchment Treatment plans is 5 years.

Particulars	Years	Targets	Progress achieved	Remarks
1) Soil and moisture conservation works and afforestation in forest areas with density less than 0.4	1987-88 1988-89 1989-90 1990-91 1991-92	250 ha. 2000 ha. 2000 ha. 2000 ha. 2001 ha.	250 ha.	Advance works are in progress. Plantation will be done in monsoon.
		8251 ha.		
2) Soil and Moisture conservation works and afforestation in forest areas with density between 0.4 & 0.6	1987-88 1988-89 1989-90 1990-91 1991-92	278 ha. 1050 ha. 1050 ha. 1050 ha. 1050 ha.	278 ha	Advance works are in progress. Plantation will be done in monsoon.
		4478 ha.	-	

3) Fence building	1987-88	1330	
and nala plug-	1988-89	1330	700 ha
ging in forest	1989-90	1330	
areas with den-	1990-91	1330	
sity above .6	1991-92	1337	

Expenditure upto 1988-89 - Rs.71.49 lakhs

Outlay for 1989-90 is Rs.155.0 lakhs

Non-forest Area

Action Plan has been prepared for treatment of 5483 ha as stated below:

i) Contour bunding	1586 ha
ii) Terracing	600 ha
iii) Nala Plugging	100 ha
iv) Pasture development	364 ha
v) Afforestation	2933 ha.

GOG has undertaken thematic mapping of the catchment area of SSP lying in Gujarat State by photo-interpretation of Satellite imageries through ISRO, Ahmedabad. The Catchment Treatment plans for forest area and non-forest area in the catchment area lying within Gujarat State will be reviewed after the densitywise maps are received from ISRO, Ahmedabad. This work will take 3 to 4 more months, as a few satellite imageries have to be obtained from the French Satellite SPOT. GOG has to indicate the present position.

4. Compensatory Afforestation

GOMP

The State Forest Department has already submitted to the Ministry of E&F the action plan of compensatory afforestation for 8737 ha covering 6547 ha of forest land and 2190 ha of non forest land for their consideration. The State Government is implementing the programme since Ministry of E&F has not communicated their views on the proposed plan.

GOM

The preliminary plan was submitted by the State Govt. in June, 1988. The total area to be covered would be 19,205 ha of which 6,205 ha are in non-forest land and the remaining area under degraded forest land. In respect of non-forest land the State Forest Deptt. has taken over possession of land from Revenue Deptt. in Akrani Tahsil. Declaration of this area as forest land is to be issued by the State Govt. A detailed project is being formulated. As regards degraded forest land, suitable proposals are yet to be submitted shortly. It was pointed out that the State wanted some forest land for rehabilitation also.

GOM was to take urgent action to locate land for rehabilitation and compensatory afforestation. Suitable proposals were to be sent to Ministry of E&F for clearance. The present position needs to be indicated by GOM for which they have been reminded.

GOG

A work plan prepared and submitted to GOI in 1986 is under implementation.

- i) Total Forest area diverted for the project = 4523 ha.
- ii) Compensatory afforestation for 4650 ha of non-forest land in Kutch District based on their proposal submitted to Ministry of E&F in 1986 has been taken up for implementation.
- iii) Implementation is spread over a period of 3 years from 1987-88 including advanced preparatory work.
- iv) Reserve fund has been created by GOG and new sub-head for deposit of funds has been sanctioned.
- v) During the 5th Environment Sub-group meeting it was decided that Dr. Sharma, Ministry of E&F, GOI would visit the areas selected for compensatory afforestation to ascertain suitability of lands for plantation work. In the 6th meeting of Environment Sub-group, it was decided that Chairman would look into the matter.
- vi) The present progress is as under:
 - a. Plantation in 500 ha has been completed.
 - b. Targetted plantation in ensuing monsoon is 2050 ha. Advance preparatory works are in progress.
 - c. Outlay for 1989-90 is Rs. 143.0 lakhs

Expenditure upto 1988-89 is Rs.23.21 lakhs

A 7 km long PVC pipe line with pumping arrangement has been installed in one of the Compensatory plantation sites at a cost of Rs.3.55 lakhs for irrigating the plantation.

Afforestation Programme in the Dam vicinity has been planned for 235 ha, as follows :

Rainfed Plantation	110 ha
Irrigated Plantation	125 ha

Progress achieved	Plantation done	Advance works in progress
Rainfed Plantation	30 ha	40 ha
Irrigated plantation	5 ha	35 ha

For watering the saplings in the large nursery at Kevadia Colony, a special perfospray system is being installed at a cost of Rs.45,000/-

5. Command Area Development:

GOG

- i) Soil surveys and ground water studies as well as drainage studies have been completed in the command area upto the Mahi river crossing.
- ii) GOG indicated that for the areas beyond Mahi river crossing, proposals received from Consultants are under scrutiny. The present position needs to be indicated.

6. Archaeological and Anthropological Studies:

GOMP

Archaeological Survey

The State Archaeological Department was entrusted with the survey work for cataloging the artifacts, monuments etc. The Archaeological Survey of India (ASI) would be responsible for the protected monuments coming under submergence in SSP. The time frame for completing the studies would be reported by Govt. of M.P.

The Archeological Survey of India (ASI) had demanded a certificate about the total submergence of protected national monuments being affected by the submergence. The necessary certificate was issued by the State in January 1988. The monuments were:

- | | |
|-----------------------------|------------|
| 1. Sidheshwar Temple | Nemawar |
| 2. Joga Fort | Joga |
| 3. Baji Rao Peshwa's Chatri | Rawarkhadi |
| 4. Choubes Aotar Temple | Mandhata |

A sum of Rs. 3.00 lakhs were placed at the disposal of the A.S.I in 12/1987. The State Department of Archaeology and Museum was allotted a sum of Rs. 7.53 lakhs in 3 instalments.

The joint inspection had been done by ASI Officers & NVDA of Sidheshwar Temple and Baji Rao Temple on 7.1.89 and Joga fort on 8 & 9 January 1989.

Time frame, physical and financial Targets and the actual progress made, expenditure incurred by ASI and State Department of Archaeology is to be reported by State Government. The present position is awaited.

Anthropological Survey

In view of the recent finding of fossilised hominid skull cap from the Narmada Basin, Archaeological Survey of India (ASI) had decided to form a working group involving institutions like Anthropological Survey of India, A.S.I., Z.S.I, Rashtriya Manav Sangrahalaya (R.M.S) and the concerned state Govt., to decide the plan of action and working modalities. The representative of ASI had a meeting with RMS, wherein it was mentioned that Pre-historic branch of ASI have already carried out exploration survey of about 150 villages and excavated an achulian site at Balwarah village. The State Govt has to expedite finalisation of the TOR for Anthropological survey with Rashtriya Manava Sangrahalaya (RMS). It was indicated that TOR with RMS is expected to be finalised by 1st week of September, 1989. Copies of the finalised TOR may be sent to NCA.

GOM

GOM has stated that only Shoolpaneshwar temple, on the border of Maharashtra and Gujarat States, which is the property of Gujarat is coming under submergence. GOG has agreed to relocate the temple which has, however, requested to ascertain the wishes of Maharashtra oustees in the matter of relocation site.

GOG

a) From the list of the protected monuments obtained from Directorate of Archaeology it is seen that no protected monuments are located in submergence area of SSP in Gujarat. However, the Director of Archaeology of GOG has undertaken an inventory survey of 19 vilages coming under submergence of SSP in Gujarat. Report of the survey is likely to be received in 2 months time.

b) There are two ancient temples at Hamfeshwar and Shoolpaneshwar which come under submergence. GOG has reported that sites for these have been finalised in consultation with the Trustee of these temples. Approval of the State Govt. for implementation was awaited.

7. Flora and Fauna Studies:

GOMP

GOMP representative stated that Bombay Natural History Society has finally expressed their inability to take up the work for surveys on flora and fauna. Now they are negotiating with

Sagar University and State Forest Research Institute for entrusting the survey work. It was reported that the TOR would be finalised by 31st August, 1989. This needs to be confirmed by GOMP and the copies of the finalised TOR are to be sent to NCA. They have been reminded in the matter.

GOM

GOM representative agreed to entrust the work for flora and fauna studies for the SSP submergence area in Maharashtra also with the same terms and conditions to the Sagar University and State Forest Research Institute, Madhya Pradesh with the same TOR as finalised by GOMP. The progress in this regard needs to be reported for which they have been reminded.

GOG

This study has been entrusted to M.S. University, Vadodara. TOR has been finalised in the meeting held on 20.3.89 with the officers of Ministry of E&F, Govt. of India. It was agreed that M.S. University will carry out flora/fauna studies in the submergence area of Gujarat project. The study is planned to be completed in two years from 1989-90.

Senior Ecologist of World Bank mission again reviewed the TOR and suggested a number of changes. The Deptt. of Botony M.S. University has now sent the modified proposal, which is under consideration of GOG.

8. Carrying Capacity of Surrounding Areas

GOMP

GOMP wanted to entrust the work to Sagar University and State Forest Institute with the same TOR finalised between GOG and MS University. The progress in this regard is awaited from GOMP.

GOM

GOM could not find any agency for carrying out these studies. It was suggested by the Chairman of the Sub-group in the meeting held on 7.8.1989 that such studies in Maharashtra should be entrusted to Sagar University and State Forest Research Institute, GOMP. For this, firm proposal should come from Govt. of Maharashtra and GOMP would persue the institutes for taking up this work. The present position is to be intimated by the State Government for which they have been reminded.

GOG

As a part of the flora and fauna studies in the submergence area of SSP in Gujarat entrusted to MS University, Vadodara, phytosociological studies will be conducted in the adjoining forest, which will help in determining the carrying capacity, of forest with a view of assessing impacts of inevitable wild life transfer following the project implementation. Also the measures needed to release the pressure on the carrying capacity of adjoining forest will be suggested. The TOR has been revised keeping in view the comments of the Ministry of E&F and the comments of the World Bank. TOR are finalised in the meeting held on 20.3.89 in the Ministry of E&F. This study would cover the sub-mergence area in Gujarat State. In this connection it is proposed to take the advice of institutions like Bombay Natural History Society, World Wide Fund for Nature, Madras Nature Park etc. Finalised copies of TOR may be sent to NCA and the progress may be intimated by the State Govt. They have been reminded.

Wildlife Conservation Measures

The area of the Sloth Bear Sanctuary, (called Dumkhal Sloth Bear Sanctuary), has been enlarged from 151 Sq.km. to 448 Sq.Km. and the extended limits reach upto the Shoreline of the reservoir. This will ensure free access to water front for the animals. Providing stone wall fencing and other conservation measures such as check dams, habitat improvement measures and firelines have been undertaken in the enlarged Shoolpaneshwar Wildlife Sanctuary to foster the flora and fauna of the area.

The development plans of Shoolpaneshwar Wild life Sanctuary are as under :

- | | |
|----------------------------------|---------------|
| 1. Fencing and Barricades | - 100 KM |
| 2. Habitat Improvement | - 2000 Metres |
| 3. Water Facility | - 8 Nos. |
| 4. Construction of quarters | - 14 Nos. |
| 5. Improvement of communications | - L.S. |

Progress achieved is as under :-

- | | |
|--|----------|
| 1. Fencing | - 3 KM |
| 2. Habitat Improvement
(Fire lines) | - 15 KMS |
| 3. Water facilities Check dams | - 2 Nos. |

Expenditure incurred upto 1988-89 is Rs.2.01 lakhs; outlay for the year 1989-90 is Rs.7.40 lakhs. The plan is phased for completion in 5 years.

Besides this sanctuary adjoining the reservoir area, the following three sancturies are located in the command area of the project.

1. Nal Sarovar - A sweet water lake famous for attracting 120 to 150 species of migratory birds from far off lands.
2. Wild Ass Sanctuary in the Rann of Kutch.
3. Black Buck Sanctuary at Velavadar.

These sancturies would also benefit from copious sweet water availability in the command area.

9. Seismicity and Rim Stability of Reservoir

Reservoir Induced Seismicity:

GOG have identified locations for instrumentation at 9 stations. GOG has received the concurrence of GOM for release of land for one station located at Shahada in Maharashtra. In the 35th meeting of the PSC held on 5th September, 1989, GOMP representative stated that action to recruit staff was on hand and the staff is expected to be made available in two months time. GOM representative indicated that construction of building was in progress and will be completed within two month's time. Regarding staff it was informed that staff is being obtained from MERI. GOG is implementing the programme for setting up of seismic instruments in Madhya Pradesh also. The progress regarding implementing the programme for setting up of the seismic instruments in Madhya Pradesh is awaited from GOG.

Reservoir Rim Stability:

Geological Survey of India (Nagpur Division) has already started the work in the areas of Maharashtra and Madhya Pradesh and proposes to complete it in 3 years. GSI has already completed the work in Gujarat state 3 years ago. The progress of work in MP and Maharashtra is awaited from GOG.

10. Health Aspects:

GOMP

The State Director of Health Services has conducted detailed surveys during 1982-84 and according to the data collected, diseases like malaria, guinea worm, goiter, gastro-enteritis and worm infections have been found in the districts falling under the submergence area. With the construction of the dam, the incidence of malaria is likely to increase and suitable control measures will have to be adopted by the Health Department. The

State Director of Health Services has agreed to monitor at intervals the incidence of water borne diseases and NVDA would keep in touch with the Directorate of Health Services to ensure implementation of preventive measures.

GOM

The preliminary health plan prepared by GOM was examined by Environment Sub-group of NCA. The plan did not cover the villages around the periphery of the reservoir. The State Public Health Deptt. has been asked to revise the plan suitably and submit to Min. of E&F and NCA. The present position is awaited from GOM for which they have been reminded.

GOG

The work plan has been prepared by the State Health Department in respect of:

- i) Surveillance and control of water related and communicable diseases.

Total implementation will take about 17 years time as and where irrigation under the canal system is developed. The programme also covers the villages on the periphery of reservoir. Two studies relating to schistosomiasis had been carried out in 1985 by the National Institute of communicable diseases and concluded that there was no risk to the project on account of this. Subsequently a team led by Chief of Schistosomiasis Division WHO, Scientist from British Council, London and Environment Advisor, World Bank carried out investigations. The analysis revealed that the project area did not have any risk of Schistosomiasis entering the area. The report (work plan) has been furnished to Min. of E&F & World Bank.

- ii) Surveillance and Control of Malaria.

Outlay for 1989-90 is Rs. 7.0 lakhs

The operation of the reservoir itself inhibits the proliferation of malaria larvae. While the reservoir builds up the storage during the monsoon rains, the larvae, which prefer to stay around the periphery, get drowned and thus are destroyed. On the contrary when the water is with drawn for power generation and irrigation the larvae are stranded and destroyed.

11. Fisheries

GOMP

The Central Inland Capture Fishery Research Institute (ICAR) Barrackpore, W.B. has been approached to undertake the study of

the environmental impacts of the dam on the aquatic life of the middle and lower Narmada Basin. Action has also been taken by the NVDA to establish a Research-cum-Monitoring Cell at Barwani to undertake pre-impoundment investigations. Sanctions for the purchase of apparatus and equipment and the appointment of staff have been issued.

NVDA has taken a basin wise approach for the study of pre and post impoundment investigation of the entire Narmada Basin and have planned to entrust these studies to following three Universities:

i) Rani Durgavati University, Jabalpur

For Upper Narmada Zone - Bargi Reservoir (Post impoundment)

ii) Barkatullah University, Bhopal

Middle Narmada Zone - Barna, Tawa and Kolar Reservoirs (Post impoundment)

iii) Vikram University, Ujjan

Lower Narmada Zone-(pre-impoundment survey) Indira Sagar, Chotta Tawa, Omkareshwar, Maheshwar and Sardar Sarovar reservoir sites.

MOU have already been signed with Vikram and Baraktullah Universities. The matter is under correspondence with Rani Durgavati University, Jabalpur.

In order to involve the Central Inland Capture Fisheries Research Institute, Barrackpore, a meeting was held at Bhopal on 1.7.1989 which was attended by Dr. Jhingran, former Director of the aforesaid institute. An approach paper is being prepared by the above institute wherein both short term and long term study programmes would be finalised. The NVDA has also moved the Director General, ICAR to incorporate specific research programmes during the 8th plan.

GOM

A similar study in Maharashtra is proposed to be entrusted to some agency in consultation with the Director of Fisheries of the State Government. The present position is to be intimated for which the State has been reminded.

GOG

Central Inland Capture Fisheries Research Institute, Barrackpore, Calcutta (Local Office at Vadodara) has undertaken the studies in respect of aquatic life upstream and down stream of Sardar Sarovar in Narmada River in Gujarat State. Report of the first phase of pre-impoundment survey has been received.

The design plans and estimates for the 10 ha Fish Farm and Fish Hatchery complex have been finalised. The plan to be implemented in 9 years includes:

1. Hydrobiological studies.
2. Establishment of Fish Hatchery and fish farm
3. Training of Fishermen
4. Establishing and assisting primary fishermen's cooperatives
5. Establishing and assisting an Inter-state Fisheries Development Board.
6. Cell at Directorate for monitoring.

The outlay proposed for 1989-90 is Rs. 42.0 lakhs.

STATUS REPORT OF STUDIES AND ACTIVITIES REGARDING THE
ENVIRONMENTAL ASPECTS OF NARMADA SAGAR PROJECT (NSP)
OCTOBER, 1989

a) Phased Catchment Area Treatment

The total Catchment Area of NSP is 61648 sq. km divided into 53 watersheds. GOMP has identified 13 high and very high priority watersheds in the vicinity of reservoir covering an area of 11022 sq. km (forest 3006 sq. km, non-forest 8016) in phase-I. Prioritisation at sub-watershed level in case of 7 out of 13 watersheds covering an area of 2420 sq. km has already been completed. Prioritisation exercise in the remaining six watersheds is presently going on. It is expected to be completed by the end of Sept., 1989. Thereafter detailed treatment plans for the actual affected areas of each watersheds will be prepared separately and implemented so as to ensure that it is completed pari-passu with the progress of reservoir impoundment.

A plan for the treatment of the Catchment Area was prepared by the NVDA and submitted to the State Forest Deptt. vide letter No. NVDA/AGRI/42/87/143/3676 dated 11th Dec., 1987 (its copy sent to the Ministry of Env. & Forest, GOI enclosed with NVDA letter No. FOR/001/12 dated 6.2.1989). It is estimated that an expenditure of Rs. 124 crores shall be incurred on the treatment of these 13 'very high and high' priority watersheds of phase-I. The year-wise targets of area to be covered and corresponding outlay and also the present position of preparation of the detailed plan of the three phases for implementation of the catchment area treatment is awaited from GOMP.

Based on the Dewan Committee's recommendation of 1985, pilot studies have been taken up in two catchments namely Datuni and Godapachar. The treatment work of these pilot projects is expected to be completed by the end of 1994. Statement showing physical and financial progress for the year 1988-89 and 1989-90 is given below:

STATEMENT SHOWING PHYSICAL AND FINANCIAL PROGRESS FOR
THE YEAR 1988-89 AND 1989-90
(ending 30th June, 1989)

S. No.	Name of work	Ghorapachar	Datuni	Man	Remarks
PHYSICAL PROGRESS					
1.	Contour survey				
	1988-89	4131.610 ha	2246.190 ha	1703.397 ha	
	1989-90 (ending 30th June, 1989)	1855.110 ha	12.000 ha	1102.912 ha	

	Total	5986.720 ha	2258.190 ha	2806.209 ha	

2. Gully survey			
1988-89	-	65575	30560
1989-90 (ending 30th June, 1989)	106.297	3700	94452
Total	106297 RMt.	69275 RMt.	125012 RMt.

FINANCIAL PROGRESS

1. Contour survey			
1988-89	47,393	31,201	26,111
1989-90 (ending 30th June, 1989)	37,770	180	16,615
Total	Rs. 85,163	Rs. 31,381	Rs. 42,726

2. Gully survey			
1988-89	-	9,930	2,585
1989-90 (ending 30th June, 1989)	17,910	675	7,303
Total	Rs. 17,910	10,614	9,888

b) Compensatory afforestation

GOMP has identified 10143 ha of non-forest and 70800 ha of degraded forest land in Dewas, Hoshangabad, Harda and Khandwa forest division for compensatory afforestation. Ministry of E&F raised certain objections regarding size of blocks and distribution of areas. It was indicated that 2000 ha non-forest land has been transferred and 67762 ha degraded forest land was available subject to the approval by Ministry of E&F. A meeting was held in the Ministry of E&F in this regard. The present position may be intimated by the Ministry of E&F.

As regards the progress of afforestation work, it may be stated that NVDA has already formed nine compensatory afforestation divisions with headquarters at Hoshangabad (one), Harda (one), Khandwa (one), Dewas (two) & Bhopal (one) and two Conservator Circles for the execution, control and supervision of the work.

The DFOs shall attend to the compensatory plantations/compensatory afforestation works together with the Catchment Area Treatment works within their territorial jurisdictions. Five of these nine DFOs are already in position and the forest Department is finalising the posting of the remaining DFOs. One Conservator and one Chief Conservator have already joined NVDA during May, 1989.

Folllowing plantations in non-forest lands have already been raised by the NVDA during 1987 and 1988-89 under Narmada Sudhikaran programme:

1. Limbaditya (near Maheshwar)	- 50 ha
2. Maked Kheda (Oposite Maheshwar)-	50 ha
3. Hoshangabad	- 10 ha
4. Rudrasagar (near Ujjain)	- 22 ha
Total	132 ha

Five compensatory afforestation divisions already in position had started preparation of plantation sites in the last financial year. Preparation of afforestation areas in 4313 ha of degraded forest land and 1,650 ha of non-forest land has already been done. Afforestation work has been carried out in July, 1989 on 1229 ha of forest land and 622 ha of non-forest land. Pastura development work on 210 ha of forest land and 150 ha of non-forest land has also been done. The details of work is as under

PROGRESS OF AFFORESTATION WORK (END OF JULY 1989)

	Item of work	Kaveri Dn.	Ghoda Paccad	Daulat Pur Dn.	Sukh-tawa	Ichha-war Dn.	Total
Preparation of Aff.area	Forest lands	2033	1119	300	181	680	4313
	Non-forest Lands	550	700	400	-	-	1650
	Total	2583	1819	700	181	680	5963
Area plant-ed	Forest lands	1175	-	44	10	-	1229
	Non-forest lands	550	68	4	-	-	622
	Total	1725	68	48	5	-	1851
Pastures	Forest	-	200	-	10	-	210
	Non-forest	-	150	-	-	-	150
	Total	-	350	-	10	-	360

Nurseries have been/are being presently established as follows:

1. A two hectare nursery in Comptt. No.126 of Khategaon Compensatory Afforestation Division of district Dewas.
2. Three nurseries of two hectares each are being established at Mordad, Awaliyal-1 and Awaliya-2 in Ghodapachhar Compensatory Afforestation Division.
3. Two nurseries of two hectares each are also being established in Kaveri Compensatory Afforestation Division one at Panali Comptt. 242 and another at Singhaji.
4. Two nurseries of two hectares each are being established at Mangrol and Khardana of Harda Compensatory Afforestation.

c) Command Area Development

GOMP had submitted command area development plan. The project on completion will provide an annual irrigation of 1.69 lakh ha of cropped area over a net C.C.A. of 1.23 lakh ha. The implementation of the plan would be taken up in three phases covering construction of main canal, distribution and drainage system. The proposal for irrigation in Phase-I, phase-II and Phase-III are to cover an area of 36100 ha, 46800 ha and 40100 ha respectively. For Phase-II it will start in 1993 and would be completed by 2002-2003. Phase-III would be taken up after completion of the project i.e. in 1997-98 and would be taken up after completion of the project report for CAD would be completed by 1992 and the work will be started by 1993-94. GOMP has to furnish information on command area surveys with year-wise target (both financial and physical) and achievements. This is awaited from GOMP.

d) Flora and Fauna

ZSI had completed fauna studies on the basis of secondary data & limited field survey and the report was submitted to Ministry of E&F. As reported earlier, NVDA had approached the Wildlife Institute of India, Dehradun to undertake the study. The Director of the Institute has agreed to involve his institute in this task. The present position regarding finalisation of TOR etc. is awaited from GOMP and the State has been reminded.

e) Archaeological and Anthropological studies

GOMP has indicated that State Archaeological Deptt. and Archaeological Survey of India (ASI) were involved in conducting

the surveys and listing out monuments affected by submergence. The ASI would be responsible for the survey of 167 villages of Khandwa District while the Department of Archaeology, Govt. of MP would survey the 48 villages in Hoshangabad district and 39 villages in Dewas district.

The ASI would depute 2 teams to take up the survey of villages which will be completely submerged. GOMP is to furnish the time frame for the studies and also the year-wise financial and physical targets in respect of both ASI and States Department of Archaeology.

The Rashtriya Manav Sangrahalaya (RMS) would support the work in the area of palaeoanthropology including prehistory for effective role in the multi-disciplinary research programme. In this way RMA would be able to acquire the possible human fossil and lithic remains that may be retrieved from the excavation in Narmada Basin.

GOMP representative stated that for finalisation of TOR with Rashtriya Manav Sangrahalaya (RMS), Bhopal, a meeting was fixed in the first week of September, 1989 alongwith Shri K.S. Singh, Director General of Anthropology. The present position in this regard is awaited from GOMP. Copies of the finalised TOR may be sent to NCA. They have been reminded.

f) Carrying capacity of surrounding areas

GOMP stated that they want to entrust the work to Sagar University and State Forest Research Institute with the same TOR finalised between GOG and MS University. The present position is awaited from GOMP.

g) Seismicity and Rim Stability

GOMP representative in the last meeting of Environment Sub-group explained that ten instruments have to be set up on the basis of studies carried out by CW&PRS for NSP and Maheshwar. NVDA had proposed the instrument as is being adopted on SSP. The firm M/s Sprengnether, USA was contacted through SSP, GOG and the firm has submitted its financial offer for Narmada Sagar Package which was finalised in consultation with IMD, New Delhi. The case has been processed for final approval by GOI Department for their clearance to import the instrument.

Regarding rim stability, NVDA promised to furnish detailed report of GSI to the Ministry of E&F. The present position needs to be confirmed by Ministry of E&F and GOMP. They have been reminded.

h) Health Aspect

NCA has forwarded a copy of note on Health Aspects of Narmada Sagar Project given by GOMP on 20.6.1989 to the Ministry of E&F for their study and comments. The comments of E&F has been sent to NVDA for modifying the report. The modified report is awaited from GOMP. The State has been reminded.

i) Fisheries Development

GOMP representative stated that NVDA has taken a basin-wise approach for the study of pre and post impoundment investigation of the entire Narmada basin and have planned to entrust these studies to following three Universities:

i) Rani Durgavati University, Jabalpur.

For Upper Narmada Zone - Bargi Reservoir (Post impoundment)

ii) Barkatullah University, Bhopal.

Middle Narmada Zone - Barna, Tawa and Kolar Reservoirs (Post impoundment)

iii) Vikram University, Ujjain.

Lower Narmada Zone-(pre impoundment survey) Indira Sagar Chotta Tawa, Omkareshwar, Maheshwar and Sardar Sarovar reservoir sites.

MOU have been already signed with Vikram and Baraktullah Universities. The matter is under correspondence with Rani Durgavati University, Jabalpur.

In order to involve the Central Inland Capture Fisheries Research Institute, Barrakpore, a meeting was held at Bhopal on 1.7.1989 which was attended by Dr. Jhingran, Director of the aforesaid institute. An approach paper is being prepared by the above institute wherein both short term and long term study programme would be finalised. The NVDA has also moved to the Director General, ICAR to incorporate specific research.

Further progress is awaited from GOMP and they have been reminded.

TERMS OF REFERENCE FOR THE ECO-ENVIRONMENTAL
AND WILDLIFE MANAGEMENT STUDIES ON THE SARDAR
SAROVAR SUBMERGENCE AREA IN GUJARAT

The Department of Botany, M.S. University of Baroda, Baroda has been entrusted with a study entitled "Eco-environmental and Wildlife Management Studies in the Sardar Sarovar submergence area in Gujarat", by Sardar Sarovar Narmada Nigam Ltd., vide office order No. NPG/ENV/Study/167/1 dt. 5.8.'89.

The following are the Terms of Reference of the study, based on the revised proposal sent by the Department of Botany, M.S. University, vide letter No. Bot/SDS/125 dt. 8.6.1989, which has been accepted by the Nigam.

TERMS OF REFERENCE

1. The study area comprises essentially the submergence area of Sardar Sarovar Project lying in Gujarat State and the neighbouring area (say about 20 Km belt along the reservoir) which will come under the zone of influence of the reservoir.
2. The study will be carried out under three distinct topics:

- a. Biological Resources Inventory.
 - b. Forest Biomass Studies.
 - c. Ecological Enhancement and Development of a Neoecosystem.
3. Under each of these three topics, the study will address itself to the following important points.

4. Biological Resources Inventory:

- a. Preparation and/or acquisition of detailed maps of submergence areas to delineate forest density classes, forage sources and water holes for the maintenance of wildlife.
- b. Identification and Collection of representative plant and animal samples and to assess significantly adverse impacts on these species from project related activity.
- c. Collection, preservation and photographic documentation of samples following standard taxonomic procedures.
- d. Identification of plant or animal species considered at risk and ~~their in-situ~~ their in-situ and ex-situ methods of conservation/preservation and propagation. Particular attention will be paid to locally grown varieties of crop plants, wild grasses and legumes. Medicinal and other economically important species will be specifically covered.

- e. Identification of foodchains and studies on seasonal changes in the dietary habits to facilitate prediction of faunal changes due to creation of a large reservoir.
- f. Identification of linkages between various insects, birds, bats and tree populations in terms of pollination and seed dispersal mechanisms so crucial in projecting future afforestation plans and sustenance of forest ecosystem.
- g. Examining the ecological behaviour and inter-dependence of key aquatic and terrestrial species, particularly in respect of seasonal variations in foraging, habitat preference and adaptability to change.
- h. Identifying the genepools likely to be affected by the project and suggesting pragmatic measures for their conservation in situ and ex-situ.

5. FOREST BIOMASS STUDIES

- a. Biomass studies will be conducted in different forest density classes and will be compared with forests in the North and South of the reservoir area with a view to

assessing the carrying capacity of the various forest density classes in terms of human and other mammalian populations.

- . Present mammalian census report will be studied with a view to facilitating future predictions and probable ~~ma~~ migration routes on the basis of forest cover, forage and water holes availability.
- b. Demarcation of corridors for migration of animals, preparation of receiving areas, habitat manipulation, exclusion of competitors ~~there~~ predators etc.
- c. Detailing a plan for animal migration and where needed, capture and transportation of animals.

For (b) and (c) above, Sardar Sarovar Narmada Nigam Ltd., will directly contact expert Institutions like Indian Institute of Wildlife Management, Dehra Dun and obtain reports, which will be utilised by the study team for formulating appropriate conservation and management policies.

- d. Determining in the submergence area and the zone of influence, the major interactions between insects and birds and plant life in terms of pollination and seed dispersal mechanisms, which are important for establishing and sustaining wildlife habitats and their economic benefits in the identified receiving areas.
- e. Preparing an action plan for wildlife and

ecological management of the area, integrating the outcome of these studies with the phasing of engineering activities and also the environmental activities already on hand. The plan should identify the priorities for the action needed to be taken.

6. Ecological enhancement and Development of a mesoecosystem.

a) Studies will be directed towards the reservoir periphery with respect to soil and land erosion status. Biological measures, in addition to civil engineering measures as needed will be appropriately suggested for protection and improvement of the catchment area. A number of indigenous and also exotic tree species and grasses will be identified for the purpose for ensuring effective conservation of the area.

(b) The impact of aquatic weeds will be studied and more particularly and the pistia and water hyacinth, especially with reference to their potential threat to the reservoir and the canal system. Studies directed towards their growth requirements and reproductive processes will be undertaken. A comparative assessment of the various mechanical, chemical and biological processes for control of the obnoxious.

weeds will be made, emphasis being on the biological methods.

(c) Ecological betterment of the reservoir peripheral area will be ensured by suggesting selective indigenous, fast growing tree legumes adaptable to the region. Results of the studies and their impact on the riparian ecosystem will be used for evolving an agro-forestry pattern congenial to the neoecosystem. The potentiality of the area for adapting these innovative methods will be properly assessed.

(d) The possibility of developing bird sanctuaries on artificial inlands with suitable tree cover in the reservoir areas, which would naturally attract a large number of colonially nesting birds, will be examined and appropriate suggestions will be made. Attention will be paid to the enrichment of the faunal composition of the altered ecosystem by encouraging development of breeding colonies of mixed species of birds.

(e) Ecological and economic enhancement of the changed ecosystem will be attempted by appropriate human manipulation. Development of apiaries as an additional source of income and also for facilitating the pollination process in the tree population will be ensured.

The tree species selection will be guided by socio-economic considerations of the area.

(f) Measures needed for improvement of the carrying capacity of the newly developed ecosystem would be formulated for facilitating creation of regulated wildlife centres.

The potential for the creation of selected nature conservation parks will be examined in collaboration with the State Forest Department.

(g) At appropriate stages of the study, the study team will avail of the expertise of the following Institutions for the specified purpose.

- (i) Bombay ^{Natural} ~~History~~ Society to assist in surveys of avifauna and formulation of appropriate programmes for development of bird sanctuaries.
- (ii) Wild life wing of the State Forest Department to assist in the survey of flora and fauna and interpretation of data.
- (iii) Madras Nature Park for assessment of amphibia and reptila, particularly in the area going under submergence and suggesting measures for preservation and conservation, as required.

- (iv) World Wide Fund for Nature - to provide advice on formulation of time specified action plans particularly for establishment of ~~new~~ protected areas and conservation strategies.

Implementation strategies :

1. The study team will interact with may governmental agencies associated with the implementation of the various recommendations that would emanate from the intensive biological studies proposed in the project. It will, in consultation and collaboration, work out appropriate strategies, biological, engineering and legal as required to enforce controls for better surveillance, monitoring and regulation of the ecosystem.
2. The whole study will be consonant with the Governments' policies and legislations relating to Forest Conservation and Wildlife Protection.

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A SHORT NOTE ON THE ACTION TAKEN SO FAR BY FISHERIES
DEVELOPMENT FOR IMPLEMENTATION OF FISHERIES WORK PLAN

1. HYDROBIOLOGICAL STUDIES:

This is planned to be undertaken in Collaboration with the Central Inland Capture Fisheries Research Institute, Barrackpore. The Fisheries Department has proposed for a separate unit for undertaking these studies regularly in Collaboration with the Central Institute. The sanctioning of this unit is still under the consideration of the Govt. In the meantime the Central Fisheries Research Institute has already initiated some environmental studies in the down stream of the river on a regular basis. Different ecological zones have been demarcated in terms of biological characteristics as well as hydrobiological variations. Sources of industrial and municipal wastes entering the river system have been identified. The first phase of the pre-impoundment studies indicate that suitable measures should be adopted to protect the commercial Fisheries of Hilsa, fresh water prawn and preventive measures are to be taken against pollution of the river stretch from industrial wastes. As soon as the separate unit is sanctioned by the Govt. Co-ordinated studies will be under taken in the system including the area to come under impoundment.

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2. ESTABLISHMENT OF FISH HATCHERY OFFISH FARM

Plans and estimates of the proposed hatchery below the dyke No.3 have been prepared and submitted to the ports, Transport and Fisheries Department for administrative approval and necessary grant. After getting the administrative approval and necessary grant, the amount will be deposited with the Sardar Sarovar Narmada Nigam Ltd., for execution of work.

In the meantime breeding of Hilsa ilisha (an anadromous fish likely to be affected by the construction of the dam) has been initiated in Collaboration with CICFRI during July-August, 1989 and 0.75 million hatchlings have been produced. The hatchlings are being reared in the fish farms at Ukai (Surat Dist.) and Umarvada (Bharuch Dist). The CICFRI is contemplating to establish a Hilsa hatchery at Bhadbhut while Dept. of Fisheries is planning to establish a hatchery for prawn near Bharuch.

3. CONSTITUTION OF A NON-STATUTORY INTER-STATE FISHERIES DEVELOPMENT BOARD

Necessity of such a board has been felt. The Fisheries Department officials and officials of the Narmada Nigam visited Tungabhadra Board to study the

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structure and functioning of the board. A draft constitution of the proposed Board is prepared and sent to Narmada control authority.

4. ESTABLISHMENT AND ASSISTING PRIMARY FISHERIES CO-OPERATIVE SOCIETIES

The dykes No.3 and 4 have been stocked with fingerlings of major crops from the year 1986-87 onwards. So far 5,51,700 fingerlings have been stocked. A co-operative society of the displaced adivasis is being formed to exploit these dykes commercially. Karjan dam which is constructed over a tributary of Narmada is also being developed for commercial fishing. So far 18,91 lakhs fingerlings have been stocked in this reservoir. A co-operative society of the adivasis is formed for the exploitation of the reservoir. The Gujarat Fisheries Development Corporation has initiated experimental fishing in the reservoir with the help of adivasi fishermen Co-operative society. 33 fishermen with 11 boats are at present fishing in the reservoir.

Tentative details of Hydrobiological studies to be undertaken in Narmada River Stretch with special reference to the Sardar Sarovar in Collaboration with the Central Inland Capture Fisheries Research Institute.

The important studies suggested in the work plan are as below.

- 1) Morphology of the reservoir.
- 2) Physical and chemical characteristics of water and soil.
- 3) Primary productivity.
- 4) Plankton studies.
- 5) Studies on fauna and flora of the river stretch.
- 6) Fish yield studies.

The department of fisheries has proposed for a separate unit for undertaking these studies. Moreover the Central Inland Capture Fisheries Research Institute, Barrackpore has started an estuarine Fisheries Research unit of Baroda to undertake environmental studies of the river stretch especially the estuarine section. It is possible for the state fisheries Department to get help and Co-operation of the Central Institute for undertaking the above studies in the following way;

The Dept. of Fisheries has no Research Personnel in the Inland Sector. The Central Fisheries can help in training the staff of the new unit. The Central Institute has most of the modern equipments for the hydrological~~xxx~~ studies which can be used by the state unit also.

The State unit will be concentrating mostly on the river stretch above the dam site so as to study the present condition of the river possible changes to take place after impoundment and work out the developmental strategy for the reservoir. The morphology of the proposed reservoir will be studied by the state unit. The Central Institute will be concentrating more in the lower stretch of the river below the dam especially in the estuarine section to study the present conditions of water, biota etc. and make inferences about the possible changes after the dam is completed. Physical and chemical characteristics of the water and soil primary productivity and plankton studies etc. will be common for both in the upper stretch and lower stretch of the river. The data of fish yield, species wise details, so and conditions of fishermen etc. will also be common for both upstream and down stream. The Central Institute will be establishing a hilsa hatchery while the hatchery to be established by the Fisheries Dept. will deal with major crop and fresh water prawn;

The monitoring cell of the Fisheries Dept. will call periodical meeting to plan and review the work being carried out by the Central Institute and the State Unit.

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Environment Sub-Group

सातवीं बैठक का कार्यवृत्त
Minutes Of the Seventh Meeting

19 दिसम्बर, 1989
नई दिल्ली में हुई

Held at New Delhi
19th December, 1989

नई दिल्ली
दिसम्बर, 1989

New Delhi
December, 1989

विषय सूची

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बैठक में भाग लेने वाले अधिकारियों की सूची

पर्यावरण भवन, नई दिल्ली में 19 दिसम्बर, 1989 को हुई नर्मदा नियंत्रण
 प्राधिकरण के पर्यावरण उपदल की सातवीं बैठक
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सचिव, पर्यावरण एवं वन मंत्रालय तथा इस उपदल के अध्यक्ष, श्री महेश प्रसाद ने सभी सदस्यों एवं आमंत्रित अधिकारियों का उपदल की सातवीं बैठक में स्वागत किया तथा तद्रूपरांत कार्यसूची में सम्मिलित मदों पर विचार-विमर्श किया गया ।

भाग लेने वाले अधिकारियों की सूची उपाबंध-सात-बैठक-1 संलग्न है ।

मद सं० सातवीं-१॥३७॥: नर्मदा नियंत्रण प्राधिकरण के पर्यावरण उपदल
की छठी बैठक के कार्यवृत्त की पुष्टि
=====

इस उपदल की छठी बैठक के कार्यवृत्त की पुष्टि कर दी गई । यह भी निर्णय लिया गया कि बैठक की कार्यसूची के उपाबंध-स्क पर यथा संलग्न श्री शेखर सिंह से प्राप्त टिप्पणियों/सुझावों को रिकार्ड में रखा जाएगा ।

मद सं० सातवीं-2॥38॥: पुर्नवास महायोजना

2.1 श्री एस.जी. दाईधरकर, सचिव [पुर्नवास], महाराष्ट्र सरकार ने बताया कि उनके समस्त प्रयत्नों के बावजूद, महाराष्ट्र सरकार, केवल महाराष्ट्र राज्य में बसने के इच्छुक 1393 जनजाति परिवारों के पुर्नवास के लिए गैर वन्य भूमि उपलब्ध कराने में असफल रही है। ये जनजाति परिवार, अपनी सामाजिक, सांस्कृतिक एवं आर्थिक स्थितियों के कारण, केवल वन्य भूमि में ही पुर्नवास के इच्छुक हैं और एक आकर्षक पुर्नवास प्रस्ताव के बावजूद, ये लोग न तो गुजरात में जाने के लिए तैयार हैं और न ही उसी जिले में परियोजना के सिंघाई कमान-क्षेत्र में पुर्नवास के इच्छुक हैं। उन्हें ऐसा आश्वासन कभी नहीं दिया गया था कि उन्हें वन्य भूमि आवंटित की जाएगी। बहरहाल, विश्व बैंक के साथ भारत-सरकार के हुए एक समझौते में यह उल्लेख है कि आवश्यक होने पर, पुर्नवास के लिए वन्य भूमि अवमुक्त कर दी जाएगी। नर्मदा जल विवाद न्यायाधिकरण के पंचाट में भी विस्थापितों को उनकी पसंद की भूमि देने का प्रावधान है। 2583.42 हेक्टेयर वन्य भूमि को अवमुक्त करने के महाराष्ट्र के प्रस्ताव को भारत सरकार द्वारा स्वीकृत न किए जाने के कारण, यह मामला अदर में लटका पड़ा है। जून, 1990 के बाद, जलमग्नता प्रारम्भ हो जाएगी, नौ गांवों के विस्थापित प्रभावित हो जाएंगे और उनके पुर्नवास की समस्या और भी गम्भीर हो जाएगी क्योंकि पंचाट के अनुसार जलमग्नता तब तक नहीं हो सकती जब तक कि वहां के विस्थापितों का पुर्नवास नहीं किया जाता। अतः उन्होंने अध्यक्ष महोदय से प्रस्ताव पर पुनः विचार करने का अनुरोध किया। अध्यक्ष महोदय ने संकेत दिया कि यद्यपि उनको यह बताया गया है कि महाराष्ट्र सरकार द्वारा प्रस्तावित वन्य भूमि में अच्छी किस्म के वन हैं, तो भी वे भारत के वन महानिरीक्षक द्वारा क्षेत्र का दौरा करने के बाद, दी जाने वाली उसकी रिपोर्ट की प्रतीक्षा करेंगे।

2.2 श्रीमती राधा सिंह, संयुक्त सचिव, जल संसाधन मंत्रालय ने स्पष्ट किया कि वर्तमान स्थिति के लिए महाराष्ट्र सरकार को दोषी नहीं ठहराया जा सकता क्योंकि वे सभी सम्भव विकल्पों पर विचार करने के उपरांत भी इसका कोई उपयुक्त हल ढूँढने में समर्थ नहीं हो पाए हैं। यह मामला लम्बे अर्से से विलम्बित पड़ा है और क्योंकि जून, 1990 में जलमग्नता प्रारम्भ हो जायगी, इसलिए और देरी करने से निर्माण अनुसूचि पर कुप्रभाव पड़ेगा।

2.3 श्री एच.एस. पन्वर ने कहा कि महाराष्ट्र सरकार संकट-स्थिति का निर्माण करने के प्रयत्न कर रही है ताकि इस मामले को एक विशेष मामले के रूप में हल किया जा सके परन्तु, वह बांध के निर्माण के समस्त पर्यावरण सम्बंधी सुरक्षा उपायों के कार्यान्वयन पर कार्यवाही नहीं कर रही है।

2.4 डा. एस.सी. मौद्गल ने स्पष्ट किया कि यह मामला इसलिए संकटपूर्ण बन गया है क्योंकि पर्यावरणीय पहलुओं का कार्यान्वयन किस बिना ही इंजीनियरी कार्यों का निर्माण चलता रहा है। उन्होंने सदस्यों को बताया कि 18.12.1989 को मुख्य सचिव, महाराष्ट्र सरकार ने सचिव, पर्यावरण तथा वन मंत्रालय के साथ एक बैठक की थी जिसमें निम्नलिखित मुद्दे उभरकर सामने आए थे :-

1. जबकि पंचाट में इस बात का तो स्पष्ट उल्लेख है कि पुर्नवास विस्थापितों की इच्छा को ध्यान में रखकर ही किया जायगा, परन्तु इसमें इस बात का जिक्र नहीं है कि पुर्नवास वन्य भूमि में किया जाना आवश्यक है। निःसंदेह, वन्य भूमि की अवमुक्ति से वन संरक्षण अधिनियम, 1980 का अतिक्रमण ही होगा।
2. ऐसा लगता है कि आज तक, विस्थापितों के यही विचार बने हुए थे कि उन्हें वन्य भूमि मिलेगी। विस्थापितों को यह स्पष्ट रूप से नहीं बताया गया कि वन्य भूमि उपलब्ध नहीं होगी। अब उन्हें स्थिति स्पष्ट कर दी जाए तथा उनके साथ अन्य व्यवहार्य विकल्पों पर बातचीत की जाए। जल संघयन का समय अर्थात् जून, 1990 के आने में अभी 7-8 महीने पड़े हैं। यदि पुर्नवास का कोई हल नहीं मिल सका तो, परियोजना के निर्माण कार्यों को रोकने के सिवा कोई विकल्प नहीं रह जायगा।

मद सं० सातवीं-३॥३१॥: चरणबद्ध आवाह क्षेत्र उपचार
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सरदार सरोवर परियोजना के आवाह क्षेत्र-उपचार की लागत का
वादी राज्यों में बंटवारा
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३.१ श्रीमती राधा सिंह ने बताया कि आवाह क्षेत्र-उपचार की लागत के बंटवारे का मामला सरकारी क्षेत्र के परामर्शी संगठन [वाष्कोस] को सौंप दिया गया है और आशा है कि इस महीने के अंत तक जल संसाधन मंत्रालय दिशा निर्देश देने की स्थिति में हो जाएगा तथा ३१ जनवरी, १९९० तक प्रत्येक परियोजना के लागत-विभाजन के सभी पहलुओं को निर्धारित कर दिया जाएगा।

डा० एस०सी० मोद्गल ने इच्छा व्यक्त की कि लागत-विभाजन को अंतिम स्म देने से पूर्व पर्यावरण तथा वन मंत्रालय के साथ परामर्श किया जाए तथा बैठकें की जाएं ताकि इसमें सभी पहलुओं को सम्मिलित किया जा सके।

मध्य प्रदेश सरकार के प्रतिनिधि ने अनुरोध किया कि परामर्शी संगठन के साथ तय हुए विचारार्थ-विषयों की प्रतिवादी राज्यों को भी उपलब्ध करा दी जाए। श्रीमती सिंह ने स्पष्ट किया कि इसके लिए कोई निश्चित विचारार्थ-विषय नहीं है। यह दृष्टिकोण योजना आयोग के इस निर्देश पर आधारित है कि परियोजना की गतिविधियों के फलस्वरूप पर्यावरण तथा वास्तविकता को हुई सीधी क्षतियों को परियोजना पर ही प्रभावित किया जाए तथा समग्र स्वीकृत परियोजना के अंतर्गत समाहित अन्य मदों का क्रियान्वयन राज्य सरकार द्वारा विशेष स्म से नामित अभिकरण की समग्र देख-रेख में, सम्बंधित विभाग द्वारा किया जाएगा। डा० मोद्गल ने बताया कि पर्यावरण तथा वन मंत्रालय ने अपने स्वीकृति पत्र में यह विनिर्दिष्ट कर दिया था कि मुक्त अपवाहन क्षेत्र के उपचार की लागत परियोजना पर ही प्रभावित करनी होगी। अतः उन्होंने चाहा कि इस प्रबंध के तैयार हो जाने पर लागत-बंटवारे के नियमों को अंतिम स्म देने से पूर्व इसे परिष्कृत किया जाए अथवा इस पर बैठक बुलाई जाए।

- कार्यवाही: मध्य प्रदेश सरकार

सरदार सरोवर परियोजना

मध्य प्रदेश सरकार

3.2 मध्य प्रदेश सरकार के प्रतिनिधि ने बताया कि आवाह क्षेत्र-उपचार के उद्देश्य के लिए इस समय 15 उपमंडल कार्यरत है। अतः प्रत्याशा है कि यह कार्य और अधिक तेजी से आगे बढ़ेगा। दातूनी एवं घोड़ापछार आवाह क्षेत्रों में दो मुख्य अध्ययन कृषि वित्त निगम, भोपाल को सौंपे गए हैं और उन्होंने वादा किया कि दातूनी की अध्ययन रिपोर्ट अगले छः महीने के भीतर प्रस्तुत कर दी जाएगी। रिपोर्टों के प्राप्त होने के बाद आगे की कार्यवाही की जाएगी। इन दोनों मुख्य क्षेत्रों के उपचार का कार्य 1994 के अंत तक पूरा कर लिया जाएगा। चूंकि नर्मदा सागर परियोजना तथा सरदार सरोवर परियोजना के पर्यावरण सम्बंधी पहलुओं के अध्ययनों और गतिविधियों की वर्तमान स्थिति-प्रलेख की सीमित प्रतियां ही प्रस्तुत की गई थी, सदस्य विद्युत नर्मदा नियंत्रण प्राधिकरण ने मध्य प्रदेश सरकार के प्रतिनिधि से अनुरोध किया कि सदस्यों में परिपत्रित करने के लिए प्रलेखों की प्रतियां समुचित संख्या में ही उपलब्ध कराई जाएं। डा. शेखर सिंह ने सचिव, पर्यावरण तथा वन मंत्रालय को लिखे दिनांक 9 अक्टूबर, 1989 के अपने पत्र का उल्लेख किया जिसके साथ उन्होंने मध्य प्रदेश सरकार द्वारा प्रस्तुत की गई आवाह क्षेत्र-उपचार योजना पर अपने प्रश्न एवं टिप्पणियां भेजी थीं। यह पत्र सदस्यों को प्राप्त नहीं हुआ था। प्रति उपाबंध-सात-कार्यवृत्त-दो पर संलग्न है। इस पत्र में उल्लिखित बातों पर अगली बैठक में विचार किया जाएगा।

3.3 मध्य प्रदेश सरकार द्वारा प्रस्तुत भौतिक प्रगति पर चर्चा करते हुए डा. मौद्गल ने कहा कि आवाह क्षेत्र-उपचार कार्य की प्रगति बहुत धीमी है और कार्य की वर्तमान गति को देखते हुए ऐसा लगता है कि निर्धारित लक्ष्य अगले 5-6 वर्षों में भी प्राप्त नहीं किए जा सकेंगे। उन्होंने मध्य प्रदेश सरकार से यह जानना चाहा कि अध्ययनों को पूरा करने तथा निर्धारित समय सीमा के भीतर उन्हें कार्यान्वित करने हेतु उनकी क्या योजना है। मध्य प्रदेश सरकार ने बताया कि अब तक निर्मित अवसंरचना, घर, स्कूल, चिकित्सालय आदि अध्ययनों को

तथा उपचारापेक्षित प्राथमिकता वाले क्षेत्रों के उपचार को भी पूरा करने के लिए पर्याप्त होगी। उप-जल विभाजकों के प्राथमिकता निर्धारण कार्य समाप्त होने के बाद विस्तृत परियोजना रिपोर्ट तैयार की जाएगी। दूसरे तथा तीसरे चरण के बारे में कोई उल्लेख नहीं किया गया।

- कार्रवाई: म.प्र. सरकार

3.4 श्री शेखर सिंह ने बताया कि पायलट परियोजनाएं 1994 तक पूरी की जानी आयोजित है। यदि वास्तविक आवाह क्षेत्र उपचार कार्य उसके बाद हाथ में लिए जाने हैं, तो उन्हें जलाशयों में संघयन शुरू से करने, पूर्ण समाप्त करना सम्भव नहीं होगा और परिणामस्वरूप, जलाशय में गाद जमाव हो जाएगा। इसके उत्तर में मध्य प्रदेश सरकार के प्रतिनिधि ने बताया कि नर्मदा सागर परियोजना में संघयन करने से पूर्व आवाह क्षेत्र उपचार कार्यों को पूरा कर लिया जाएगा परन्तु सरदार सरोवर परियोजना को नहीं।

3.5 अध्यक्ष महोदय ने जानना चाहा कि जबकि आवाह क्षेत्र उपचार भारत में नया नहीं है और देश के विभिन्न भागों में विभिन्न प्राधिकरणों द्वारा ऐसे कार्य किए जाते रहे हैं तो इन पायलट परियोजनाओं की क्या आवश्यकता है। मध्य प्रदेश सरकार के प्रतिनिधि ने इस तथ्य को स्वीकारते हुए कहा कि प्रत्येक धाटी के कुछ अपने विशिष्ट लक्षण होते हैं। इसलिए अपेक्षित उपचार की विभिन्न कोटियों का पता लगाने के लिए इन परियोजनाओं को हाथ में लिया गया है। बहरहाल, मुख्य उपचार कार्य भी पायलट परियोजनाओं के साथ-साथ हाथ में लिए जाते रहेंगे, और समय पर पूरे कर लिए जाएंगे।

3.6 डा॰ कट्टी ने सलाह दी कि तकनीकी दृष्टिकोण से, पायलट परियोजनाओं को शुरू करने का कोई औचित्य नहीं है। अतः पायलट परियोजनाएँ केवल अकादमिक लाभ के लिए ही हो सकती हैं। उन्होंने यह भी स्पष्ट किया कि उपचार किए गए क्षेत्र को स्थायीकृत होने के लिए दो वर्ष का समय अपेक्षित होगा। अतः उपचार कार्य को जल संघयन से बहुत पहले पूरा किया जाना आवश्यक है।

3.7 डा० मोद्गल ने आशंका व्यक्त की कि वन्य/वन्य जीव सम्बंधी सुनिश्चित मानदण्डों के अनुसार, यह कार्य समय-सीमा के भीतर पूरा नहीं किया जा सकेगा । मध्य प्रदेश सरकार के प्रतिनिधि ने बताया कि दो परिमंडलों के अतिरिक्त वन विकास निगम भी बनी हुई है, जोकि इसमें से कुछ कार्य अपने हाथ में ले रही है । गैर वन्य क्षेत्रों सम्बंधी कार्य हाथ में लेने के लिए भी 15 उप मंडल बना दिए गए हैं । यह ठीक है कि यह कार्य बहुत बड़ा है, परन्तु इसे निष्पादित किया जा सकता है । 13 जल विभाजकों को अभिज्ञात किया जा चुका है जिनमें से 7 के ब्यौरे प्राप्त हो चुके हैं शेष 6 के ब्यौरे दिसम्बर, 1989 के अंत तक प्राप्त हो जाने प्रत्याशित है । इन ब्यौरों के प्राप्त हो जाने के बाद विस्तृत परियोजना रिपोर्ट तैयार करके एक सुनिश्चित समय सूची तैयार कर ली जायेगी ।

3.8 अध्यक्ष महोदय के विचार में यह एक श्रम-साध्य गतिविधि है अतः इसकी गति और तीव्र की जा सकती है । मध्य प्रदेश राज्य के प्रतिनिधि ने बताया कि जब तक विस्तृत रिपोर्ट उपलब्ध नहीं हो जाती, तब तक यथार्थ समय-सीमा बता पाना सम्भव नहीं है । यह एक विशाल प्रयोग है और यथार्थ समय अनुसूची बताने से पूर्व कुछ और समय लगेगा । बहरहाल, अगले 6 महीने में वे समय-सीमा बताने में समर्थ हो जायेंगे । अध्यक्ष महोदय ने 6 महीने की अवधि को अधिक लम्बी बताते हुए कहा कि यह बेहतर होगा कि इसे और जल्दी सम्पन्न कर लिया जाए ।

सरदार सरोवर परियोजना

मध्य प्रदेश सरकार

3.9 मध्य प्रदेश सरकार के प्रतिनिधि ने सूचित किया कि सम्बंधित अध्ययन गोविंदराम सेक्सरिया प्रौद्योगिकी एवं विज्ञान संस्थान द्वारा दिसम्बर, 1989 तक पूरे कर लिए जायेंगे । उसके बाद अंतिम कार्य योजना बनाने के उद्देश्य से उप-जल विभाजक स्तर पर प्राथमिकता निर्धारित करने का कार्य हाथ में लिया जायेगा और कार्य योजना सितम्बर, 1990 तक पूरी कर ली जायेगी । अध्यक्ष महोदय ने निर्देश दिया कि ये अध्ययन, निश्चित स्म से, उक्त समय तक पूरे कर लिए जाए ।

गुजरात सरकार

3.10 श्री सी.के. कोशी ने बताया कि सभी योजनाएँ तैयार कर ली गई हैं और उनका कार्यान्वयन किया जा रहा है। गुजरात सरकार का वन विभाग इस गतिविधि में शामिल है।

महाराष्ट्र सरकार

3.11 महाराष्ट्र सरकार ने इन अध्ययनों को गोविंदराम सेक्सारिया प्रौद्योगिकी एवं विज्ञान संस्थान को सौंप दिया है और उनके वन संरक्षक रिपोर्ट को शीघ्र तैयार करवाने के लिए अगले सप्ताह इन्दौर जा रहे हैं। प्रत्याशा है कि रिपोर्ट दिसम्बर, 1989 के अंत तक प्राप्त हो जायगी।

मद सं० सातवीं-4॥40॥: प्रतिपूरक वनरोपण

नर्मदा सागर परियोजना

4.1 मध्य प्रदेश सरकार के प्रतिनिधि ने बताया कि प्रतिपूरक वनरोपण के लिए 10.143 हेक्टर गैर वन्य भूमि तथा 70.802 हेक्टर विवृत वन्य भूमि को अभिज्ञात किया जा चुका है। नवम्बर, 1989 तक 3,772 हेक्टर गैर वन्य भूमि हस्तांतरित कर दी गई थी। शेष गैर वन्य भूमि को हस्तांतरित करने के लिए कार्यवाही की जा रही है। उन्हें आशा है कि वे अब से 9,000 हेक्टर प्रति वर्ष की दर से वनरोपण कार्य करने में समर्थ है। 9 जिला वन अधिकारी, 2 वन संरक्षक तथा एक मुख्य वन संरक्षक, सम्बंधित कर्मचारियों के साथ कार्यरत हैं। 1988-89 में 132 हेक्टर गैर वन्य भूमि में पेड़ लगाए गए थे। जुलाई 1989 में 1,229 हेक्टर वन्य भूमि तथा 622 हेक्टर गैर वन्य भूमि में वनरोपण का कार्य किया गया।

4.2 श्री सी.जी. पटनायक, उप महानिरीक्षक [वन], पर्यावरण तथा वन मंत्रालय ने आगाह किया कि चूंकि मध्य प्रदेश सरकार ने 75 हेक्टर वन्य भूमि का बिना अनुमोदन लिए विनाश करके वन [संरक्षण] अधिनियम का अतिक्रमण किया है, इसलिए उन्हें 82,000 हेक्टर विवृत वन्य भूमि में अतिरिक्त प्रतिपूरक वनरोपण करना पड़ेगा। मध्य प्रदेश सरकार के प्रतिनिधि ने बताया कि पर्यावरण तथा वन मंत्रालय द्वारा बिजली-धर के लिए 50 हेक्टर भूमि ही अनुमोदित की गई है, और स्थल से खोदी गई सामग्री को डालने के लिए कोई स्थान नहीं दिया गया है। उपर्युक्त 75 हेक्टर वन्य भूमि का अतिक्रमण करने से परियोजना प्राधिकरण को और अंततः पूरे राष्ट्र को एक बहुत विशाल धन राशि की बचत होती है जो अन्यथा खोदी गई सामग्री को कहीं और दूर स्थित स्थान पर फेंकने के लिए ठेकेदार को अदा करनी पड़ती। श्रीमती राधा सिंह ने इस बात का समर्थन किया।

4.3 मध्य प्रदेश सरकार ने अध्यक्ष महोदय से निर्माण सामग्री की प्राप्ति के लिए वन क्षेत्र में एक खदान खोलने की अनुमति देने के लिए अनुरोध किया। अध्यक्ष महोदय ने उत्तर में कहा कि पर्यावरण तथा वन मंत्रालय की एक समिति 29.12.1989 को सम्बंधित स्थल का निरीक्षण करेगी तथा इस उद्देश्य के लिए भूमि का आवंटन करने की सम्भावनाओं पर विचार करेगी और साथ-साथ वन्य भूमि के व्यपर्जन के लिए शांति भी निर्धारित करेगी।

अभिज्ञात नहीं की जा सकी । पर्यावरण तथा वन मंत्रालय के 6.9.1989 के पत्र के उत्तर में 26.9.1989 को एक विस्तृत रिपोर्ट उनको भेजी गई थी । उन्होंने यह भी स्पष्ट किया कि कच्छ जिले में प्रतिपूरक वनरोपण करके, कमान क्षेत्र में एक नया वन्य क्षेत्र बना रहे है ।

4.7 अध्यक्ष महोदय ने सुझाव दिया कि परियोजना प्रभावि क्षेत्र में ही उपयुक्त क्षेत्र को दूर करने के लिये तही दिशा में प्रयत्न किए जाने चाहिये और 29.12.1989 को क्षेत्र का दौरा करने जाने वाली समिति को इसकी भी जांच करनी चाहिए ।

महाराष्ट्र सरकार

4.8 महाराष्ट्र सरकार के प्रतिनिधि ने उपदल को सूचित किया कि 3,600 हेक्टेयर भूमि के लिए प्रस्ताव एक सप्ताह के भीतर पर्यावरण तथा वन मंत्रालय को भेज दिए जायेंगे ।

मद सं० सातवीं-5॥4॥: कमान क्षेत्र विकास =====

नर्मदा सागर परियोजना

5.1 मध्य प्रदेश सरकार के प्रतिनिधि ने बताया कि कमान क्षेत्र के विकास की प्रस्तावित खाका-योजना के ब्यौरे नर्मदा नियंत्रण प्राधिकरण सचिवालय को प्रस्तुत किए जा चुके हैं। इस सम्बंध में एक विस्तृत नोट उपाबंध-सात कार्यवृत्त-तीन पर संलग्न है। जिस पर अगली बैठक में चर्चा की जाएगी।

सरदार सरोवर परियोजना

5.2 गुजरात सरकार के प्रतिनिधि ने बताया कि माही पारण के उपरांत 6 अध्ययनों का कार्य प्रारम्भ कर दिया गया है तथा इन अध्ययनों को सम्पन्न करने की समय-योजना से समय पर अवगत करा दिया जाएगा। श्री कट्टी ने अनुरोध किया कि इन अध्ययनों की सेवा-शर्तों को सदस्यों को भेज दिया जाए। कार्यवाही गुजरात-सरकार।

मद सं० सातवीं-642: वनस्पति एवं जीव-जन्तु सर्वेक्षण और पुरातत्व वैज्ञानिक अध्ययन

नर्मदा सागर परियोजना

6.1 मध्य प्रदेश सरकार के प्रतिनिधि ने सूचित किया कि भारतीय वन्य जीव संस्थान के साथ विचारार्थ विषयों को अंतिम स्म दे दिया गया है तथा अध्ययन कार्य प्रगति पर है ।

पुरातत्व वैज्ञानिक अध्ययन

6.2 40 शिल्प-तट्टों में 20 देवास जिले में तथा 20 होशंगाबाद जिले में का सर्वेक्षण कार्य पूरा कर लिया गया है तथा शेष कार्य 31.3.1990 तक पूरा कर लिया जा सगा । वर्तमान स्थान से स्थानांतरित किए जाने वाले कतिपय स्मारकों को अभिज्ञात किया जा चुका है तथा उनके पुनरवस्थापन के लिए भारतीय पुरातत्व सर्वेक्षण विभाग को समुचित धन राशि उपलब्ध करा दी गई है । पुनरवस्थापन योजनाएं अभी तैयार की जानी हैं ।

नृविज्ञान सर्वेक्षण

6.3 मध्य प्रदेश सरकार ने भारतीय नृविज्ञान सर्वेक्षण विभाग के महानिदेशक से इस कार्य को हाथ में लेने हेतु अनुरोध किया था जिसे उन्होंने अत्यधिक बड़े कार्य की संज्ञा देकर, अस्वीकार कर दिया था । अब इस सर्वेक्षण कार्य को जनजाति अनुसंधान संस्थान को सौंपने का निर्णय लिया है । "विचारार्थ विषयों" को 10-15 दिनों में अंतिम स्म देकर सदस्यों को उपलब्ध करा दिए जायेंगे ।

सरदार सरोवर परियोजना

वनस्पति एवं जीव-जन्तु

6.4 मध्य प्रदेश सरकार के प्रतिनिधि ने सूचित किया कि भारतीय वन्य जीव संस्थान के साथ विचारार्थ विषयों को इस महीने के अंत तक अंतिम स्म दे दिया जा सगा ।

6.5 महाराष्ट्र सरकार के श्री एस.जी. दाईधकर ने सूचित किया कि सम्बंधित प्रस्ताव हाल ही में मध्य प्रदेश सरकार को भेजा गया है और वे उन्हीं "विचारार्थ विषयों" के आधार पर यह मामला उन्हें सौंपने हेतु सांख्यिक विषयविद्यालय और राज्य वन अनुसंधान संस्थान, मध्य प्रदेश के साथ बातचीत करेंगे ।

6.6 गुजरात में आर्थिक पर्यावरणीय तथा वन्य जीव प्रबंध अध्ययनों, जिनमें विषय बैंक एवं पर्यावरण तथा वन मंत्रालय के सुझाव शामिल कर लिए गए हैं, के लिए विचारार्थ विषय कार्यसूची के उपाबंध-5 द्वारा परिपत्रित किए जा चुके हैं । अध्यक्ष महोदय के अनुरोध पर श्री शेखर सिंह इस विचारार्थ विषय की संवीक्षा करके अपनी टिप्पणी शीघ्र भेजने के लिए सहमत हो गए ।

पुरातत्व वैज्ञानिक अध्ययन

6.7 मध्य प्रदेश सरकार ने ये अध्ययन राज्य के पुरातत्व विभाग को सौंप दिए हैं तथा सर्वेक्षणों के लिए कुछ अदायगियां भी कर दी गई हैं जोकि आशा है, 31.3.90 तक पूरे हो जाएंगे । कतिपय ऐसे स्मारकों बाजीराव पेशवा की छतरी एवं चौबीस अवतार मन्दिर को अभिज्ञात कर लिया गया है जिन्हें वहां से स्थानांतरित करना आवश्यक होगा । इस उद्देश्य के लिए समुचित धन राशि भी भारतीय पुरातत्व विज्ञान सर्वेक्षण विभाग को उपलब्ध करायी जा चुकी है । मध्य प्रदेश सरकार का इस धाटी में पास गए शिल्प-तथ्यों को एक संग्राहलय में रखने का प्रस्ताव है ।

6.8 गुजरात सरकार के प्रतिनिधि ने बताया कि शूलपाणेश्वर तथा हम्पेश्वर मन्दिरों के न्यासी इन मन्दिरों को निषिद्ध किए गए अन्य स्थान पर स्थानांतरित करने पर सहमत हो गए हैं ।

नृविज्ञान अध्ययन

6.9 इन सर्वेक्षण कार्यों को जनजाति अनुसंधान संस्थान को सौंपने का निर्णय हो लिया गया है । "विचारार्थ विषयों" को 10-15 दिनों में अंतिम रूप देकर सदस्यों को प्रस्तुत कर दिया जाएगा ।

मद सं० सातवीं-7॥43॥: परिवेशी क्षेत्रों की वहन क्षमता
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नर्मदा सागर परियोजना

मध्य प्रदेश सरकार

7.1 मध्य प्रदेश सरकार के प्रतिनिधि ने सूचित किया कि इस कार्य के सम्बंध में भारतीय वन्य प्राणि संस्थान, देहरादूर के साथ बातचीत की जा चुकी है। विचारार्थ विषयों को अंतिम स्म दिया जा चुका है और संस्थान ने कार्य आरम्भ कर दिया है, जिन्हें इन अध्ययनों को पूरा करने में तीन वर्ष का समय लगेगा। पशुओं की पुनरवस्थापना सम्बंधी अध्ययन भी फ्रेण्ड्स ऑफ नेचर सोसाइटी को सौंप दिए हैं। कार्य योजना अभी तैयार की जानी है।

7.2 श्री शेखर सिंह ने सूचित किया कि उन्हें जनता से शिकायत मिली है कि कुछ पेड़ गिरा दिए गए हैं। मध्य प्रदेश सरकार के प्रतिनिधि ने उत्तर दिया कि अपराधिकृत स्म से कोई पेड़ नहीं गिराया गया है।

सरदार सरोवर परियोजना

मध्य प्रदेश सरकार

7.3 मध्य प्रदेश सरकार के प्रतिनिधि ने बताया कि सागर विश्वविद्यालय तथा राज्य वन अनुसंधान संस्थान, के अतिरिक्त जबलपुर विश्वविद्यालय से भी सम्पर्क स्थापित किया गया है। विचारार्थ विषयों को इस माह के अंत तक अंतिम स्म दे दिया जाएगा।

महाराष्ट्र सरकार

7.4 महाराष्ट्र सरकार के प्रतिनिधि ने सूचित किया कि मध्य प्रदेश सरकार को उसी संस्थान/संस्थानों के साथ विचारार्थ विषयों को तय करने के लिए बातचीत करने हेतु प्राधिकृत किया जा चुका है जिनको वे अपना कार्य सौंपेंगे।

गुजरात सरकार

श्री शेखर सिंह, विचारार्थ विषयों की जांच करेंगे तथा अपनी टिप्पणियों को शीघ्र ही पर्यावरण तथा वन मंत्रालय को प्रस्तुत कर देंगे ।

मद सं० सातवीं-844: भूकम्पीयता एवं जलाशय की रिम-स्थायित्व

॥क॥ जलाशय द्वारा प्रेरित भूकम्पीयता

नर्मदा सागर परियोजना

8.1 मध्य प्रदेश सरकार के प्रतिनिधि ने सूचित किया कि उपस्करों के आयात के लिए इलेक्ट्रानिकी विभाग का अनुमोदन मिल गया है और उन्होंने अब कम्प्यूटर उपस्करों के आयात करने के लिए भी अपनी स्वीकृति दे दी है। अब आर्थिक कार्य विभाग तथा तकनीकी विकास महानिदेशालय से स्वीकृति लेनी रह गई है। गुजरात सरकार से मध्य प्रदेश सरकार की ओर से उसी फर्म को आदेश देने के लिए अनुरोध किया जा रहा है जिनसे उन्होंने सरदार सरोवर परियोजना के लिए ऐसे ही उपस्कर खरीदे थे।

सरदार सरोवर परियोजना

8.2 मध्य प्रदेश के प्रतिनिधि ने बताया कि इस समय भवनों का निर्माण कार्य चल रहा है जिसके पूरा हो जाने पर आवश्यक कर्मचारियों की व्यवस्था कर दी जाएगी।

॥ख॥ जलाशय रिम-स्थायित्व

नर्मदा सागर परियोजना

8.3 मध्य प्रदेश सरकार के प्रतिनिधि ने बताया कि भारतीय भूवैज्ञानिक सर्वेक्षण विभाग की सर्वेक्षण रिपोर्ट पर्यावरण तथा वन मंत्रालय को भेजी जानी है, जोकि अभी भारतीय भूवैज्ञानिक सर्वेक्षण विभाग से प्राप्त नहीं हुई है।

- कार्यवाही: मध्य प्रदेश सरकार

सरदार सरोवर परियोजना

8.4 गुजरात सरकार के प्रतिनिधि ने सूचित किया कि सरदार सरोवर परियोजना के डूब क्षेत्र के गुजरात में स्थित भाग के अध्ययन कार्य भारतीय भूवैज्ञानिक सर्वेक्षण विभाग द्वारा पूरे किए जा चुके हैं तथा रिपोर्ट से पता चलता है कि गुजरात के क्षेत्र में जलाशय की रिम पूर्णतया सुरक्षित है। महाराष्ट्र और मध्य प्रदेश में स्थित जलाशय की रिम का अध्ययन कार्य एक वर्ष पहले भारतीय भूवैज्ञानिक सर्वेक्षण विभाग, नागपुर ने किया था। उनकी रिपोर्ट पर्यावरण तथा वन मंत्रालय एवं नर्मदा नियंत्रण प्राधिकरण को प्रस्तुत की जानी है।

-कार्यवाही: गुजरात सरकार

मद सं० सातवीं-१॥४५॥: स्वास्थ्य सम्बंधी पहलु
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नर्मदा सागर परियोजना

१०१ नर्मदा सागर परियोजना से सम्बद्ध स्वास्थ्य-पहलुओं पर मध्य-प्रदेश सरकार के प्रस्तावों पर पर्यावरण एवं वन मंत्रालय की टिप्पणियाँ नर्मदा नियंत्रण प्राधिकरण द्वारा मध्य प्रदेश सरकार को भेज दी गई थी। बहरहाल, ये टिप्पणियाँ उन्हें अभी तक मिली नहीं थी। मध्य प्रदेश सरकार के प्रतिनिधि उसकी एक प्रति नर्मदा नियंत्रण प्राधिकरण के सचिवालय से ले लेंगे।

सरदार सरोवर परियोजना

१०२ सरदार सरोवर परियोजना पर विशेष स्म से कोई चर्चा नहीं हुई।

१०३ बहरहाल, मध्य प्रदेश सरकार तथा महाराष्ट्र सरकार के प्रतिनिधियों ने सदस्यों में परिचालित करने हेतु दो नोट उपलब्ध कराए। ये दोनों नोट उपाबंध-सात कार्यवृत्त-चार एवं पांच पर संलग्न हैं जिन पर अगली बैठक में चर्चा की जाएगी।

मद सं० सातवीं-10॥46॥: सरदार सरोवर परियोजना/नर्मदा सागर परियोजना
में मत्स्योद्योग विकास

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मध्य प्रदेश सरकार

10.1 तीनों विश्वविद्यालयों नामशः उमरी नर्मदा क्षेत्र के लिए जबलपुर विश्वविद्यालय, मध्य नर्मदा क्षेत्र के लिए बरकतउल्लाह विश्वविद्यालय, भोपाल तथा निम्न नर्मदा क्षेत्र के लिए विक्रम विश्वविद्यालय, उज्जैन के साथ करारों पर हस्ताक्षर हो चुके हैं तथा कार्य को पूरा करने के लिए आवश्यक रकमों की व्यवस्था कर दी गई है। आशा है कि वे इन कार्यों को तीन साल में पूरा कर लेंगे। श्री शेखर सिंह ने इच्छा व्यक्त की कि एक अंतिम रिपोर्ट की बजाए कुछ अंतरिम रिपोर्टों की व्यवस्था की जाए। विश्वविद्यालयों के साथ विचार करके, प्रारम्भिक रिपोर्ट सदस्यों को उपलब्ध कराई जा सकती है।

महाराष्ट्र सरकार

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10.2 महाराष्ट्र में ऐसे अध्ययनों को पूरा करने के लिए यहां सरकार द्वारा राज्य सरकार के मत्स्य निदेशक के साथ मशविरा करके किसी उपयुक्त अभिकरण का पता लगाया जाना है। महाराष्ट्र सरकार के प्रतिनिधि ने कोई ब्यौरा नहीं दिया।

गुजरात सरकार

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10.3 मत्स्योद्योग कार्य योजना के कार्यान्वयन पर अब तक की गई कार्यवाही पर एक संक्षिप्त टिप्पणी कार्यसूची के उपाबंध-चार पर संलग्न है। सदस्यों द्वारा इस पर अपनी टिप्पणियां नर्मदा नियंत्रण प्राधिकरण तथा पर्यावरण तथा वन मंत्रालय को भेजी जाएं।

10.4 डा॰ मौद्गल ने बताया कि यदि पहले के पूर्ण किए जा रहे निर्माण कार्य के कारण यदि इन अध्ययनों की त्रिफारिशों का कार्यान्वयन व्यवहार्य नहीं रह जाता है, तो ये अध्ययन केवल शास्त्रीय ज्ञान की विषय-वस्तु बनकर ही रह जायेंगे।

उदाहरणार्थ सरदार सरोवर में संघर्ष जून, 1990 में आरम्भ किया जाना है । यदि किन्हीं ऐसी प्रवासी जातियों को अभिज्ञात किया जाता है जिनके लिए बांध के भीतर यांत्रिकीकृत मछली उत्पादक का निर्माण आवश्यक हो जाता है, तो ऐसा किया जाना सम्भव न होगा । अतः यह सुझाव दिया गया कि अध्ययनों में लगे संगठनों को सर्वेक्षण शीघ्र पूरे करने के लिए कहा जाए ताकि जलधरों के संरक्षण के लिए उनके द्वारा की गई सिफारिशों को कार्यान्वित किया जा सके ।

- कार्यवाही: गुजरात सरकार

मद सं० सातवीं-११॥४७॥: पर्यावरण विकास केन्द्र की स्थापना =====

इस विषय पर एक संयुक्त प्रबंध डा० कट्टी तथा प्रो० रामशेषन् से अक्टूबर, 1989 तक प्राप्त होना अपेक्षित था। डा० कट्टी ने सूचित किया कि क्योंकि वे देश से बाहर गए हुए थे, इसलिए रिपोर्ट पूरी नहीं की जा सकी। इसके अतिरिक्त इस कार्य से सम्बद्ध संकल्पनाओं को वास्तविक स्तर से समझने के लिए समग्र भौगोलिक क्षेत्र, कुल कमान क्षेत्र आदि जैसे महत्वपूर्ण आंकड़े नर्मदा नियंत्रण प्राधिकरण से प्राप्त किए जाने आवश्यक है। क्योंकि यह कार्य काफी विशाल है इसलिए इसे पूरा करने के लिए प्रो० रामशेषन् के साथ दो बैठकें की जानी आवश्यक होंगी। इसके लिए उन्हें परियोजना रिपोर्टों की भी आवश्यकता पड़ेगी। श्री वीर अमर प्रकाश ने बताया कि परियोजना रिपोर्ट केन्द्रीय जल आयोग में उपलब्ध है और इसके अतिरिक्त यदि किसी अन्य सामग्री की आवश्यकता हो, तो उसे ^{सम्बंधित} राज्य सरकारों से उपलब्ध किया जा सकता है। श्री एन०के० दीक्षित, सदस्य **॥सिप्ल॥** नर्मदा नियंत्रण प्राधिकरण इस बारे में प्रस्तावों को कार्यरत देने के लिए, डा० कट्टी से 15 जनवरी, 1990 को सम्पर्क करेंगे।

मद सं० सातवीं-12/48: पर्यावरणीय प्रबंध पर एक प्रवासी परामर्शदाता
की नियुक्ति
=====

श्रीमती राधा सिंह ने उल्लेख किया कि पर्यावरणीय कार्य योजनाओं को समन्वित करने हेतु यू.एस.आई.ए. की सहायता के अन्तर्गत व्यवस्थित किए जाने वाले एक प्रवासी विशेषज्ञ की सेवाओं का उपयोग करने के विषय बैंक के प्रस्ताव को स्वीकार अथवा अस्वीकार करने पर सलाह देने के लिए जल संसाधन मंत्रालय ने पर्यावरण तथा वन मंत्रालय को लिखा था। अध्यक्ष महोदय ने संकेत दिया कि चूंकि आंकड़े एकत्र किए जा रहे हैं इसलिए पर्यावरणीय कार्य योजनाओं का प्रतिपादन करने हेतु किसी प्रवासी सहायता की अपेक्षा नहीं है।

अध्यक्ष महोदय ने सलाह दी कि स्वीकृत कार्य योजना तैयार करने के लिए भारतीय लोक प्रशासन संस्थान के श्री शेखर सिंह की सेवाओं का उपयोग किया जाए तथा नर्मदा नियंत्रण प्राधिकरण द्वारा यह कार्य श्री शेखर सिंह को सौंपने के प्रस्ताव को इस उपदल ने अपनी स्वीकृति दे दी।

मद सं० सातवीं-1347: प्रचार
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श्रीमती राधा सिंह ने प्रचार का प्रश्न उठाया । परन्तु समय के
अभाव में इस पर विचार नहीं किया जा सका ।

मद सं० सातवीं-14§50§: सामान्य
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श्री वीर अमर प्रकाश द्वारा दिए गए सुझाव पर यह निर्णय लिया गया कि राज्य सरकारों द्वारा तय किए गए सभी विचारार्थ विषयों की प्रतियां सदस्यों को परिपत्रित करने हेतु नर्मदा नियंत्रण प्राधिकरण के सचिवालय को प्रस्तुत की जाए।

अध्यक्ष महोदय ने यह उचित समझा कि अपेक्षित अनुगामी कार्यवाही तथा योजनाओं के प्रतिपादन के लिए अगली बैठक की प्रतीक्षा नहीं करनी चाहिए, जैसा कि पहले किया जाता रहा है। अतः उन्होंने निर्देश दिया कि परियोजना प्रस्तावक प्रत्येक पखवाड़े के अंत में प्राप्त की गई प्रगति की रिपोर्ट नर्मदा नियंत्रण प्राधिकरण को भेजा करें जिसके उपरान्त नर्मदा नियंत्रण प्राधिकरण सम्बंधित विकास से सदस्यों को अवगत कराएंगे। परियोजना प्रस्तावक इस कार्यवाही का अनुसरण करने पर सहमत हो गए।

उपाबंध-सात-कार्यपुस्त-स्क

पर्यावरण भवन, सी.जी.ओ. काम्पलेक्स, लोधी रोड, नई दिल्ली
में 19.12.1989 को 10.30 बजे हुई नर्मदा नियंत्रण प्राधिकरण के
पर्यावरण उप-दल की सातवीं बैठक में भाग लेने वाले अधिकारियों
की सूची

1. श्री महेश प्रसाद, सचिव, पर्यावरण तथा वन मंत्रालय, भारत सरकार, नई दिल्ली
2. श्री वीर अमर प्रकाश, कार्यकारी सदस्य, नर्मदा नियंत्रण प्राधिकरण, नई दिल्ली
3. श्रीमती राधा सिंह, संयुक्त सचिव, जल संसाधन मंत्रालय, नई दिल्ली
4. श्री सी.के. कोशी, सचिव [पुनर्वास], नर्मदा विकास विभाग, गुजरात सरकार
गांधीनगर
5. श्री एस.जी. दाईचंकर, सचिव [पुनर्वास], महाराष्ट्र सरकार, बम्बई
6. श्री डी.आर. धर्माचार्य, सदस्य [पर्या. एवं पुनर्वास], नर्मदा धाटी विकास
प्राधिकरण, भोपाल
7. श्री एस.एस. पन्वर, निदेशक, भारतीय वन्य जीव संस्थान, देहरादून
8. प्रो. आर.के. कट्टी, विशेषज्ञ, बम्बई
9. श्री अशोक खोस्ला, अध्यक्ष, डेप्लामेंट आलर्टनेटिव, नई दिल्ली
10. श्री सी.वी. शर्मा, सदस्य [विद्युत], नर्मदा नियंत्रण प्राधिकरण, नई दिल्ली
11. डा. एस.सी. मौद्गल, सलाहकार, पर्यावरण तथा वन मंत्रालय, नई दिल्ली
12. श्री एस.एम. पाई, सचिव, नर्मदा नियंत्रण प्राधिकरण, नई दिल्ली
13. श्री टी.के. मुखोपाध्याय, विशेषज्ञ [जल विज्ञान], नर्मदा नियंत्रण प्राधिकरण,
नई दिल्ली
14. श्री एस.एस. पटनायक, उप महानिरीक्षक [वन], पर्यावरण तथा वन मंत्रालय,
नई दिल्ली
15. श्री प्रदीप भार्गव, विशेष कार्य अधिकारी, नर्मदा धाटी विकास प्राधिकरण,
भोपाल

16. श्री ओ.पी. शर्मा, उप मुख्य ँवन, नर्मदा धाटी विकास प्राधिकरण, भोपाल
17. श्री एम.बी. मेहता, मुख्य वन संरक्षक, गुजरात सरकार, गांधीनगर
18. श्री ए.वी. गुरुराज राव, विशेषज्ञ ँपर्यावरण, सरदार सरोवर नर्मदा निगम लि० गांधीनगर
19. श्री शेखर सिंह, भारतीय लोक प्रशासन संस्थान, नई दिल्ली
20. श्री के. जगदीश, डेपुटी कमिश्नर, नई दिल्ली
21. श्रीमती नीलम कपूर, सूचना अधिकारी, जल संसाधन मंत्रालय, नई दिल्ली
22. श्री ओ.पी. तक्सेना, उप निदेशक, नर्मदा नियंत्रण, प्राधिकरण नई दिल्ली

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MINUTES OF THE SEVENTH MEETING OF ENVIRONMENT SUB-GROUP HELD ON
19.12.1989 AT PARYAVARAN BHAWAN, NEW DELHI

Shri Mahesh Prasad, Secretary, Ministry of Environment & Forests and Chairman of the Sub-group welcomed the Members and Invitees to the 7th meeting of the Environment Sub-group. Discussion on the agenda items was taken up thereafter.

A list of participants is enclosed at Annex.VII-Min.1.

Item No.VII-1(37): CONFIRMATION OF THE MINUTES OF THE 6TH
MEETING OF ENVIRONMENT SUB-GROUP

The minutes of the Sixth meeting of the Sub-group were confirmed. It was also decided that the comments/suggestions received from Shri Shekhar Singh as indicated in Annex.I of the Agenda Notes for this meeting would form part of the record.

Item No.VII-2(38): REHABILITATION MASTER PLAN

2.1 Shri S.G. Daithankar, Secretary (Rehabilitation) GOM indicated that inspite of their best efforts, GOM was unable to find non-forest land for rehabilitation of 1393 tribal families who have desired to resttle in Maharashtra State only. These tribal families are willing to accept only forest land for their resettlement due to their social, cultural and economic reasons and are neither prepared to go to Gujarat inspite of an attractive rehabilitation package nor are they willing to resettle in command area of the project in the same district. They have never been promised that forest land will be made available to them, though an agreement of the World Bank with the Govt. of India stipulates release of forest land, if required, for rehabilitation. The NWDT award also stipulates provision of land of their choice to the oustees. Due to non-acceptance by the Govt. of India of the proposal of the GOM for diversion of 2583.42 ha. of forest land, the matter has reached a dead end. Oustees of 9 villages will get affected after June, 1990 when the submergence starts and the problem of their resettlement would become rather acute as under the award submergence can be permitted only after resettlement. Therefore, he requested the Chairman to review the proposal again. Chairman indicated that though he has received information that the forest land proposed by GOM has good quality forest, he would await the report of Inspector General, Forest, Govt. of India after his field visit sometime later this month.

2.2 Mrs. Radha Singh, Joint Secretary, MOWR explained that Government of Maharashtra cannot be blamed for the present situation. GOM has tried all possible alternatives, but has failed to find a suitable solution. This issue is pending since long & further delay will seriously upset construction schedule as the submergence will start from June, 1990.

2.3 Shri. H.S. Panwar stated that GOM is trying to create a crisis situation so as to resolve the issue as a special case but they are not pursuing the implementation of the environmental safeguard measures pari-passu with the construction of the dam.

2.4 Dr. S. Maudgal stated that this has become a critical issue because the engineering works have gone ahead without implementing the environmental aspects. He informed the members that on 18.12.89, Chief Secretary, GOM had a meeting with the Secretary, Ministry of Env. & Forests in which the following points emerged:

1. While the Award clearly stipulated that rehabilitation has to be done in consultation with the wishes of the oustees, it does not stipulate that they have to be rehabilitated in forest land. Indeed, release of forest land will only violate the Forest (Conservation) Act, 1980.

2. It seems, until today, the oustees are proceeding under the impression that they might get forest land. The oustees have not been categorically told that the forest land will not be available. This should be done and the next viable alternative explored with them. Only 7-8 months are available before June, 1990, the date for impoundment. If a solution to the rehabilitation is not found, there is no alternative but to stop the construction of the Project.

2.5 Shri V.A. Parkash, Executive Member, NCA stated that the NWDT is clear about the consideration of the willingness/choice of the oustees for their rehabilitation and since the Forest (Conservation) Act came into force after the NWDT award, therefore, it is silent about the use of forest and for the purpose of resettlement.

2.6 Shri Shekhar Singh opined whether it is possible to rehabilitate the oustees from Maharashtra in forest land only by shifting them from one forest to another. This will create serious problems because there are many more tribals in Narmada Sagar, Sardar Sarovar and other projects who were either displaced or will be displaced in future who may also demand to be rehabilitated in forest land only. It is not possible, therefore, to show special consideration for Narmada Project only. An attractive package of compensation should be provided. Ministry of E&F should be careful in taking a decision in this regard.

2.7 Mrs. Radha Singh stated that Ministry of Welfare emphasises the need for resettlement of the tribal oustees in forest only and for that purpose they have already prepared a note for consideration of the Cabinet Committee. Chairman responded that Ministry of Welfare alone cannot decide these issues. The above referred note of the Ministry of Welfare, for example, was not agreed to.

2.8 Chairman stated that a final report on non-availability of alternative land for rehabilitation of the oustees would come from the Chief Secretary, on the basis of discussions held on 18.12.89.

Item No. VII-3(39): PHASED CATCHMENT AREA TREATMENT

Sharing of cost of catchment treatment of SSP by party States

3.1 Mrs. Radha Singh stated that the work of preparation of policy paper for sharing of cost of catchment treatment has been entrusted to a Public Sector Consultancy Organisation (Water & Power Consultancy Service (I) Ltd. and it is expected that by the end of this month, MOWR would be in a position to give the guidelines and by 31st January, 1990, the cost sharing aspects for each project will be worked out. Representative of GOMP desired that the terms of reference given to the Consultancy organisation should be made known to the party States. Mrs. Singh clarified that there were no fixed terms of reference. The approach is based on the directive of the Planning Commission that the direct damage to the environment and ecology due to project activities should be charged to the project and other items which form part of the overall integrated project will be executed by the concerned Deptts. of the State under the overall Co-ordination of an agency to be specified by the State Govt.

Dr. Maudgal pointed out that the Ministry of Env. & Forests had specified in their clearance letter that the cost of treatment of the free draining catchment has to be charged to the project. Therefore, he desired that the paper when ready may either be circulated or a round of talks held before finalising the cost phasing formula.

(Action: Representative, MOWR)

NARMADA SAGAR PROJECT

Govt. of Madhya Pradesh

3.2 Representative of the GOMP stated that for the purpose of catchment area treatment, 15 sub-divisions are now in position and it is, therefore, expected that the work will progress at a faster rate. Agriculture Finance Corporation, Bhopal to whom two pilot studies in Datuni and Ghodapachhar catchments have been entrusted has promised to submit the study report for Datuni by end of December 1989 and for Ghodapachhar within next six months. Further action will be taken after the reports are received. The treatment work of these two pilot area will be completed by the end of 1994. Since, only a limited number of copies giving the status of studies and activities on environmental aspects of NSP and SSP were submitted, Member (Power), NCA requested that GOMP should make available sufficient number of copies for circulation to all members of the Sub-group. Dr. Shekhar Singh mentioned about his letter dated 9.10.89 addressed to the Secretary, Ministry of Env. & Forests enclosing questions and comments on the catchment area treatment plan submitted by GOMP. This letter was not received by members (Copy enclosed at Annex.-VII Min.2). Discussion on the contents of this letter may be held in the next meeting.

3.3 Resuming the discussion on the physical progress submitted by GOMP, Dr. Maudgal indicated that the progress on CAT is very slow and at the present rate of progress, the target may not be achieved in the next 5-6 years. He desired GOMP to indicate how they propose to complete the studies and implement them within the stipulated time frame. GOMP indicated that the infrastructure created so far will be sufficient to complete the studies and for treatment of the priority areas needing treatment as specified in Phase-I. The detailed project report will be drawn up after the prioritisation work of sub-watersheds is completed. Nothing was mentioned regarding 2nd and 3rd phases.

(Action: GOMP)

3.4 Shri Shekhar Singh stated that pilot projects are planned to be completed by 1994. If the actual CAT work is to be taken up after that, there will be no possibility of its completion before impounding of water in the reservoir which would result in silting of the reservoir. On this, representative of GOMP stated that they will be able to complete the CAT before impounding of NSP but not the SSP.

3.5 Chairman wanted to know the utility of pilot projects when CAT is not a new subject in India; rather it is practised in different parts of the country by different authorities. GOMP representative while conceding the fact, stated that every valley has got certain special characteristics and these pilot projects have been taken up to reflect various types of treatment required. However, main CAT work will be taken up side by side with the pilot projects and completed in time.

3.6 Dr. Katti said that technically there is no reason to go for pilot project. So the pilot projects can only be for academic reasons. He also pointed out that it would take two years for the treated area to stabilize and hence the need to complete the treatment much in advance of impoundment.

3.7 Dr. Maudgal stated that on the basis of established Forest Deptt. norms, the work cannot be completed within the proposed time frame. GOMP representative said that in addition to two Circles, there is also Forest Development Corporation which is taking up some of the work. With regard to the non-forest area, they have created 15 sub-divisions which will be undertaking this work. Though the amount of work involved is very much, it can be accomplished. 13 priority water sheds have been identified and details in respect of 7 have been received and in respect of remaining 6, the details are expected by end of December, 1989. Once these details are received, detailed project report will be prepared and a definite work schedule prepared.

(Action: GOMP)

3.8 Chairman was of the view that this is a labour intensive activity and, therefore, could be accelerated. GOMP

representative indicated that unless the detailed reports are available, no realistic time frame can be given. It is a tremendous exercise and it will take time to give a realistic time frame. During the next six months, they will be able to give a time frame. Chairman indicated that six months will be too long and it will be better if it is done expeditiously.

SARDAR SAROVAR PROJECT

Government of Madhya Pradesh

3.9 GOMP representative informed that the studies by Govindram Seksaria Institute of Technology & Science (GSITS) will be completed by December, 1989. Therefore, work of prioritisation at Sub-water sheds would be taken up for drawing up the final Action Plan. The Action Plan will be completed by September, 1990. Chairman desired that the studies should invariably be completed by that time.

Government of Gujarat

3.10 Shri C.K. Koshy stated that all plans are ready and implementation work is going on. Forest Department of GOG is involved in this activity.

Government of Maharashtra

3.11 GOM has entrusted the study to the GSITS and their Conservator of Forests will be visiting Indore next week to get the report expedited. The report is expected by the end of December, 1989.

Item No.VII-4(40): COMPENSATORY AFFORESTATION

Narmada Sagar Project

4.1 GOMP representative stated that 10,143 ha non-forest land and 70,802 ha of degraded forest land has been identified for compensatory afforestation. Upto the end of November, 1989, 3,772 ha of non-forest land has been transferred. Rest of the non-forest land is under process of transfer. He was hopeful to take up henceforth afforestation at the rate of 9,000 ha per year. Nine D.F.Os, two Conservators and one Chief Conservator together with supporting staff are in position. In the year 1988-89 plantation was raised on 132 ha of non-forest area. In July, 1989, afforestation work was carried out on 1,229 ha of forest and 622 ha of non-forest land.

4.2 Shri C.P. Patnaik, D.I.G. (Forest), Ministry of E&F pointed out that GOMP has to raise compensatory afforestation in an additional area of 82,000 ha of degraded forest land as they have violated the Forest (Conservation) Act by destroying 75 ha of forest without prior approval. GOMP representative explained that only 50 ha has been approved by Ministry of E&F for the power house but there is no space for dumping the excavated material from the site. By encroaching upon the above mentioned 75 ha of forest land, the project authorities and, in turn, the nation is saving an enormous amount of money which otherwise would have to be paid to the contractor for disposal of the excavated material over a longer lead. Mrs. Radha Singh also strongly supported this.

4.3 GOMP also requested the Chairman for permitting them to open a quarry for the construction material in forest area. Chairman responded that a Committee of Ministry of E&F would visit the site on 29.12.1989 and see if some land can be allotted for this purpose and settle the penalty for diversion of forest land.

4.4 Shri Patnaik further raised a question regarding planting trees along a belt of 1-2 kms. width on both sides of the river as earlier suggested by Ministry of E&F. It was pointed out by the State Government representatives that the proposal is impracticable as such a stretch of land is extremely difficult to acquire.

Sardar Sarovar ProjectGOMP

4.5 GOMP representative stated that they have already set up Compensatory Afforestation Divisions and Conservator Circles to carry out the work simultaneously in NSP and SSP areas. No time bound plan was, however, made available.

GOG

4.6 GOG representative stated that they are going ahead with the implementation of compensatory afforestation as per afforestation plan of raising plantation in 4650 ha of non-forest area in Kutch district. The team from Ministry of E&F visited the plantation area and found that some area was not suitable because of salinity and GOG has identified an additional 2,000 ha of non-forest area to compensate the unsuitable patches in Kutch district. Out of this, 1088 ha has already been acquired. The success of plantation is about 30% in some cases.

4.7 Shri Shekhar Singh pointed out that compensatory afforestation should be in the Project Impact area and not in a far off region like Kutch. This was pointed out by him in the previous meeting also. Shri Panwar stated that the compensatory afforestation must be raised within the project impact area depending on the availability of suitable land in the vicinity. GOG representative replied that the entire impact area has been surveyed jointly with the State Forest Department and suitable non-forest land could not be identified for this purpose. A detailed report was sent on 26.9.1989 to Ministry of E&f in reply to their letter of 6.9.1989. He also stated that by compensatory afforestation in Kutch, they are creating new forest area in the command.

4.8 Chairman suggested that sincere efforts should be made to find an area in the project impact zone and the Committee visiting on 29.12.1989 could also look into this.

GOM

4.9 GOM representative intimated the Sub-group that the proposals for 3,6000 ha of land will be sent to the Ministry of E&F within a week.

Item No. VII-5(41) - COMMAND AREA DEVELOPMENT

Narmada Sagar Project

5.1 GOMP representative stated that the details of proposed frame work plan for the development of command area has already been submitted to NCA Secretariat. A detailed note in this regard is at Annex-VII Min.3 which could be discussed in the next meeting.

Sardar Sarovar Project

5.2 Representative of GOG indicated that 6 studies have been commissioned beyond Mahi crossing and the time frame for carrying out these studies will be intimated in due course. Shri Katti requested for TOR of these studies to be sent to the Members.

(Action: GOG)

Item No. VII-6(42): SURVEY OF FLORA AND FAUNA AND ARCHAEOLOGICAL STUDIES

NARMADA SAGAR PROJECT

6.1 GOMP indicated that TOR has been finalised with Wildlife Institute of India and the study is going on.

Archaeological Studies

6.2 The surveys have been completed for 40 artifacts (20 in Dewas & 20 in Hoshangabad districts). Remaining will be completed by 31.3.1990. Certain monuments which have to be shifted from their present locations have been identified and adequate funds have been placed at the disposal of Archeological Survey of India for their relocation. Relocation plan has not yet been prepared.

Anthropological Survey

6.3 GOMP had approached the Director General of Anthropological Survey of India who declined to undertake it, the work being too big a task. Now it has been decided to hand over the survey work to the Tribal Research Institute. TOR will be finalised within 10-15 days and given to Members.

SARDAR SAROVAR PROJECT

Flora & Fauna

6.4 GOMP representative informed that TOR with Wildlife Institute will be finalised by the end of this month.

6.5 Shri S.G. Daithankar of GOM informed that they have sent the proposal to GOMP recently and GOMP will pursue the matter with Sagar University and State Forest Research Institute, M.P. with the same TOR.

6.6 The TOR for Eco-environmental and Wildlife Management Studies in Gujarat incorporating the suggestions of World Bank and Ministry of E&F were circulated as Annex.5 to the Agenda. On a request from Chairman, Shri Shekhar Singh agreed to scrutinise the TOR and submit his comments shortly.

Archeological Studies

6.7 GOMP has entrusted these studies to State Archeological Department and some payments has already been made for taking up the survey which are expected to be completed by 31.3.1990. Certain monuments (Bajirao Peswa's Chhatra & Chaubees Avtar Mandir), which have to be shifted, have been identified and adequate funds have been provided to Archeological Survey of India for this purpose. GOMP proposes to create a museum to house the artifacts which are found in the valley.

6.8 GOG representative stated that the trustees of Shoolpaneshwar and Hamfeshwar temples have agreed to relocate the temples for which the sites have been finalised.

Anthropological Studies

6.9 It has been decided to hand over the survey work to Tribal Research Institute. TOR will be finalised within 10-15 days and given to Members.

Item No.VII-7(43): CARRYING CAPACITY OF SURROUNDING AREAS

NARMADA_SAGAR_PROJECT

GOMP

7.1 GOMP representative informed the Sub-group that the work has been negotiated with the Indian Institute of Wildlife, Dehradun. The TOR has been finalised and the Institute has started the field work and will take about 3 years to complete the studies. Friends of Nature Society has also been entrusted with the studies on relocation of animals. Action plans are yet to be worked out.

7.2 Shri Shekhar Singh informed that he has received the complaint from public that some trees have been felled. GOMP replied that there is no case of unauthorised tree felling.

SARDAR_SAROVAR_PROJECT

GOMP

7.3 GOMP representative informed that in addition to Sagar University and State Forest Research Institute, Jabalpur University has also been contacted. The TOR will be finalised by the end of this month.

GOM

7.4 GOM representative informed that GOMP has already been authorised to negotiate the TOR with the same institutions as for GOMP.

GOG

Shri Shekhar Singh will examine the TOR and submit his comments to Ministry of E&F shortly.

Item No.VII-8(44): SEISMICITY AND RIM STABILITY OF RESERVOIR

A. Reservoir Induced Seismicity

NARMADA SAGAR PROJECT

8.1 GOMF representative informed that the case for import of equipment has been approved by the Deptt. of Electronics who have now accorded clearance for import of computer equipment also. Further clearance will be needed from DEA and DGTD. GOG is being requested to place orders on behalf of GOMP on the firm from whom GOG had purchased similar equipment for SSP.

SARDAR SAROVR PROJECT

8.2 GOMP representative stated that presently the buildings are being constructed and after the buildings are completed, necessary staff will be provided.

B. Reservoir Rim Stability

NARMADA SAGAR PROJECT

8.3 GOMF representative stated that detailed report of GSI is to be furnished to the Ministry of E&F, which has not yet been received from GSI.

(Action: GOMP)

SARDAR SAROVAR PROJECT

8.4 GOG representative informed that studies in Gujarat part of SSP submergence have already been completed by GSI and the report reveals that the rim of the reservoir in Gujarat area is completely safe. GSI, Nagpur had undertaken the work on rim stability studies in Maharashtra and Madhya Pradesh one year back. There reports are to be submitted to MOE&F and NCA.

(Action: GOG)

Item No.VII-9(45): HEALTH ASPECTS

NARMADA SAGAR PROJECT

9.1 The comments of the Ministry of E&F on the proposals of GOMP on health aspects of NSP were forwarded by NCA to GOMP. However, as they have not received them, GOMP representative will collect a copy from NCA secretariat.

SARDAR SAROVAR PROJECT

9.2 There was no specific discussion on SSP.

9.3 GOMP and GOM representatives, however, handed over two notes for circulation among members. These are appended at Annex.VII Min.4&5 respectively to be discussed in the next meeting.

Item No.VII-10(46): FISHERIES DEVELOPMENT IN SSP/NSP RESERVOIR

Govt. of Madhya Pradesh

10.1 MOU has been signed with all the three Universities i.e. Jabalpur University for Upper Narmada Zone, Barkatulla University, Bhopal for middle Narmada Zone and Vikram University, Ujjain for lower Narmada Zone and necessary funds have been provided to complete the work. It is expected that they will take 3 years' time to complete the work. Shri Shekhar Singh desired that interim reports should be detailed instead of only one final report. The preliminary reports, after checking up with the universities, could be made available to the members.

Govt. to Maharashtra

10.2 GOM was to find out the agency in consultation with the Director of Fisheries of the State Govt. to carry out such studies in Maharashtra. No details were given by the representative of GOM.

Govt. of Gujarat

10.3 A short note on the action taken so far on implementation of Fisheries work plan was appended with the agenda at Annex.V. The comments on this may be communicated by the members to NCA and MOE&F.

10.4 Dr.Maudgal stated that the studies would become of academic interest only if implementation of their recommendations is not feasible due to construction works already being completed. For example, Sardar Sarovar impoundment is to begin in June, 1990 and if some migratory agencies are identified requiring construction of a mechanised Fish Lift in the dam body, it would become impossible. It was, therefore, suggested that the organisations, entrusted with the studies, should be asked to expedite their surveys so that their findings can be implemented to conserve aquatic life.

(Action: GOG)

Item No.VII-11(47): SETTING UP OF AN ENVIRONMENT DEVELOPMENT CENTRE

A joint paper in this regard was expected from Dr. Katti and Prof. Ramaseshan by middle of October, 1989. Dr. Katti informed that as he was out of the country, the report could not be completed. Moreover, basic critical inputs from NCA such as overall geographical area, total command area etc. to visualise the work are needed. Considering the amount of work, at least two meetings may be necessary with Prof. Ramaseshan. For this purpose they will also need Project Reports. Shri V.A. Parkash informed that the Project Reports are available with CWC and if anything further is required, concerned States can be approached. Shri N.K. Dikshit, Member (Civil), NCA will coordinate with Dr. Katti on 15th January, 1990 to workout the proposal.

ANY OTHER ITEM**Item No. VII-12(48): APPOINTMENT OF EXPATRIATE CONSULTANT ON ENVIRONMENTAL MANAGEMENT**

Mrs. Radha Singh stated that a reference was made by MOWR to MOE&F seeking advice on the acceptance or otherwise of the proposal of the World Bank to utilise the services of an expatriate expert to be provided under USAID assistance for coordination of Environmental Action Plans. Chairman, indicated that expatriate assistance will not be required for formulation of environmental action plans as the data is still being collected.

Chairman advised that Shri Shekhar Singh of IIPA may be engaged to prepare an integrated action plan and the Sub-group accepted the proposal of awarding the work by NCA to Shri Shekhar Singh.

Item No. VII-13(49): PUBLICITY

Mrs. Radha Singh raised the question of publicity. However, this item could not be discussed due to lack of time.

Item No. VII-14(50): GENERAL

On a suggestion from Shri V.A. Parkash, it was decided that copies of all the TORs finalised by the State Governments will be submitted to NCA Secretariat for further circulation to Members of the Sub-group.

Chairman desired that necessary follow up action and formulation of plans need not wait till the next meeting as seems to have been the practice in the past. He, therefore, directed that the project proponents should promptly keep reporting to NCA Secretariat the progress achieved every fifteen days or so, NCA Secretariat, in turn, will keep the members apprised of the developments. The project proponents agreed to follow this course of action.

ANNEXES

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VII-Min. 4	VI-3(34)	39-45
VII-Min. 5	VI-5(36)	46-57

List of participants attended the 7th meeting of
Environment Sub-group held on 19.12.1989 at 10.30 AM
Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi.

1. Shri Mahesh Prasad, Secretary to the Govt. of India, Ministry of Environment & Forests, New Delhi.
2. Shri Vir Amar Parkash, Executive Member, NCA, New Delhi.
3. Smt. Radha Singh, Joint Secretary, Ministry of Water Resources, New Delhi.
4. Shri C.K. Koshy, Secretary (Rehabilitation), Narmada Development Department, Govt. of Gujarat, Gandhinagar.
5. Shri S.G. Daithankar, Secretary (Rehabilitation), Govt. of Maharashtra, Bombay.
6. Shri D.R. Thapliyal, Member (E&F), Narmada Valley Development Authority, Bhopal.
7. Shri H.S. Panwar, Director, Wildlife, Institute of India, Dehradun.
8. Prof. R.K. Katti, Expert, Bombay.
9. Shri Ashok Khosla, President, Development Alternative, New Delhi.
10. Shri C.V. Sarma, Member (Power), NCA, New Delhi.
11. Dr. S.C. Maudgal, Adviser, Ministry of Environment and Forests, New Delhi.
12. Shri S.M. Pai, Secretary, NCA, New Delhi.
13. Shri T.K. Mukhopadhyay, Specialist (Hydrology), NCA, New Delhi.
14. Shri S.S. Patnaik, D.I.G. (Forest), Ministry of Environment & Forests, New Delhi.
15. Shri Pradeep Bhargava, O.S.D., Narmada Valley Development Authority, Bhopal.
16. Shri O.P. Sharma, Dy. Chief Forest, Narmada Valley Development Authority, Bhopal.
17. Shri M.B. Mehta, C.C.F., DFS, Govt. of Gujarat, Gandhinagar.
18. Shri A.V. Gururaja Rau, Specialist (Environment), Sardar Sarovar Narmada Nigam Ltd., Gandhinagar.
19. Shri Shekhar Singh, Indian Institute of Public Adm., New Delhi.

20. Shri K. Jagdish, Development Alternatives, New Delhi.
21. Smt. Neelam Kapur, Information Officer, Ministry of Water Resources, New Delhi.
22. Shri O.P. Saxena, Deputy Director, NCA, New Delhi.

दूरभाष : 8317309 (9 साइन)



भारतीय लोक प्रशासन संस्थान
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October 9, 1989

Dear Shri Mahesh Prasad,

I enclose some questions and comments on the Catchment Area Treatment Plan of the Government of Madhya Pradesh for the Narmada Basin CAT. These were circulated along with minutes of the Sixth Narmada Control Authority Environment Sub-Group Meeting.

I would be grateful if clarifications are sought on the matter from GAMP so that they could be discussed at the next sub-group meeting.

Also, none of the study outlines and work-plans that were to be circulated to members, as per decision in sixth meeting, have so far been received. These may also be kindly expedited so that they could be discussed at the next meeting.

With regards,

Yours sincerely,


 Shekhar Singh

Shri Mahesh Prasad
 Chairman, NCA Environment Sub-Group, and
 Secretary
 Ministry of Environment and Forests
 Government of India
 Paryavaran Bhawan
 CGO Complex, Lodi Road
 New Delhi - 110003

C.C. 1. Vice-Chairman,
 Narmada Development Authority,
 Tulsi Bhawan,
Bhopal

✓ 2. Shri K. Jagdish
 Development Alternatives
 22, Olof Palme Road
 Vasant Vihar
New Delhi 110057

Catchment Area Treat Plan, GMP (Annex VI-Min.4, p.24)
Questions and Comments

1. It is stated (para 3 & 4) that "for the protection of the interests of the ISP reservoir - it has not been considered incumbent to deal with the catchment upstream of Bargi dam". Again, that catchment of dams (like Tawa, Barna, Kolar, Sukta, etc.) upstream of ISP can also be ignored. The reason seems to be that silt from these areas will be trapped in dams prior to ISP and therefore not affect ISP.

Such a position appears incorrect for the following reasons :

- 1.1 One of the major reasons CAT is insisted upon is because it regulates water flows. Therefore, the Narmada River catchment prior to ISP, irrespective of other intervening dams, needs to be treated in order to ensure assured and regulated water supply to ISP
 - 1.2 Significant quantity of silt will still by-pass these earlier dams and enter ISP reservoir, especially as these dams get rapidly silted up and have to let much of the monsoon flow out.
 - 1.3 The life and safety of these upstream dams also have implications on the down stream ISP.
2. At the end of para 5, the area of 13 water sheds identified for CAT in phase I is shown as 11,022 sq. km. However, at the end of para 7 it is "worked out" as 2,42,000 ha (66,000 + 1,76,000) or 2420 sq.km. This is only 21.97% of the earlier mentioned area. However, the reason for this reduction is not clear.
 3. A far more detailed report is required before any meaningful suggestions can be given for CAT. This report should include the maps, survey results and principles of categorisation into different levels of criticality.

COMMAND AREA DEVELOPMENT

- ACTION PLAN

November 1989

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STATEMENT NUMBER

1. Statement showing Phase-wise details of construction of canal system and On Farm Development works and Irrigation Development
2. Year-wise Development of Irrigation
3. Year-wise Physical and Financial Programme of Command Area Development

DRAWING NUMBER

1. Index Map of Narmada Sagar Complex
2. Natural Drainage Map of Narmada Sagar and Omkareshwar Command Areas
3. Composite Command Area of Narmada Sagar and Omkareshwar showing Zones and Location of Dykes

1.0

INTRODUCTION

1.01

Project in Brief

The Indira Sagar Project envisages construction of 92 m. high concrete gravity dam across river Narmada near village Punasa in District Khandwa of Madhya Pradesh. The Dam site is 70 Kms. from Khandwa and 130 kms. from Indore. (Index Map at Drawing No. 1).

The project on completion will provide an annual Surface Irrigation of 1.69 lakh Ha. over a net C.C.A. of 1.23 lakh Ha. in Khandwa and Khargone districts of M.P. In addition 96000 Ha. additional annual Irrigation will also be achieved on introduction of sprinkler irrigation and conjunctive use of ground water. The project would generate a Firm power of 223 MW in initial stage and 118 MW in final stage with an Installed capacity of 1000 MW.

1.02

Project Clearance and Administrative Approval

The techno-economic clearance by the Central Water Commission was given in 1984. The Government of India, Ministry of Environment and Forest accorded approval from environmental angle vide its Memo No. 3-87/80-I-A dated 24th June, 1987. The approval for diversion of forest land has also been accorded by the Government of India vide letter No. 8/646/84-FC dated 7th October, 1987. The Technical Advisory Committee to the Planning Commission have recommended the project with the estimated cost of Rs. 2,167.67 Crores (including environmental cost, etc.) for approval in its meeting dated 11th January, 1989. The clearance has been received vide Government of India, Planning Commission Memo No. 2 (249)/89-I&CAD dated 6th September, 1989.

The State Government have accorded administrative approval to the estimate amounting of Rs. 1,392.85 Crores in September 1984. The administrative approval for the updated estimated cost at December 1988 price level amounting to Rs. 2,167.67 Crores (including environmental cost, etc.) is yet to be obtained.

1-2

1.03 Estimated Cost of Indira Sagar Project

The break-up of the cost of the project is as follows :

Unit		Approved Estimate (1983)	Revised Estimate (1988)
I	Head Works	472.34	832.32
II	Canal	405.40	541.98
III	Power	515.11	619.37
Total		1,392.85	1,993.87
a.	Catchment area treatment		124.00
b.	Command area development		50.00
Grand Total		1,392.85	2,167.67

1.04 Plan of Implementation

The Project is proposed to be completed in different stages as follows :

i. Dam and Power House

a. Stage - I (June 1994)

- Completion of concrete dam and saddle dam upto an elevation of 213 m. (700 Ft.)
- Diversion of Railway track between Talvadia and Khirkiya railway stations.
- Rehabilitation of oustees in Harsud town.

1-3

b. Stage - II (June 1997)

- Completion of concrete dam upto crest level without radial gates, power house and installation of one unit of 125 MW and commissioning of 1st unit by September 1997.

c. Stage - III (June 1998)

- Installation of radial gates and appurtenant works including remaining 7 units of 125 MW each.

ii. Canals

The canal system is proposed to be completed in three phases/segments to match with the potential that would be available with stage construction of the Head Works. The segment-wise implementation is given below.

Main canal reach in Kms.	Construction Phase Year	Phase	Irrigation Phase Year	Phase	Area (Ha.)
Head to 81.59	1989-90 to June 1997	I	1995-96 to 2000-01	I	36,100
81.59 to 206.28	1993-94 to 2002-03	II	1997-98 to 2003-04	II	82,900
206.28 to 248.65 and 0 to 83 of Khargone Lift Canal	1997-98 to 2006-07	III	2002-03 to 2007-08	III	1,23,000

1.05 Phasing of Outlay and Expenditure

The sector wise expenditure incurred on works and outlays proposed in different five year plans till completion are as under :

1-4

(Rs. in Crores)			
Plan Outlay Upto	Sector-wise Expenditure		Total
	Irrigation	Power	
Upto the end of VIth Plan	3.48	22.16	25.64
Upto the end of VIIth Plan	13.18	146.00	159.18
VIIIth Plan	284.68	899.14	1,183.82
IXth Plan	474.18	-	474.18
Xth Plan	150.85	-	150.85
Total	926.37	1,067.30	1,993.67

2.0 COMMAND AREA

2.01 Location

The command area lies in Districts Khandwa and Khargone of Madhya Pradesh. Whole of it is on South of Narmada River and extends upto Satpura hill range.

2.02 Topography

The area is rolling and undulating with plain land patches along the river and in between ridges and hill.

2.03 Command Area Features

The command area details are as under :

Sl. No.	Particulars	Area in Lakh Ha.
1.	Gross Command Area	2.10
2.	Culturable Command Area	1.75
3.	Unculturable Area	0.35
4.	Net Cropped Area	1.42
5.	Area Proposed for Irrigation	
	a. Zone - I	0.64
	b. Zone - II	0.59
	Total	1.23
6.	Annual Irrigation	
	a. Zone - I	0.86
	b. Zone - II	0.83
	Total	1.69

2-2

Sl. No.	Particulars	Area in Lakh Ha.
---------	-------------	------------------

7. Intensity of Irrigation

a.	Zone - I	134 %
b.	Zone - II	142 %
c.	Over all	138%

2.04 Climate

The climate of command area is semi arid and sub tropical monsoon type with average annual rain fall varying from 1016 mm on eastern portion decreasing to 760 mm towards western portion. The summer is quite hot with average temperature in May being 43° C to 45° C. The relative humidity in dry weather is very low i.e. of the order of 12% and maximum in monsoon season being around 87%.

2.05 Land Irrigability Classification

The soil survey of about 2.10 lakh Ha. in the command area has been conducted by the Agriculture department of the state with the help of the National Bureau of Surveys and Land Use planning, Nagpur, and Jawaharlal Nehru Krishi Vishwa Vidhyalaya, Jabalpur. The broad features are as under :

Sl. No.	Land irrigability class	Slope (%)	Depth of soil (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

2.06 Soil Classification

The soils of the area have been classified in to 26 soil series taking into account the morphological

2-3

features, topography, physico-chemical and chemical characteristics.

2.07 Soils of Subdued Hills

The soils of the subdued hills comprise of eight soil series. These soils are dark redish brown to very dark brown in colour and coarse in texture, at times mixed with gravel and rock fragments. In general, these are very shallow to moderately deep. The soils are prone to erosion, due to soil and topographic limitations such soils are mostly classified in irrigability classes 4 and 6 with limitation of soil depth and topography singly or in combination.

2.08 The Soils of Plain Table Land

This comprises of ten soil series. These soils are darker in colour, moderately fine to fine in texture and are moderately deep to very deep. These soils can be put to intensive cultivation under proper management. These soils are irrigable and classified in irrigability classes 2 to 4 with major limitation of soil depth or texture.

2.09 The soils of Alluvial Plain

This comprises of four soil series. These soils are very deep and are darker in colour. These soils are moderately fine to fine texture developed over alluvium brought by Narmada and its tributaries on nearly level to gently sloping land scape. These are moderate to strongly calcareous in nature, lime content increasing with depth. The area occupied by these soils is best suited to cultivation and irrigation. The soils of alluvial plain are classified in irrigability class - 2 with some soil and topography limitations. However, due to their slow to very slow infiltration rates, the soil shall be prone to water logging, if suitable drainage is not provided under irrigation.

2.10 The Soils of Flood Plain

This comprises of four soil series. The soils are very deep with colour varying from yellowish brown to dark brown. The soils occupy very gently to moderately slopping landscape and are moderately susceptible to erosion and flooding. These are grouped into irrigability classes 2,3 and 4 with some soil and topographic limitations.

3-1

3.0

CROP WATER REQUIREMENTS

3.01

Cropping Pattern

The proposed cropping pattern for the Indira Sagar Project is based on the existing cropping pattern (depicting the nature and taste of cultivators, effect of fluctuation in market price adaptability of climate and soil), the cropping pattern developed within and neighbouring command under irrigation from wells and tanks etc.

Depending on the rainfall, existing cropping pattern and the soil conditions the whole command has been divided in two zones as under :-

a. Zone-I

Covering Khandwa tehsil of District Khandwa & Barwaha & Bhikengaon tehsils of district Khargone.

b. Zone-II

Covering Kasrawad, Khargone, Thikri, Rajpur and Badwani Tehsils of district Khargone.

3.02

Existing Cropping Pattern in the Command Area of Indira Sagar Project

The existing cropping pattern in the command under Zone - I and Zone - II is given in table below.

[Reference : World Bank appraisal report chapter - 5(ii) page - 1 table - I and minutes of 42nd T.A.C. meeting held on 11.1.1989 (Annexure 9-A)]

S.No.	Crops	Zone-I (%)	Zone-II (%)
A. Kharif :-			
1.	Cotton	32.89	28.87
2.	Groundnut	6.94	12.03
3.	Paddy	3.80	1.44
4.	Vegetables	1.81	2.33

3-2

S.No.	Crops	Zone-I	Zone-II
5.	Sugarcane	0.38	1.82
6.	Jowar	25.19	12.79
7.	Maize	1.30	8.05
8.	Moong	2.21	2.05
9.	Bajra	3.45	2.50
10.	Other pulses	5.18	7.11
11.	Other Kharif	6.01	9.69
Total Kharif		88.96	88.68
B. Rabi :-			
1.	Wheat	8.18	8.05
2.	Vegetables	0.38	0.64
3.	Pulses	1.23	1.79
4.	Other rabi	1.25	0.83
Total Rabi		11.04	11.32
Grand total		100.00	100.00

3-3

Sl. No.	Crops	Zone-I	Zone-II	Sowing time (fort-nightly)	Duration days
A. Kharif : Irrigated					
1.	Cotton L.S.	5	5	10th	265
2.	Cotton M.S.	10	10	11th	210
3.	Cotton M.S.	20	20	12th	150
4.	Jowar HYV	5	5	12th	105
5.	Jawar 2 HYV	5	5	12th	105
6.	Maize HYV	5	8	13th	105
7.	Groundnut	10	15	13th	120
8.	Chillies	3	3	13th	160
9.	Vegetables	2	2	13th	120
Total Kharif Irrigated		65	73		
Kharif : Unirrigated					
10.	Moong/Urad	5	5	13th	90
11.	Early Jowar	15	5	13th	105
12.	Arhar	3	3	13th	135
Total Kharif Unirrigated		23	13		
C. Rabi : Irrigated					
13.	Wheat HYV	15	15	21st	135
14.	Wheat 2 HYV	30	30	22nd	135

3-4

Sl. No.	Crops	Zone-I	Zone-II	Sowing time fort- nightly)	Duration days
15.	Gram	6	6	20th	120
16.	Vegetables (Onion)	2	2	20th	135
17.	Fodder (Berseam)	1	1	21st	160
Total Rabi Irrigated		54	54		
D. Summer Crop					
18.	Groundnut	8	8	3rd	110
19.	Moong	2	2	5th	75
Total Summer Crop		10	10		
D. Perennial					
20.	Sugarcane	3	3	4th	365
21.	Banana	2	2	12th	365
Total Perennial		5	5		
Total Cropping Intensity		157%	155%		

3.03 Proposed Cropping Pattern of Indira Sagar Project:-

The details of proposed cropping pattern is given in table-2, The percentage of area under crops mentioned in the cropping pattern may vary with changing soil, topographical condition and

3-5

infrastructure facilities in sub zones classified in the soil survey reports. However all trend in the command will be as tabulated below :-

[Reference : Minutes of 42nd T.A.C. meeting held on 11.1.89 (Annexure 9-B)]

Sl. No.	Crops	Zone-I	Zone-II	Sowing time fort- nightly)	Duration days
A. Kharif : Irrigated					
1.	Cotton L.S.	5	5	10th	265
2.	Cotton M.S.	10	10	11th	210
3.	Cotton M.S.	20	20	12th	150
4.	Jowar HYV	5	5	12th	105
5.	Jawar 2 HYV	5	5	12th	105
6.	Maize HYV	5	8	13th	105
7.	Groundnut	10	15	13th	120
8.	Chillies	3	3	13th	160
9.	Vegetables	2	2	13th	120
Total Kharif Irrigated		65	73		
B. Rabi : Irrigated					
10.	Wheat HYV	15	15	21st	135
11.	Wheat 2 HYV	30	30	22nd	135
12.	Gram	6	6	20th	120
13.	Vegetables (Onion)	2	2	20th	135

3-6

Sl. No.	Crops	Zone-I	Zone-II	Sowing time fort- nightly)	Duration days
14.	Fodder (Berseam)	1	1	21st	160
Total Rabi Irrigated		54	54		
C. Summer Crop					
15.	Groundnut	8	8	3rd	110
16.	Moong	2	2	5th	75
Total Summer Crop		10	10		
D. Perennial					
17.	Sugarcane	3	3	4th	365
18.	Banana	2	2	12th	365
Total Perennial		5	5		
Total Irrigation Intensity		134%	142%		

3.04 Details of crop water requirement

The crop water requirement of Indira Sagar Project for Zone I and II has been calculated with due considerations to climatological factors affecting evapotranspiration, soils, proposed cropping pattern for command and loss of water in conveyance from canal head to the field and during its application in the field.

3-7

Area

Zone-I 64000 Ha.
Zone-II 59000 Ha.

Sl. No.	Name of Crop	Zone - I				Zone - II				Total water requirement
		CCA	Area (Ha.)	Delta at canal head (mm)	Water required at head M.Cum.	CCA	Area (Ha.)	Delta at canal head (mm)	Water required at head M.Cum.	
<u>Kharif</u>										
1.	Cotton L.S.	5	3200	1881	60.10	5	2950	1803	53.19	113.38
2.	Cotton M.S.	10	6400	1467	93.89	10	5900	1364	80.48	174.37
3.	Cotton M.S.	20	12800	887	113.54	20	11800	859	101.36	214.90
4.	Jowar HYV	5	3200	571	18.27	5	2950	574	16.93	35.20
5.	Jowar 2HYV	5	3200	664	21.86	5	2950	1644	19.00	40.86
6.	Maize HYV	5	3200	837	28.22	8	4720	837	39.51	67.73
7.	Groundnut	10	6400	765	51.90	15	8850	765	67.70	119.60
8.	Chillies	3	1920	1166	23.08	3	1770	1166	20.64	43.72
9.	Vegetables	2	1280	736	9.93	2	1180	736	8.68	18.61
<u>Rabi</u>										
10.	Wheat HYV	15	9600	807	61.25	15	8850	807	71.42	132.67
11.	Wheat 2HYV	30	19200	842	161.86	30	17700	842	149.03	310.89
12.	Gram	6	3840	571	21.93	6	3540	571	20.13	42.06
13.	Vegetable (Onion)	2	1280	860	10.88	2	1180	860	10.15	21.03
14.	Fodder (Berseam)	1	640	1180	7.55	1	590	1180	6.96	14.51
<u>Summer</u>										
15.	Groundnut	8	5120	1212	62.05	8	4720	1212	57.21	119.26
16.	Moong	2	1280	810	10.37	2	1180	810	9.56	19.93

3-8

Sl. No.	Name of Crop	<u>Zone - I</u>				<u>Zone - II</u>				Total water requirement
		2 CCA	Area (Ha.)	Delta at canal head (mm)	Water required at head M.Cum.	2 CCA	Area (Ha.)	Delta at canal head (mm)	Water required at head M.Cum.	
<hr/>										
<u>Perennial</u>										
17.	Sugarcane	3	1920	3139	59.85	3	1170	3139	55.56	115.41
18.	Banana	2	1280	2850	36.65	2	1180	2850	33.63	70.28
<hr/>										
Total		134	85760		853.19	142	83780		820.19	1672.38

i.e., 1.335 MAF

Note : For purpose of planning however 1.4 MAF is taken the potential use in order to cater to possible changes in cropping pattern and irrigation to forest area etc.

4.0 SURFACE & SUB-SURFACE DRAINAGE

4.01 Need for Drainage

The drainage is essential to avoid stagnation of water in agricultural area and proper disposal of surplus water, which may hamper agricultural growth and may also affect the agricultural land adversely.

4.02 Natural Drainage

The map showing the natural drainage is enclosed (Drawing No. 2). It may be seen that the command area is traversed by a close network of natural drainage. As such only field drains are considered sufficient. The natural drains will take care of the lateral and main drains. At some places, where natural drains are inadequate the lateral and main drains will also be constructed in selected patches.

4.03 Effect of Dykes

A number of Dykes are existing in command area. (Drawing No. 3). These Dykes act as partial barriers to the ground water flow. Special care will be taken for areas upstream of the Dykes and wherever essential ditches for sub-surface drainage will be provided.

4.04 Sub-surface Drainage

Stage - I drainage investigation studies have shown that no significant sub surface drainage problem is expected to arise in the overall command on introduction of irrigation from Indira Sagar Project. However in case of the rise of the ground water table, it can be kept under control either by ground water development or provision of open ditches or a combination of both.

4.05 Provisions in Estimate

In the estimate for Command Area Development a provision of Rs. 12.50 crores has been made for development of vertical drains i.e. dug well and development of ground water use. Based on the cost estimate of the sample areas, the average cost of surface drainage works out to Rs. 300/- per Ha. and an additional provision of Rs. 3.68 Crores exists in the project estimate.

4.06

Ground Water Monitoring

- a. Monitoring of ground water table fluctuations with respect to rainfall and irrigation application is essential for further detailed investigations for assessments of aquifer characteristics and identifying vertical dykes etc. For this purpose, the command area has been divided into 34 zones, as shown in Drawing No. 3. Out of these 34 zones, zone No. 8, 23, 29 and 34 are considered critical.
- b. The ground water organization of the state is already doing this job, for their permanent observations wells. In addition to it, additional wells situated in the command area have been selected at the rate of one well per 2 villages which works out to about 750 Ha. This density has been increased to one well per 350 Ha. in critical areas. It is planned to take monthly observations in these wells. In some areas the job of observations has already been taken up in November 1989. It is also planned to install piezometers tips in selected areas.
- c. The detailed Planning Schedule is given below

Phase-I	By March 1990
Phase-II	By September 1990
Phase-III	By March 1991
- d. The data collected during these years will be analysed very frequently and action plan worked out to ensure full control on the ground water table in various zones and soil types. The analysed data will be a power tool to frame the micro level policy for conjunctive use.

5.0

GROUND WATER AND CONJUNCTIVE USE

5.01

Surface Ground Water Policy

The Indian Institute of Sciences, Bangalore, have carried out studies to identify the scope for development of ground water in the composite command of Indira Sagar Project. This is with a view to provide additional irrigation facilities and also to avoid the hazards of water logging. The data of the water level of the Sardar Sarovar and other projects was supplied to the Indian Institute of Sciences, Bangalore, for their study in question.

The Institute, in their study, proposed an average conjunctive use of 70% from surface water and 30% from ground water.

Tube wells are not feasible in the area due to rocky bed. The ground water utilisation will be done through dug wells.

5.02

Conjunctive Use and Control

The Indian Institute of Sciences, Bangalore, have divided the entire area into 34 small zones and classified the potential water logging situation for each zone (Drawing No. 3).

For development of conjunctive use and control of water table, it has been proposed to adopt a policy of conjunctive use of surface and ground water. To implement the above policy, dug wells with 3 HP motor pump has been suggested by the experts. The zone-wise details of the required development of ground water are given in (Drawing No. 3). On an average, experts have proposed the conjunctive use policy of 70 : 30, which will need on an average of one well for each 6.2 Ha. of gross area.

5.03

Implementaion of Policy

For effective implementation of the above policy, the total requirement of dug well in the entire command of Indira Sagar Project will be about 34,000. The statistics shows that there were 10,700 dug wells during the year 1978-79 and during 1987-88, they were 16,000. Considering the present growth rate, it is estimated that, in the year 1997-98, there will be about 27,000 wells in the

area and at the end of the completion of the project, it would be going upto 44,000, which is more than the required number of dug wells. Even if the density of wells is not uniform, the provision of Rs. 12.50 Crores in the project estimates will take care of the deficit in the command.

5.04 Ground Water Monitoring

To control the ground water table from rising, the pre-determinant level ground water monitoring will be done. As soon as the water level tends to rise, then the pre-determinant surface water supply will be reduced and the cultivators will be encouraged to use ground water. And, the normal flow of surface water will only be supplied when the ground water is lowered to predetermined level. With the efficient monitoring of the ground table, water logging can be controlled.

5.05 Energy Requirements

At present, cultivators are to irrigate from deep wells with limited availability of water. The present cost of digging deep wells is also very high. After introduction of surface irrigation, water table will rise to an economical pumping level. Construction of deep dug well will not be necessary and the cultivators will gladly go in for such shallow pumping. Due to reduction in the depth of pumping, the energy required for per unit of water will be reduced and therefore after commencement of Project the energy requirement will not increase.

6.0

COMMAND AREA DEVELOPMENT PROGRAMME

6.01

Objectives

The objectives of the command area development programme would be

- Optimum utilization of created potential of irrigation.
- Introduction of multiple cropping pattern and increasing the levels of productivity and strengthening of Agriculture research activity.
- Creation of adequate communication and storage facilities.
- Conservation management for integrated fisheries development.
- Intensification of dairy development.
- Machineries for timely implementation of the programme.

6.02

Main Components of Command Area Development Programme

The main components of the Command area development programme are on Farm Development, Conjunctive use, Agro Industries, Regulated Market, Ware Housing Facilities, Roads etc.

6.03

On Farm Development

This includes land shaping, land levelling, drainage facilities, field irrigation channels and roads etc. The works on O.F.D. will be started 2 years in advance of the start of irrigation from canal system in phased manner in the entire command area.

6.4

Conjunctive use of Ground Water

To provide safe guards against excess use of water, conjunctive use of ground water to the extent of 30% is proposed as per study of Indian Institute of Science, Bangalore. 27,000 Nos. additional wells are envisaged in Indira Sagar Project command. However, the actual no. will depend on the progress of private wells before onset of canal irrigation.

6.05 Agro Industries

The programme envisages provision of key, agro based industries in the command area on the basis of potential available. The report of study on industrial growth potential and perspective plan on industrilization (1985), conducted by Tata Consulting Services has been received.

6.06 Regulated Markets

Provision has been made for strengthening the market system. A survey for agricultural marketing in Indira Sagar Project command area has already been conducted by M/s. Dilip Swamy and Ashok Gulati of Society for study of economic disparities, New Delhi and thier report of February 1985.

6.07 Ware Housing Facilities

It is expected that there will be an increase in production to the extent of four to eight times due to development of irrigation facilities. To handle this increased production store and Ware Housing facilities will be needed.

6.08 Roads

The existing road density in the command area is 0.16 Kms./Sq. Kms., which is very low. It is felt that road density should be 0.32 Kms./Sq.Kms. The objective will be to connect all villages in the command area with O.D.R. or village roads as part of project development. Some O.D.R./V.R. will be up graded to single lane black top M.D.R. and few such lanes may be constructed to achieve a density of 0.32 Kms./Sq.Kms. The following measures will be necessary.

- Construction of ODR/VR to village which do not have a connection 320 Kms.
- Improvement of existing ODR/VR to single lane MDR with black top 84 Kms.
- Construction of single lane MDR with black top 16 Kms.

The above are based on the report of M/s. Dilip Swamy and Ashok Gulati on Agricultural Marketing in Narmada Sagar Complex submitted by them after detailed studies.

The average cost of roads construction will be Rs. 500 per Ha. Accordingly the cost of road construction in the command area of 1.23 Lakh Ha. work out to Rs. 6.00 crores.

6.09

Estimated Cost of Command Area Development Programme

A tentative provision of Rs. 4,000 per Ha. is provided for CAD works of Indira Sagar Project in consultation with C.W.C. Out of this Rs. 2,000 is for land shaping, Rs. 1,000 for conjunctive use and Rs. 1,000 per Ha. for road-communication and for On Farm Development works.

The tentative break-up of the cost estimate is as follows :

Sl. No.	Item	Total cost (Rs. Crores)
1.	On Farm Development	25.00
2.	Conjunctive Use	12.00
3.	Others	
	i. Agro Industries	3.00
	ii. Regulated Markets	2.00
	iii. Ware Housing facilities	2.00
	iv. Roads	6.00
	TOTAL	50.00

7-1

7.0

IMPLEMENTATION OF COMMAND AREA DEVELOPMENT PROGRAMME

7.01

Implementation of Irrigation

The construction of main canal, distribution and drainage system will be implemented in 3 phases as given below

Phase - I The project envisages irrigation of 36100 Ha. and the construction of Phase-I project is scheduled to be completed in period of 10 years starting from 1988-89.

Phase - II Project envisages irrigation of 46800 Ha. The construction will be started in the year 1993-94 and completed in the year 2002-03.

Phase - III The Phase-III project after completion will irrigate 40100 Ha. The construction period being 1997-1998 to 2006-07.

Details of implementation schedule for the three phases is given in Statement No. 1.

It may be seen that the period of completion of surveys of distribution and drainage system has been indicated as 1989-90 to 1994-95 for all the three phases. These surveys in fact include and cover micro distribution net work also i.e., the phase wise implementation schedule for surveys and planning of micro distribution network is as follows :

Sl. No.	Phase	Period of surveys and Planning of Micro Distribution Network
1.	Phase-I	By 1989-90
2.	Phase-II	1990-91 to 1992-93
3.	Phase-III	1992-93 to 1994-95

7-2

7.02 Irrigation Development

Development of irrigation will start simultaneously with the construction of canal system and full potential will be achieved in 2007-2008 i.e., one year after the completion of canal system.

The year-wise development of the irrigation is given in Statement No. 2

7.03 Implementation of Command Area Development Works

The command area development works will be started two years in advance of irrigation from canal system. Survey for the command area development will be started in the year 1993-94 and completed by 2005-06. Physical phasing of On Farm Development works has been done to complete the work in the year 2006-07. Statement No. 3 gives physical and financial phasing of command area development works.

7.04 Present Status of Survey for Irrigation and Command Area Development Works

The Alignment of main canal under Phase-I has been finalised. Survey of main canal under Phase-II and Phase-III will be completed by 6/92 and 6/94 respectively.

Basic surveys for distribution and drainage system has been completed for the Phase-I command area and that of Phase-II and Phase-III will be complete by 6/93 and 6/95 respectively.

The detailed project report for command area development will be prepared and submitted by 1992-1994 and the work will be started by 1993-1994.

**Statement showing Phase wise details of construction of
Canal System and On Farm Development works
and Irrigation Development**

Sl. Particulars No. Reach	Phase-I Kms. 0 to 81.59 of main canal in- cluding distri- bution & drai- nage system	Phase-II Kms. 81.59 to 206.29 of main canal in- cluding distri- bution & drainage system	Phase-III Kms. 206.29 to 248.65 of main canal and Khargone lift canal including distribution & drainage system
1. Length of main canal kms.	81.59	114.70	M.C. 42.36 K.L.C. 83.00
2. No. of distri-	8 Nos.	14 Nos.	8 Nos.
3. Area proposed for irriga- tion (Ha.)	36100	46800	40100
4. Estimated cost of distribu- tion & drain- age system (updated) Rs. millions.	3093.4	1297.2	1029.2
IRRIGATION			
5. Period of completion of survey of main canal	1988-89	1989-90 to 1990-91	1991-92 to 1993-94
6. Period of completion of distribution and drainage system	1989-90	1990-91 to 1992-93	1992-93 to 1994-95
7. Period of completion of distribution and drainage system	1988-89 to 1996-97	1993-94 to 2002-2003	1997-98 to 2006-2007

Sl. Particulars No. Reach	Phase-I Kms. 0 to 81.59 of main canal in- cluding distri- bution & drai- nage system	Phase-II Kms. 81.59 to 206.29 of main canal in- cluding distri- bution & drainage system	Phase-III Kms. 206.29 to 248.65 of main canal and Khargone lift canal including distribution & drainage system
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8. Period for irrigation on development of proposed area	1997-2001	1997-2004	2002-2008
9. Period of completion of lined water course	1997-2001	1997-2004	2002-2008

On Farm Development Works

Sl. Particulars No.	Phase-I	Phase-II	Phase-III
1. Area (Ha.)	36100	46800	40100
i. On Farm Development Works period of completion of survey	1993-94 to 1997-98	1995-96 to 2002-03	2001-2002 to 2005-06
ii. Period of completion	1993-94 to 2000-02	1995-96 to 2004-05	2001-02 to 2006-07
2. Soil survey	To be conducted by 1990-91	1991-92 to 1994-95	1995-96 to 1998-99
3. Water Management Pilot Project	1991-92 to 1996-97	1993-94 to 1998-99	1996-97 to 2002-03
4. On Farm Development, drainage forestry, Fishery, animal husbandry, Agro industry, Regulated markets, Warehousing and Roads.	1993-94 to 2000-2001	1995-96 to 2004-2005	2001-02 to 2004-05

Year-wise Development of Irrigation

Year	Area in Ha. yearwise			Cumulative
	Phase-I	Phase-II	Phase-III	
1995-96	5000	-	-	5000
1996-97	7000	-	-	12000
1997-98	7000	5000	-	24000
1998-99	8000	5000	-	37000
1999-2000	5000	6000	-	48000
2000-01	4100	6000	-	58100
2001-02	-	7000	-	65100
2002-03	-	9500	4500	79100
2003-04	-	8800	5000	92900
2004-05	-	-	7000	99900
2005-06	-	-	8000	107900
2006-07	-	-	9000	116900
2007-08	-	-	7100	123000

Statement No. 3

Physical Quantity in Thousand Ha.
Financial in Lakhs Rupees

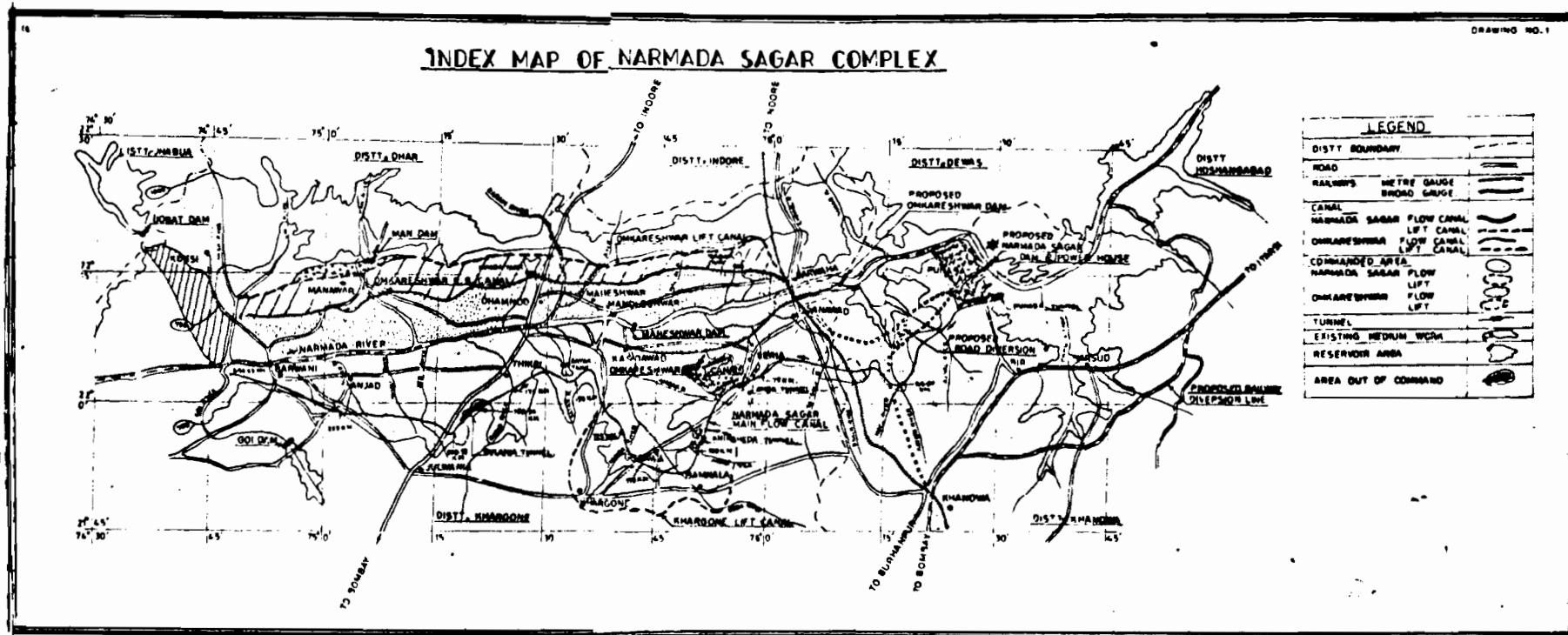
YEAR-WISE PHYSICAL AND FINANCIAL PROGRAMME OF COMMAND AREA DEVELOPMENT

S.No.	Description of work	Phase of Const.	VIII th Plan				IX th Plan				X th Plan				XI th Plan				Total	
			1993-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000-01	01-02	02-03	03-04	04-05	05-06	05-07	P	F	P	F
			Phy	Fin	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F
1.	On Farm Development-Surveys	I	3	3	5	4	10	8	10	8	8	7	-	-	-	-	-	-	36	30
		II	-	-	-	-	2	2	2	2	4	3	8	7	8	7	9	7	47	40
		III	-	-	-	-	-	-	-	-	-	-	2	2	4	3	12	9	40	30
	Total		3	3	5	4	12	10	12	10	12	10	8	7	8	7	9	7	123	100
2.	On Farm Development-Construction	I	1	10	2	30	5	100	5	100	5	100	5	100	3	60	-	-	36	700
		II	-	-	-	-	2	30	2	30	5	100	6	100	6	120	6	120	47	900
		III	-	-	-	-	-	-	-	-	-	-	2	40	5	100	5	100	40	800
	Total		1	10	2	30	7	130	7	130	10	200	11	200	11	220	11	220	123	2400
3.	Conjunctive use Development deep/shallow tube wells		-	-	-	-	-	-	5	50	5	50	10	100	10	100	15	150	20	200
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	200	20	200
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	50	123	1200
4.	Development of other Amenities																			
a)	Agro Industries		-	-	-	-	-	-	20	50	40	100	40	100	23	50	-	-	-	300
b)	Regulated market		-	-	-	-	-	-	20	30	40	70	40	70	23	30	-	-	-	200
c)	Ware Housing		-	-	-	-	-	-	20	30	40	70	40	70	23	30	-	-	-	200
d)	Roads		-	-	-	-	-	-	20	100	40	200	40	200	23	100	-	-	-	600
	Total		13	34	140	140	470	697	767	537	329	378	429	409	407	250	123	5000		

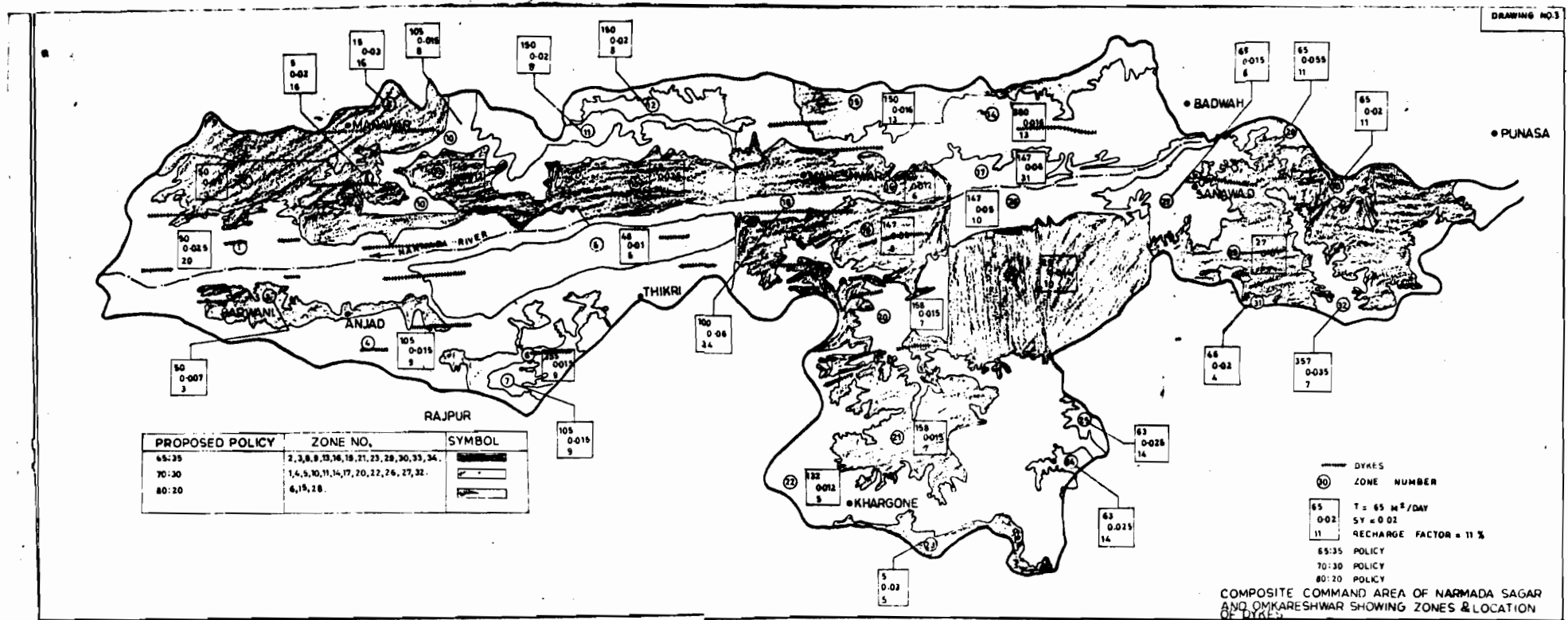
VIIIth Plan = Rs. 0.47 Crores, IXth Plan = Rs. 22.14 Crores, Xth Plan = Rs. 20.82 Crores, XIth Plan = Rs. 6.57 Crores

Grand Total = Rs. 50.00 Crores

• P-Physical
•• F-Financial







HEALTH ASPECT

INTRODUCTION

Any project on a river valley development invariably causes major changes in the environment. As such construction of Narmada Sagar Project and its canal system for irrigation and non agricultural use of water will have its effect on the existing environment.

The Narmada Valley Development Project, in MP involves 6 Divisions and 20 Districts in the valley area. In the Lower Narmada Zone in NSP Khandwa, Dewas and Hoshangabad districts are mainly concerned.

The Director of Health Services, MP have been constantly observing the health conditions in these districts. From the Health Statistics data collected for the period 1982-1984, the present health conditions in the valley is almost normal and is not a matter of concern. However, diseases like Malaria, Guinea Worm, Goitre, Gastro-enteritis and worm infestations have been found prevalent in these districts. Schistosomiasis and Leishmaniasis have not yet been reported in MP. Studies were specially conducted to assess the possibilities of Schistosomiasis in MP by the W.H.O. and the National Institute of Communicable Diseases, New Delhi and they have opined that Schistosomiasis does not exist as yet in MP. However it has been agreed that NICD would Co-ordinate Schistosomiasis monitoring activities.

STATUS OF WATER BORNE AND WATER RELATED DISEASES

MALERIA

It can be seen that Malaria appears to be the single most important hazard to be tackled for the present. Malaria is prevalent all over the state but in Khandwa, the incidence of falciparum malaria is more, With development of irrigation canals there is likely to be high transmission potential and it is likely that its incidence may increase. Anti-malaria measures will have to be planned as per guidelines of the Director, NMEP. Historically working projects and their productivities have been hampered or the projects have been closed due to epidemics of malaria in the project population particularly during the construction phase. In the present position also the incidence of P.F. Malaria was reported high in Narmada Nagar in Punasa Block of Khandwa District where construction work of the project is in progress.

Adoption of regular mosquito control measures will also help in preventing the other insect borne diseases such as Encephalitis and K.F.D. etc.

GUINEA WORM

Guineaworm infestation is present in 10 districts of the Valley. With the rise of water table and lesser chances of Cyclops proliferation, the chance of the spread of this disease will be remote. With the implementation of Guineaworm

control programme in the State, it is likely that the disease may be eradicated from the presently affected area much before the full project comes up.

GOITRE

Goitre prevalence has been reported in 8 districts of the Valley. With deforestation, and soil erosion it is likely that the iodine content of the soil may get considerably reduced, leaving a status of iodine deficiency in the population. This may further aggravate the prevalence of Goitre in the project area. This will have to be carefully watched.

FILARIA

Filaria endemacy is not reported in the Valley area but with the constructions of large water body and irrigation canals, there would be high transmission of vector species of mosquitoes (Culex) and migrants carriers of filaria from neighbouring endemic states on the project side may lead to a potential danger of development of new foci.

SCHISTOSOMIASIS

This disease does not appear to occur in Narmada Sagar Project area. The literature suggests that the disease does exist at a low level in India. In Narmada Sagar Project area, an investigation on this disease was conducted by NICD. This study was undertaken at the request of World Bank as part

of the pre-appraisal process. This assignment was given to NICD by GOI Ministry of irrigation and power. On the basis of investigation, the study concluded that human forms of schistosomiasis do not exist at present in project area.

However creation of large water supply and irrigation system provides conditions that can transform a basically uninfected population into a almost universally infected population. Thus the potential of this disease to develop in the project area must be viewed very seriously even though the disease does not appear to exist in this area now.

GASTRO ENTERITIES/CHOLERA AND OTHER WATER BORNE DISEASES

Cholera/Gastro enterities cases have been reported in Narmada Valley area, but due to increased economical development and living standard in developing project area, and providing potable water the incidence of these diseases are likely to be less, but close monitoring on the outbreaks of such diseases will have to be observed.

OTHER DISEASES

Besides the above preventable diseases frequent and seasonal changes in the climatic conditions, physical environment, living pattern, social stress and strain may cause occurrence of other disease such as respiratory, allergic Rheumatic, skin and sexually transmitted diseases etc.

HEALTH CARE PROGRAMME

The planning of Health aspect will therefore include provision of Health Centres and referred Hospitals for diagnosis and treatment of all such diseases including specialised services to cater the need of static and mobile population of the project integrating them with the planned control measures for the above mentioned, disease.

It will not be out of place to emphasize the need of inclusion of Health Education Programme in such project areas.

The Director of Health Services, MP has agreed to monitor at intervals the incidence of all water concerned diseases and other diseases in the project area and in surrounding districts of the Narmada Basin through out the period of construction and further to undertake all necessary steps to prevent their incidence.

For this a nodal officer is nominated but it has to set up a separate cell at the Directorate level who shall be independently collecting data and monitor this aspect. This cell will monitor all the health activities of both Narmada Sagar and Sardar Sarovar Projects.

In addition to the State level monitoring cell, it shall also be essential to strengthen the existing infrastructure of these three districts including the district HQ., so that periodically supervision and monitoring activities are carried out adequately and effectively.

Besides this, the health institutions including

the subcentres of the area of submergence will have to be suitably located elsewhere keeping in view the norms laid down by Govt. of India under the rural Health care programme and such locations be decided by the D.H.S. in consultation with the concerned districts.

SCREENING OF LABOUR POPULATION

The labour population coming from the same districts, neighbouring districts of the State working at the Dam site will have to undergo screening as regards lung diseases, malaria filaria, leprosy, water borne disease and sexually transmitted diseases for detection purpose and also for curative purpose. 30 bedded hospital is proposed to be established at the Dam site having Medical Specialists, Gynecologists, Paediatrician, Radiologist and Pathologist.

Radiological examination of all the labourers will be under taken to detect preumoconiosis and pulmonary tuberculosis in their early stages, Serological examination of blood will be under taken to diagnose carriers and patients of sexually transmitted diseases, enteric fever hepatic disorders, Pathological examination of stool and urine samples will be under taken to diagnose amoebic and many more diseases. Sputum examination will be done to screen open cases of pulmonary tuberculosis.

SANITATION AND PREVENTIVE MEASURES OF

LABOUR CAMPS

This is of most importance to prevent epidemics

of water borne diseases, scabies and lice etc.

1. Safe drinking water, filtered and chlorinated water should be supplied.
2. To prevent spread of water borne diseases through canals into population of command area of the districts perfect sanitation should be maintained.

Mobile Units

It is proposed to provide five mobile units in this area to impart health facilities in the villages as well as construction sites and camps. Each unit will comprise of following officers and supporting staff.

1.	Medical Officer	1
2.	Compounder/pharmacist grade II	1
3.	Dresser	1
4.	Ward boy	1

Each mobile unit will be equipped with one mobile van along stretcher cupboard, oxygen cylinder, etc. These units will be under the administrative control of Health Deptt. of M.P. The recurring cost on this unit would be Rs.10.97 lakhs while the non-recurring cost is expected to be Rs.7.50 lakhs.

WATER QUALITY MONITORING

Presently M.P. Pradushan Niwaran Mandal is monitoring the water quality at 14 points in the Narmada Valley and conducting laboratory examination for 23 physical and chemical parameters.

ACTION PLAN FOR PUBLIC HEALTH SECTOR ON ENVIRONMENTAL ASPECTS OF SARDAR SAROVAR PROJECT :

An irrigation Project on river particularly big projects cause substantial changes in the environment. As such creation of Sardar Sarovar reservoir will produce its effect on the environment.

33 villages of 2 Talukas of Dhule District i.e. Akranl and Akkalkuwa will be affected due to Sardar Sarovar Project.

By and large in Dhule District following diseases are prevalent.

- | | |
|-------------------------|---|
| 1. Water borne | Cholera
Gastroenteritis
Infective Hepatitis
Worm infestation |
| 2. Mosquito borne | Malaria |
| 3. Nutritional Diseases | Goitre, Anaemia |
| 4. Genetic disorder | Sickle cell anemia |

Water from Sardar Sarovar will not be utilised for irrigation or drinking purpose in Maharashtra. Therefore incidence of the above disease will not altered. Except the mosquito borne diseases. Incidence of Malarial due to increased breeding of Mosquito vector might increase due to changes in the environment after formation of Sardar Sarovar Project.

Malaria and Filariasis :

With the construction of Sardar Sarovar Dam breeding of vector species of Malaria will increase. There will also be formation of cesspools due to seepage. It will also favour breeding of mosquitoes. Due to the migration of labourers, there will be ample opportunities of spread of Malaria. Amongst the Public Health Problems increase of malaria will be a major problem.

MALARIA GUIDELINES FOR IRRIGATION PROJECT :
(Action to be taken by the Irrigation Department)

Malaria Vector mosquito usually breeds in clean stagnating water. The conditions for spread of malaria are ideal when the number of malaria mosquitoes and the malaria parasite carrier in the human population i.e. the malaria patients, are present.

The following steps taken by the Irrigation Department would be useful for controlling malaria:

1) **Seepage from Dam**

Attention is needed for lining of the dam wall causing seepage of water.

The seepage water collects in low laying areas converting them into breeding places for mosquitoes.

Where the seepage from dam cannot be stopped by lining then the collection of water can be connected with a nearby permanently flowing water channels.

2) **Irrigation Project :**

In a large irrigation project labourers are usually imported from different parts of the country. The project should have an in built anti-malaria organisation for prompt detection and treatment of malaria cases and for the indoor residual insecticidal spray of all buildings as advised by the local antimalaria organisation.

3) **To check spread of P. Falciparum malaria :**

When imported labourers return back to their native places, the District Health authorities of that place should be informed by the project authority the name of address of the returning labourers for follow-up.

4) In the irrigation project areas, the project authorities should always seek help from the nearest anti-malaria organisation.

Proposal for implementation of antimalarial measures in Irrigation Project areas (Action to be taken by the Public Health Department).

In the irrigation project areas there is always a problem of importation of Malaria cases from different parts of the State as well as flare up of the outbreak due to transmission

A large number of labour arrive at the work site from different parts of the State or even different part of the country. Some of these casual labour area already malaria cases where the source of infection may be from their own place of residence or from where they have arrived. At the construction site at number of places, excavation is done where water is collected, so also a large quantity of water is used for construction work, which stagnates here and there. Frank breeding of mosquitoes taken place in such water collections.

When already there are cases of malaria amongst the people working there and when there are favourable mosquitogenic conditions, frank transmission of the disease takes place amongst the workers. Hence, at number of times, focal outbreake are noticed in the irrigation project areas every year.

It is, therefore, proposed to implement anti-malaria measures in the irrigation project areas. They will have to be considered on 2 aspects mentioned above, i.e. surveillance and antilarval measures.

1) Surveillance :

Detection of cases of malaria from amongst people working there. This is done by house to house or hut to hut visit by the malaria staff so appointed. Radical treatment is given to malaria cases after examination of the blood.

For this purpose the Irrigation Department should make budget provision on the basis mentioned below :

1. Staffing pattern to be adopted for surveillance of malaria cases :

<u>Cateoory</u>	<u>No.of Posts</u>	<u>Pay Scale Rs.</u>
1. Malaria Sur.Worker	at the rate of one per 5000 population	Rs. 290-540
2. Malaria Sur.Inspector	at the rate of one per 15,000 at 20,000 population.	Rs. 235-680

Remarks : For every 5,000 population one malaria surveillance worker is needed, and for such 3-4 malaria surveillance workers one malaria surveillance inspector is needed to supervise the work of the malaria surveillance worker and to administer radical treatment to the malaria cases.

II) Anti-larval measures :

To take anti-larval measures will have to be undertaken where frank breeding of the mosquitoes is taking place and to cut down the vector density so that transmission of the disease can be curtailed.

- a) One field worker for every 5,000 population Pay Scale Rs. 200-280. (Old scale)
- b) One Superior Field Worker for every 15,000 to 20,000 population. Pay Scale Rs. 290-540. (Old scale)

Remarks :

The field workers and the superior field workers will carry out anti-larval measures in the project areas so as to eliminate mosquito breeding. For each 3 or 4 such field workers one superior field worker is needed to supervise the work of these field workers.

In addition to the above mentioned field workers, five field workers and one superior field worker will be required to carry out anti-larval measures in about 5 Km. length of the river down stream from the site of the dam, and to treat the water collections in the river belt as well as in and around the dam construction site.

Material and equipment for every 10000 pop. at the work site

- | | |
|----------------------------|--------------------------|
| 1. Mosquito larvicidal oil | : 5,000 litres per year. |
| 2. Baytex | : 5 litres per year. |
| 3. Abate | : 5 litres per year |
| 4. Pyrethrum extract 2% | : 10 litres per year |

Equipment :

1. Each malaria surveillance worker and malaria surveillance inspector will have to be provided with a surveillance kit (costing approx. Rs. 100 per kit).
2. Knapsack sprayer : One per field worker for antilarval work (costing about Rs. 400/- per knapsack sprayer).
3. One Thermal fogging machine (e.g. van for machine) Costing approx. Rs. 5000/- per machine).
4. In addition to this, for minor engineering work like de-weeding, desilting, filling, channelisation etc. equipment

such as ghenwells, phowada, pickaxe will have to be provided from the departmental stock.

In place where the project population (Labour + regular departmental colony population) is 40,000 and above, one Sanitary Inspector should be provided in the pay scale of Rs.335-680/-. He will supervise the anti-malaria activities within the project as well as, look after the stock of antilarval equipment and material.

If a project dispensary is established one additional malaria surveillance worker should be provided and posted in the project dispensary to carry out passive surveillance.

In case where the population is small only one malaria surveillance worker and only one field worker is required to be appointed on the basis of scale mentioned above, one malaria surveillance inspector should be provided who will look after the surveillance activity as well as anti-larval activity within the project area.

While calculating the number of staff that is required population that will be engaged at the site of the const. work of the dam as well as the strength of workers that will be required for construction of dam etc. should be taken into consideration so that surveillance activity and the antilarval activity can be ensured at both the places like dam site and the dam construction.

It is proposed that the Irrigation Department should make the required provision for such staff while formulating the scheme, and the staff should be continued as long as the work is in progress. Thus it should be obligatory for the authorities to prepare estimates to provide for such staff whenever an irrigation project is taken in hand.

As regards the anti & malaria drugs the same will be provided by the District Malaria Organisation, as this activity will be carried out in the district. An over all supervision of the anti-malaria activity within the project area will be a part and parcel of district activity and therefore it will be supervised by the District Malaria Officer of the district. He will guide the project authorities in the implementation of the anti-malaria activity within the project area.

(Action to be taken by the Irrigation Dept.)

MALARIA GUIDELINES FOR IRRIGATION PROJECT :

Malaria mosquito usually breed in clean stagnating water. The conditions for spread of malaria are ideal when the number of malaria mosquitoes and the malaria parasite carries in the human population i.e. the malaria patients are present.

The following steps taken by the Irrigation Department would be useful for controlling malaria :

1. Established Irrigation Canal :

All the tributories of the canal are not flowing at a time as a result of the unused tributories develops lot of pending which are helping breeding mosquitoes. After laying of eggs in the stagnating water it takes about 10 days to become adult mosquito from egg stage. To avoid mosquito breeding in the pending arrangement may be made to flush the unused tributories once in a week by which there will be no stagnating of water and breeding of mosquitoes.

2) Seepage from canal :

Attention is needed for lining of the canal wall causing seepage of water.

The seepage water collects in low laying areas converting them into breeding places for mosquitoes.

Where the seepage from canal cannot be stopped by lining then the collection of water can be connected with a nearby permanently flowing water channels.

3) Irrigation Project :

In a large irrigation project laborers are usually imported from different parts of the country. The project should have an in built anti-malaria organisation for prompt detection and treatment of malaria cases and for the indoor residual insecticidal spray of all buildings as advised by the local antimalaria organisation.

In small irrigation projects the project authorities may contact District Malaria Organisation to take anti-malaria measures.

4) To Check spread of P. Falciparum malaria :

When imported labourers return back to their native places, the District Health authorities of that place should be informed by the project authority of the name and address of the returning labourers for follow-up. This is particularly applicable to the labourers returning from North-eastern region of the country, where P. falciparum, malaria parasite (cassative organism for cerebral malaria and deaths) is resistant to antimalaria drug chloroquine.

5) In the irrigation project areas, the project authorities should always seek help from the nearest anti-malaria organisation.

Proposal for implementation of anti-malaria measures
in Irrigation Project areas. (Action to be taken by
..... the Public Health Dept).

In the irrigation project areas there is always a problem of imporation of malaria cases from different parts of the state as well as flare up of the outbreak due to transmission of the disease within the project area.

A large number of labour arrive at the work site from different parts of the State or even different part of the country. Some of these casual labour are already malaria cases where the source of infection may be from their own place of residence or from where they have arrived. At the construction site at number of places, excavation is done where water is collected, so also a large quantity of water is used for construction work, which stagnates here and there. Frank breeding of mosquitoes takes place in such water collections.

When already there are cases of malaria amongst the people working there and when there are favourable mosquitogenic conditions frank transmission of the disease takes place amongst the workers. Hence, number of times focal outbreaks are noticed in the irrigation project areas every year.

It is, therefore, proposed to implement anti-malaria measures in the irrigation project areas. They will have to be considered on 2 aspects mentioned above.

1. Surveillance : Detection of cases of malaria from amongst people working there by house to house or hut to hut visit by the malaria staff so appointed. Give radical treatment to malaria cases after examination of the blood.

where

2. To take anti-larval measures/ frank breeding of the mosquitoes is taking place and to cut down the vector density so that transmission of the disease can be curtailed.

For this purpose the Irrigation Department ~~shxwx~~ should make budget provision on the basis mentioned below :

1 Staffing pattern to be adopted for surveillance of malaria cases :

Category	Number of posts.	Pay scale Rs.
1. Malaria Surv. worker.	at the rate of one per 5,000 population.	Rs. 290-540 Rs. 250-435 475-1666
2. Malaria Surv. Inspector	at the rate of one per 15,000 to 20,000 population.	Rs. 290-540 335-680 1200-2046

Remarks : For every 5,000 population one malaria surv. worker is needed, and for each 3-4 malaria surveillance workers one malaria surveillance inspector is needed to supervise the work of the malaria surv. worker and to administer radical treatment to the malaria cases.

2. Anti-larval measures :

a) One field worker for every 5,000 population Paysacele 4/
Rs. ~~200-280~~ 750-940

b) One Superior field worker for every 15,000 to 20,000 population.
Pay scale Rs. 975-1660

Remarks The field worker and the Supervisor field workers will carry out anti-larval measures in the project areas so as to eliminate mosquito breeding. For each 3 or 4 such field workers one Superior field worker is needed to supervise the work of these field workers.

In addition to the above mentioned field workers, five field workers and one superior field worker will be required to carry out anti-larval measures in about 5 kmt. length of the river down stream from the site of the dam, and to treat the water collections in the river ~~but~~ as well as in and around the dam construction site.

Material and equipment for every 10,000 population at the work site :

- | | | |
|----------------------------|---|------------------------|
| 1. Mosquito larvicidal oil | : | 5,000 litres per year. |
| 2. Daytex | : | 5 litres per year. |
| 3. Abate | : | 5 litres per year. |
| 4. Pyrethrum extract 2% | : | 10 litres per year. |

Equipment :

1. Each malaria surveillance worker and malaria surveillance inspector will have to be provided with a surveillance kit . (costing approx. Rs. 100 per kit.)
2. Knapsack sprayer : One per field worker for antilarval work, (costing about Rs. 400/- per knapsack sprayer.)
3. One Thermal fogging machine (e.g. van fog machine) Costing approx. Rs. 5000/- per machine).
4. In addition to this for minor engineering work like dweeding, destilting, filling, channelisation etc. equipment such ghamella, phawada, pickaxe will have to be provided from the departmental stock.

In place where the project population (Labour + regular departmental colony population) is 40,000 and above one Sanitary Inspector should be provided in the payscale of Rs. 335-680. He will supervise the anti-malaria activities within the project as well as look after the stock of antilarvals etc.

If a project dispensary is established one additional malaria surveillance worker should be provided and posted in the project dispensary to carry out entire surveillance.

In case where the population is so small that there is only one malaria survey worker and only one field worker is required to be appointed on the basis of scale mentioned above, one malaria surveillance inspector should be provided who will look after the surveillance activity as well as anti-larval activity within the project area.

While calculating the number of staff that is required the population that will be engaged at the site of the construction work of the dam as well as the strength of workers that will be required for construction of canals etc. should be taken into consideration so that surveillance activity and the antilarval activity can be ensured at both the places like dam site and the canal construction.

It is proposed that the Irrigation Department should make the required provision for such staff while formulating the scheme, and the staff should be continued as long as the work is in progress. Thus it should be obligatory for the authorities to prepare estimates to provide for such staff whenever an irrigation project is taken in hand.

As regards the anti malaria drugs the same will be provided by the District Malaria Organisation, as this activity will be carried out in the district. And even all supervision of the anti-malaria activity within the project area will be a part and parcel of district activity and therefore it will be supervised by the District Malaria Officer of the district. He would guide the project authorities in the implementation of the anti-malaria activity within the project area.

All the irrigation projects which are in progress at present should be provided such staff from the next financial year and those which will come up in future should automatically get the staff as the staffing pattern of the project.

Action Plan

FINANCIAL IMPLICATIONS INVOLVED IN SARDAR SAROVAR PROJECT(DHULE DIST)
FOR THE POPULATION RESIDING WITHIN 6 KM BELT OF THE RESERVOIR I.E.(13738)

Sr. Category of No. post	pay scale	Total post created	Pay & allows for one post (on average cost)	PROVISIONS FOR	
				One month	12 months
1) Health Worker (MSW) Rs 975-25-1150-EB-20-1660		3	Pay 1287 DA 374 HRA 45 CLA 20 TA/PTA 300	3861 1122 135 60 900	46332 13464 1620 720 10800
			Total 2026	6078	72936
2) Health Asstt. (MSI) Rs 1200-30-1560-EB-40-2010		1	Pay 1583 DA 461 HRA 90 CLA 20 TA/PTA 375	1583 461 90 20 375	18996 5532 1080 240 4500
			Total 2529	2529	30348
3) Field Worker Rs 750-12-870-EB-14-940		3	Pay 840 DA 244 HRA 45 CLA 20 TA/PTA 300	2520 732 135 60 900	30240 8724 1620 720 10800
			Total 1449	4317	52164

Sr. Category of No. post & pay scale	Total post created	Pay & allows for one post (on average cost)	PROVISIONS FOR	
			One month	12 months
d) Health Worker (SEW) Rs 975-25-1150-EB-30-1660	1	Pay 1287 DA 374 HRA 45 CLA 20 TA/PTA 300	1287 374 45 20 300	15444 4428 540 240 3600
		Total 2026	2026	24312
e) Health Worker (IC) Rs 975-25-1150-EB-30-1660	1	Pay 1287 DA 374 HRA 45 CLA 20 TA/PTA 300	1287 374 45 20 300	15444 4428 540 240 3600
		Total 2026	2026	24312
f) Sanitary Inspector (HA) Rs 1200-30-1580-EB-40-2040	1	Pay 1583 DA 461 HRA 90 CLA 20 TA/PTA 375	1583 461 90 20 375	18996 5532 1080 240 4520
		Total 2529	2529	30348

MATERIAL & EQUIPMENT REQUIRED FOR THE POPULATION RESIDING IN 6 KM BELT AREA .

MATERIAL

		<u>Total cost</u>
1) M.L.011	7500 lit/year	24277.50
2) Baytex	7.5 lit/year	2595.00
3) Abate	7.5 lit/year	2047.50
4) Pyrethrum extract 2%	15 lit/year	1350.00
Total		<u>30270.00</u>

EQUIPMENT

1) Surv.kit	4	cost ₹.100/kit	400.00
2) Knap sack sprayer	3	cost ₹. 400/sprayer	1200.00

3) In addition to this, for minor engineering work like dewatering, desilting, filling etc. equipment such as ghamelas, phawadas, ^{axes} ~~arees~~ will have to be provided from the departmental cost.

Total cost for Material & Equipment/year = 31870

Total expenditure on staff/year 234420

Grand Total ₹. 266290

PKK/11989

केवल सरकारी प्रयोग के लिए
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नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल Environment Sub-Group आठवीं बैठक की कार्यसूची Agenda for Eighth Meeting

: पर्यावरण भवन नई दिल्ली
ue : Paryavaran Bhawan New Delhi

दिनांक : 14 मई, 1990
समय : 10-30, सुबह
Date : 14th May, 1990
Time : 10-30 A.M.

नई दिल्ली
मई, 1990

New Delhi
May, 1990

I N D E X

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**ITEM NO.VIII-1(48) - CONFIRMATION OF THE MINUTES OF THE SEVENTH
MEETING OF ENVIRONMENT SUB-GROUP**

The minutes of the 7th meeting of Environment Sub-group of Narmada Control Authority were circulated to all members and invitees vide letter No. D-34(7)/89/2018 dated the 8th January, 1990.

Govt. of Maharashtra vide their letter dated 11.1.1990 (Annex-VIII-1) has stated that no separate anthropological survey in Maharashtra appears necessary since Govt. of Madhya Pradesh was already carrying out an anthropological survey in Narmada basin.

Wild Life Institute of India, Dehradun vide their letter dated 19.1.1990 (Annex-VIII-ii) has referred the item No.VII-6(42) - Survey of Flora and Fauna and Archaeological studies of the 7th meeting and has stated that the institute has undertaken the responsibility of the studies relating to flora and fauna in the Narmada Sagar Project and Omkareshwar Project and not in SSP.

Subject to the above amendments, the minutes of the 7th meeting of Environment Sub-group held on 19.12.1989 may be confirmed.

**ITEM NO.VIII-2(49) - FOLLOW-UP ACTION ON THE DISCUSSIONS HELD
WITH THE STATE GOVERNMENTS OF MADHYA
PRADESH & GUJARAT BY THE REPRESENTATIVE OF
MINISTRY OF ENVIRONMENT & FORESTS**

As decided in the last meeting of the Narmada Control Authority held on 10th April, 1990, Advisor, Ministry of Environment and Forests would visit Gujarat and Madhya Pradesh to discuss in detail the follow-up action on the environmental action plans prepared/proposed to be prepared by the State Governments. The result of the discussions would be presented by him at the meeting of the Sub-group.

**ITEM NO.VIII-3(50) - ENVIRONMENTAL ISSUES DISCUSSED IN THE MEET-
ING OF NARMADA CONTROL AUTHORITY HELD ON
4.4.1990 AND 10.4.1990**

34th meeting of the Narmada Control Authority was held on 4th and 10th April, 1990 under the Chairmanship of Shri M.A. Chitale, Secretary to the Govt. of India, Ministry of Water Resources. Under Item No.XXXIV-2(369) - Review of action taken on earlier decisions on environmental safeguard measures was also discussed. Regarding the base paper on Sharing of Costs of Catchment Area Treatment among the party States, Chairman assured the Authority that the note would be got ready by the Ministry of Water Resources by the end of April, 1990.

Dr. Maudgal, Adviser, Ministry of Environment & Forest circulated a brief note at the NCA meeting indicating the present status of various studies in respect of both SSP and NSP. This is placed at Annex-VIII-iii. Members may like to discuss.

ITEM NO.VIII-4(51) - WORK SCHEDULE FOR FINALISATION OF ENVIRONMENTAL ACTION PLANS

Chairman, NCA also desired in the last meeting of NCA held on 10.4.1990 that a few items like (i) relocation of Temples and Archaeological Monuments (ii) Felling programme for trees in the submergence area and (iii) Compensatory afforestation, may be identified for discussion in the Environment Sub-group with a view to initiate immediate action on them. The States were requested telegraphically to supply the requisite information contained in Annexure-VIII-iv immediately. The State representatives may like to present a status position and their programme of action. Members may like to discuss the above items and also action plans on various other environmental aspects to fix a definite time-frame.

ITEM NO.VIII-5(52) - SETTING UP OF A ENVIRONMENTAL DEVELOPMENT
CENTRE

A joint paper in this regard was expected from Dr. R.K. Katti and Prof. S. Ramaseshan. A draft proposal was prepared by Dr. Katti which was forwarded to Prof. Ramaseshan on 19.2.1990 for his comments/suggestion. Shri N.K. Dikshit, Member (C), NCA had discussion on 31.3.1990 with Prof. R.K. Katti and Prof. Ramaseshan at Bombay and it was decided that the draft proposal prepared by Dr. Katti would be further modified. It is expected to have another discussion with Prof. Katti and Prof. Ramaseshan during the first week of May and the modified proposal would be circulated during the meeting.

ANY OTHER ITEM

DATE & VENUE OF NEXT MEETING

ANNEXURES

INDEX TO ANNEXURES

<i>Annex No.</i>	<i>Agenda item in which referred to</i>	<i>Page No.</i>
<i>Annex-VIII-1</i>	<i>Item No.VIII-1(48)</i>	<i>1</i>
<i>Annex-VIII-11</i>	<i>Item NO.VIII-1(48)</i>	<i>2</i>
<i>Annex-VIII-111</i>	<i>Item No.VIII-2(49)</i>	<i>3-12</i>
<i>Annex-VIII-1v</i>	<i>Item No.VIII-3(50)</i>	<i>13-14</i>

-----oo0oo-----

Annex re-VIII (1)

NO.RPA.3189/CR-124/89/R-5.
Revenue and Forests Department,
Mantralaya, Bombay- 400 032.

Dated : 11.1.90

To,

The Secretary to the
Government of India,
Ministry of Environment and Forests,
Paryavaran Bhavan, C.O.O.Complex,
Phase-II, Lodhi Road,
NEW DELHI : 110 003.

Subject : SARDAR SAROVAR PROJECT
Archaeological study/Anthropological
study in the submergence area of...

Sir,

I am directed to refer to the discussions held in 7th meeting of Environment Sub-Group of Narmada Control Authority on 19th December 1989, at New Delhi and to state that since Government of Madhya Pradesh is already carrying out an anthropological survey in Narmada Basin, which forms the part of Gujarat, Madhya Pradesh and Maharashtra submergence areas and since the area and race of people is akin to that of Madhya Pradesh, no separate anthropological survey in Maharashtra appears necessary.

Yours faithfully,

sd/-
(M.RAMASWAMY)
Deputy Secretary to Government,
Revenue and Forests Department.

Copies to :

- ✓ 1. The Secretary,
Narmada Control Authority,
Palika Bhavan, Sector XIII,
R.K.Puram, NEW DELHI : 110 066
2. The Secretary to the Government of India,
Ministry of Water Resources,
Shram Shakti Bhavan, Rafi Marg,
NEW DELHI : 110 001.

sd/-
Deputy Secretary to Government,
Revenue and Forests Department.

भारतीय वन्यजीव संस्थान
नू पार्क, देहरादून 248006

Annexure-VIII (11)

एच.एस. पणवार
H. S. Panwar
Director

WILDLIFE INSTITUTE OF INDIA
NEW FOREST, DEHRA DUN-248 006

निदेशक

असाइनमेंट-टी/13-1/3990-भा040न0

दिनांक-जनवरी, 19, 1990

प्रिय श्री सक्सेना,

वृथा आपके पत्र डू-डी-34/7/39/2018 दिनांक-9 जनवरी, 1990 का अवनीवन करें जिसके द्वारा आपने नॉनोडा के पर्यावरण उमदल को डि019/12/ को हुई बैठक का कार्य वृत्त भेजा है।

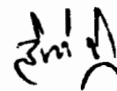
बैठक को मद संख्या-गाऊवों-6428 संबन्धित पैरा 6.1 एवं 6.4 प्रूठ-158 में भारतीय वन्यजीव संस्थान का उल्लेख है। इस बारे में एक स्पष्ट करना चाहिए कि इस संस्थान ने केवल नर्मदा गंगर रीरप्रोजेक्ट तथा नर्मदा ओवरलैप रीरप्रोजेक्ट के संबन्धित क्षेत्र में ही "वनस्पति एवं वन्य जीव अध्ययन" का जिम्मा लिया है। सरदार सरोवर क्षेत्र में न तो नॉनोडा और न ही गुरात में इस संस्थान द्वारा किया गुरु का अध्ययन हाथ में लिया गया है, और न ही ऐसा कोई अध्ययन हाथ में लिया जावेगा। संस्थान अपने स्वयं के कार्यक्रम को व्यस्तता के कारण ऐसा करने में असमर्थ है।

बैठक में भा मॉगु के प्रतिनिधि ने पैरा 6.4 में उल्लेखित ऐसी कोई बात नहीं की। अतः पैरा 6.4 में इस संस्थान से संबन्धित उल्लेख को निरस्त करने का कष्ट करें।

पैरा 6.1 में उल्लेखित विवरण सही है।

नव वर्ष की शुभकामनाओं सहित,

भवदीय



॥ एच0एस0पणवार ॥

श्री ओ0सी0सक्सेना,

उप निदेशक

नर्मदा निबन्धन प्राधिकरण, पर्यावरण

7 फ्लोर, नालिका भवन,

मेक्टर-13, आर0के0पुरम,

नई दिल्ली-110066

MINISTRY OF ENVIRONMENT & FOREST
STATUS REPORT
(MARCH, 1990)

Annexure-VIII (111)

SARDAR SAROVAR PROJECT

S.NO.	ITEM	PREREQUISITES	PRESENT STATUS
[1]	[2]	[3]	[4]
1.	<u>CATCHMENT AREA TREATMENT:</u>		
	Catchment Area in Madhya Pradesh - 26,358 Sq Km.	°Total degraded are needing treatment to be surveyed and demarcated.	<u>GOMP</u> - Surveys entrusted to Govindram Seksaria Institute of Technology.
	Catchment Area in Maharashtra - 1317 Sq Km.	°Prioritisation of watershed/ areas for treatment °Mobilisation of such inputs as:	- Interpretation of LAND SAT data is completed. - Pilot project initiated over 10,000 ha. in Mann river catchment.
	Catchment Area in Gujarat - 423 Sq Km.	- Creation of nurseries of indigenous plants & grasses.	- Treatment plan for M.P. expected G.O.M. by September, 1990.
	°No phasing of work in Madhya Pradesh & Maharashtra.	- Manpower.	<u>G.O.M.</u> - Detailed surveys entrusted to GSITS. Report was expected by February, 1990.
	°5 years proposed for Catchment treatment in Gujarat.	- Irrigation facilities for nurseries & plantations. - After care of the plantations.	- No time schedule indicated for preparation of action plans.

[1]	[2]	[3]	[4]
		<p>Details of engineerings structures like check dams, retaining walls, etc. and other soil conservation measures.</p> <p>°Coordination of work among three States including cost sharing.</p>	<p><u>G.O.G.</u></p> <p>- Treatment plan ready for 31,707 ha. of forest and 5,483 ha. of non-forest land.</p> <p>- Area covered so far 1,228 ha.</p> <p>- The scheme of catchment treatment under review by ISRO, Ahmedabad to take up Thematic mapping.</p>

°SURVEYS STILL UNDER WAY IN M.P. AND MAHARASHTRA

°NO PHASING OF SOIL CONSERVATION WORKS DONE SO FAR

°COMPLETION OF CATCHMENT TREATMENT BEFORE IMPOUNDMENT NOT LIKELY.

2. COMEPNSATORY AFFORE - STATION:

-Diversi^{on} of 13,385 ha. of forest area required. The break up is:

Gujarat - 4165.9 ha.

M.P. - 2731.0 ha.

Maharashtra- 6488.4 ha.

-Inputs required area nureseries, irrigation, follow-up arrangements etc.

-Identify & ascertain suitability of land for afforestation with time targets.

-Action plans to be prepared.

-Creation of nurseries.

-Mobilisation of 'manpower' to complete work in 10 years.

-Provision of irrigation facilities for nurseries & plantations.

G.O.M.P.

-8737 ha. proposed for compensatory afforestation.

-Identification of degraded forest area underway.

-245 ha. of non-forest area planted so far.

-Detailed plans expected by June, 1990.

[1]	[2]	[3]	[4]
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-After care arrangements.

G.O.M.

-Area to be covered 19,205 ha. (6205 ha. non-forest and 13,000^{ha} degraded forest areas).

-Detailed scheme not yet ready.

G.O.G.

-Area to be covered 4650 ha.

-Implementation spread over 3 years.

-Plantation in 600 ha. has been done up to September, 1989.

-Plantations in dam vicinity covering 235 ha.

-Only G.O.G. have taken up compensatory afforestation.

°ACTION PLANS AWAITED
°COMPENSATORY AFFORESTATION PLAN MAY 'OVERSHOOT' IMPOUNDMENT SCHEDULE

[1]	[2]	[3]	[4]
-----	-----	-----	-----

3. COMMAND AREA DEVELOPMENT

-Area to be irrigated 17.92 lakh ha.

No phasing for CAD indicated.

°Survey of command area for land capability, water availability and cropping pattern.

°Demarcation of areas prone to, waterlogging and salinity etc.

°Action plans for ground levelling, grading and drainage.

for
optimal utilisation of natural resources, both land and water.

°Infrastructure creation for marketing etc.

°Training facilities for farmers to switch over to new cropping pattern and use of improved seeds and other inputs.

-Soil surveys and ground water studies completed only up to Mahi river crossing.

-6 studies commissioned beyond Mahi crossing.

-Command area development scheme to be prepared after the completion of studies. No plans available at present.

ACTION PLANS NOT AVAILABLE

°TIME FRAME NOT KNOWN

[1]	[2]	[3]	[4]
4.	<u>FLORA AND FAUNA & CARRYING CAPACITY</u>	<p>°Prevailing status of flora and fauna.</p> <p>°Listing of 'endangered and rare species, if any.</p> <p>°Carrying capacity of the habitat before and after submergence.</p> <p>°Identification of agencies with wildlife Research Institute to provide overall guidance.</p>	<p><u>G.O.M.P.</u></p> <p>-Studies entrusted to State Forest Research Institute, Jabalpur.</p> <p>-Time required for the studies would be three years.</p> <p><u>G.O.M.</u></p> <p>-Studies to be carried out by Sagar University and State Forest Research Institute. Terms of reference are being finalised.</p> <p><u>G.O.G.</u></p> <p>-Studies entrusted to M.S. University, Vadodra.</p> <p>-The study planned to be completed in 2 years.</p> <p>-The inception report was discussed in January, 1990. Follow up action not indicated.</p>

ACTION PLANS LIKELY TO BE READY AFTER THREE YEARS' STUDY IN 1993.

[1]	[2]	[3]	[4]
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5. ARCHAEOLOGICAL STUDIES

°Identification of monuments, buildings and archaeological sites needing protection and rehabilitation.

-Rehabilitation Plans.

°Identification of sites and monuments.

°Rehabilitation Plans in consultation with experts and public representatives.

-Archaeology Department to classify the artifacts and monuments.

-ASI will study protected monuments under submergence.

G.O.M.P.

-ASI have carried out exploration in 150 villages.

-The work now to be given to Tribal Research Institute.

-Terms of reference are being finalised.

G.O.M.

-Only one temple coming under submergence. G.O.G. has agreed to relocate this temple.

G.O.G.

-Steps taken to relocate 2 temples.

°PLANS FOR RELOCATION OF TEMPLES/MONUMENTS ARE NOT YET READY.

[1]

[2]

[3]

[4]

6. REHABILITATION

°Submergence of 237 villages with population of 66,675.

°Problem of rehabilitation covers States of Madhya Pradesh, Maharashtra & Gujarat.

°Diversion of 2500 ha. forest land proposed by Maharashtra.

-Enumeration of affected villages.

°Socio-economic survey and profile of the population affected.

°Rehabilitation plan including occupational training facilities.

°Identification of resettlement sites in consultation with oustees.

°Location sites to be identified in the light of non-availability of forest land.

°Wide publicity to Rehabilitation Package proposed.

-Land being identified.

-Joint inspections by officials being done.

-Plans under preparation.

7. SEISMICITY AND RIM STABILITY

-G.O.G. have identified locations for 9 stations.

-Instruments already installed at Kevadia, Korjan, Naswadi and Kawat.

-Studies for rim stability in Maharashtra and Madhya Pradesh are likely to take three years.

STATUS REPORT
(MARCH, 1990)

NARMADA SAGAR PROJECT

S.NO.	ITEM	PREREQUISITES	PRESENT STATUS
/1/	/2/	/3/	/4/

1. **CATCHMENT AREA TREATMENT**

-Total catchment area -
61,648 sq.km. (divided in 53
watersheds)

-Treatment to be done in three
phases.

-Implementation period is 10 years.

-First phase to cover 11,022 km²
in 13 priority watersheds in the
vicinity of reservoir.

°Total degraded area needing treat-
ment to be surveyed and demarca-
ted.

°Prioritisation of watersheds for
treatment.

°Action Plans to be formulated
for Phases-I, II and III.

°Mobilisation of such inputs as

-creation of nurseries of
indigenous plants & grasses.

-manpower.

-irrigation facilities of nurseries
& plantations.

-after care of the planta-
tions.

Details of engineering structures
like check dams, retaining walls,
etc. and other soil conservation
measures.

Phase-I

-Seven watersheds out of the 13
identified covering an area of
2420 sq.km. surveyed.

-Action plan for phase-I likely to
be ready in Sep., 1990.

-No action initiated yet for phase-II
& III even for survey.

-Two circles and 15 sub-divisions
in position.

-Two pilot projects in Daturi and
Godapachar initiated and treatment
expected to be completed by 1994.

°PHASE-I ACTION PLAN AWAITED BY SEPTEMBER, 1990. TIME TARGETS NOT FIXED

°PHASES-II & III SURVEYS & PLANS NOT KNOWN.

°COMPLETION OF CATCHMENT TREATMENT BEFORE IMPOUNDMENT NOT LIKELY.

NARMADA SAGAR PROJECT

<u>1/</u>	<u>2/</u>	<u>3/</u>	<u>4/</u>
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2. COMPENSATORY AFFORESTATION

-Area to be covered 80,940 ha (10,413 ha non-forest and 70,800 ha degraded forest).

-Inputs required are nurseries, irrigation, follow-up arrangements, etc.

-Resolve issues arising out of Forest (Conservation) Act, 1980 violation involving 75 ha for land area without approval.

-Identify & ascertain suitability of land for afforestation with time targets.

-Action plan to be prepared.

-Creation of nurseries.

-Mobilisation of manpower to complete plans in 10 years.

-Provision of irrigation facilities for nurseries & plantations.

-5 compensatory afforestation Divisions created.

-3772 ha of non-forest land has been transferred by NVDA for afforestation.

-Afforestation work taken up in 1229 ha of forest land and 622 ha of non-forest land.

-8 out of 16 proposed nurseries established.
Details not known.

-Annual targets not known

•ACTION PLANS AWAITED

•COMPENSATORY AFFORESTATION PLAN NOT EXPECTED TO BE COMPLETED IN TIME AT PRESENT PACE.

NARMADA SAGAR PROJECT

<u>1/</u>	<u>2/</u>	<u>3/</u>	<u>4/</u>
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3. COMMAND AREA DEVELOPMENT

-Net culturable command area to be covered 1.23 lakh ha.

-Command area development proposed in 3 phases:

Phase-I: 36100 ha

Phase-II: 46800 ha

Phase-III: 40100 ha

°Survey of command area for land capability, water availability and cropping pattern.

°Demarcation of areas prone to waterlogging and salinity etc.

°Action Plans for ground levelling, grading and drainage.

°For optimal utilisation of natural resources, both land and water.

°Infrastructure creation for marketing etc.

°Training facilities for farmers to switch over to new cropping pattern and use of improved seeds and other inputs.

-The command area surveys with year-wise targets, both physical and financial, yet to be received from the G.O.M.P.

-Quantum of "On-farm" works to be ascertained with Action Plans.

-Action Plans for salinity/waterlogging prone areas not available.

°SURVEYS BEING CARRIED OUT

°PLANS AWAITED

°TIME FRAME NOT KNOWN.

**SARDAR SAROVAR AFFORESTATION PROGRAMME
MADHYA PRADESH/MAHARASHTRA/GUJARAT**

Item	Total Qty.	Target Year				
		1990-91	1991-92	1992-93	1993-94	1994-95
Expected level of submergence.						
Identification of coups.						
Identification of alternative area for afforestation.						
Access to coups.						
Establishment of depots.						
Fixation of feeling agencies.						
Development of nurseries.						
Plantation						
Removal of roots and clearance for submergence.						
Organisational strengthening for implementation of the programme.						

**SARDAR SAROVAR RELOCATION OF MONUMENTS
MADHYA PRADESH/GUJARAT/MAHARASHTRA**

Item	Total Quantity	1990-91	1991-92	1992-93	1993-94
Level of expected submergences.					
Number of Monuments to be relocated.					
Selection of site for alternative location.					
Fixing agency for reconstruction.					
Reconstruction activity.					
Removal of existing structure.					
Organisational strengthening for implementation of the programme.					



नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल
Environment Sub-Group

आठवीं बैठक का कार्यवृत्त
Minutes of the Eighth Meeting

14 मई, 1990
नई दिल्ली में हुई

Held at New Delhi
14th May, 1990

नई दिल्ली
जून, 1990

New Delhi
June, 1990

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MINUTES OF THE 8TH MEETING OF ENVIRONMENT SUB-GROUP
HELD ON 14.5.1990 IN PARYAVARAN BHAWAN, NEW DELHI

Shri Mahesh Prasad, Ministry of Environment & Forests and Chairman of the Environment Sub-Group of NCA welcomed the members and invitees to the 8th meeting of the Environment Sub-Group. The list of participants is enclosed at Annex-VIII-Min-1.

Discussion on the agenda items was taken up thereafter.

Item No. VIII-1(48) - CONFIRMATION OF THE MINUTES OF THE 7TH
MEETING OF ENVIRONMENT SUB-GROUP

The amendments suggested by the Government of Maharashtra and the Wildlife Institute of India, Dehradun in the minutes of the 7th meeting of the Sub-Group were accepted and the minutes of the 7th meeting of the Sub-Group confirmed with these modifications.

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Item No. VIII-2(49) - FOLLOW UP ACTION ON THE DISCUSSIONS HELD WITH THE STATE GOVTS. OF MADHYA PRADESH, MAHARASHTRA AND GUJARAT BY THE REPRESENTATIVE OF ENVIRONMENT & FORESTS

As decided in the last NCA meeting, Dr. S. Maudgal, Adviser, Ministry of Environment & Forests was to visit the States of Gujarat, Maharashtra and Madhya Pradesh to discuss in detail, the follow-up action on the environmental action plans prepared/proposed to be prepared by the State Governments. Dr. Maudgal intimated that a visit to Madhya Pradesh has not been possible and, therefore, he presented the outcome of his discussions with the officers of Maharashtra and Gujarat. He stated that as per the terms of the clearance accorded by his Ministry, action plans should have been ready by end of 1989. The approval granted to the project, therefore, needs extension and the States should apply for the same.

MAHARASHTRA

He intimated that out of 1982 oustee families from SSP submergence in Maharashtra, 294 have opted to go to Gujarat and 63 families have actually shifted from Manibeli to Parveta. An area of 2700 ha of forest land was requested to be released for resettlement of the families who want to be rehabilitated in forest area. This requirement has now been revised to 4000 ha. In the meeting held on 3rd May, 1990 at Bombay between the Chief Minister, Maharashtra, and Minister of State (E&F), the stand of the Ministry of Environment & Forests ruling out the possibility of releasing forest land had been made clear with an understanding that other alternatives had to be devised for resettlement in Maharashtra or Gujarat. GOM representative, however, stated that all possible alternatives have been exhausted. Chairman, NVDA pointed out that the NWDT has specified only that the oustees would give option for land of their choice and that such an option cannot be in violation of other laws and regulations. If the choice of the oustees to opt for forest land only has to be strictly maintained, then, it may create problems in regard to oustees from Madhya Pradesh and also other projects in the country.

Dr. Maudgal pointed out that resettlement activities are linked to the availability of suitable land and alternative packages are still being attempted. The time-frame for shifting of the families is still not known but has to be worked out latest upto September, 1990 so that forest clear felling could be planned to be completed before impoundment.

Chairman, NVDA, GOMP also stated that the full cost of rehabilitation should be borne by the Government of Gujarat.

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Clear felling of forest in submergence area

Clear felling of trees over a forest area of 6488.4 ha is to be done by GOM for which at least four years are required. However, this work cannot commence until a satisfactory rehabilitation package is evolved. As no plan for R&R has been finalised, the clear felling of this forest is not expected to be completed by 1994. To synchronise the completion of clear felling operations with the impoundment in 1994, it is essential that work should commence latest by September, 1990.

Catchment Area Treatment

Dr. Maudgal pointed out that the priority area demarcation was done by Govindram Seksaria Institute of Technology and Science, Indore and a preliminary report was given to GOM on 12th March, 1990. This report is, however, to be reviewed and updated in consultation with Soil Survey Department, Government of India by end of May, 1990.

Micro plans for treatment are to be prepared (one Forest Division from Ukai project area is being diverted for this job) which would require four months for each block of 2000 ha. Creation of nursery is proposed only after micro plans are ready. Unless irrigated nurseries are being thought of, planting stock will not be available before 1992. Under the circumstances, the catchment treatment work cannot be completed by 1994 as it is scheduled to be a 6 year programme with 10 year after care.

It was suggested that the treatment work should be started in a phased manner, as soon as priority area is decided rather than wait for the formulation of all the Micro Plans..

Compensatory Afforestation

Government of Maharashtra was to submit the proposal for compensatory afforestation covering an area of 19205 ha out of which 6205 ha is non-forest land. It will take 6 years for implementation of the plan that is upto 1997 if it can start in 1991-92 and 10 years thereafter for after care. The plan has, however, not yet been referred to the Ministry of Environment & Forests. GOM representative indicated that the plan has been prepared by the Forest Development Corporation and would be brought on 18.5.1990 when the Chief Ministers are meeting..

Flora and Fauna

This study is being done by the Sagar University, Jabalpur and State Forest Research Institute, Madhya Pradesh with the same terms of reference as finalised by GOMP. The period of the study is indicated as 2 years.

Shifting of Shoolpaneshwar Temple

The methodology for shifting of this ancient temple has to be worked out. It was suggested that the issue should be resolved as per the wishes of the local people as well as the religious leaders.

GUJARAT

Catchment Area Treatment

Dr. Maudgal informed that GOG had identified 19386 ha forest area for priority treatment which has now been increased to 27204 ha. An integrated plan is being prepared and modified action plan is expected by the end of June, 1990. An area of 1228 ha has so far been treated. The entire work plan is to be completed in five years and three years are required for after care. In the non-forest land, the work will be done on 3025 ha area by Gujarat Land Development Corpn. This plan is not yet ready as consent of the owners is required. Area treated so far is 300 ha. The cost provision made earlier for treatment of forest land has been increased from Rs. 6.95 crores to Rs. 15.35 crores. Revision of the non-forest land treatment cost, earlier provided as Rs. 3.45 crore is yet to be done.

On a request from representative of GOMP, GOG representative explained the nature of the work being undertaken in the catchment area treatment like contour bunding, terracing, nala plugging, pasture development and afforestation. It was agreed that the three States should work out a common treatment package to facilitate apportionment of treatment cost.

Chairman suggested that Government of Gujarat should circulate a note within 15 days detailing the methodology adopted and the basis on which it was adopted for discussion amongst the States. On the basis of mutual discussions, this issue should be resolved within one month's time.

[Action: GOG, GOMP, GOM]

Compensatory Afforestation

Dr. Maudgal informed that the area proposed for compensatory afforestation was 4650 ha which is being modified. After care period is to be increased from 2 years to 3 years as in their catchment area treatment programme.

Command Area Development

It was indicated that Government of Gujarat has completed the studies upto Mahi river crossing and a 3 years study beyond Mahi was commissioned. It was indicated that preliminary plans

are being prepared. GOG representative stated that beyond Mahi, GOG has divided the area into three zones and the study was expected to be completed in three years' time. The Chairmam enquired when the results of the study would be available and what was the year-wise programme of command area development? Government of Gujarat representative intimated that the interim report may be made available shortly and the CAD works would be done along with the development of the command from 1997 to 2015.

Flora and fauna, Carrying Capacity & fisheries

Dr. Maudgal informed that these studies were entrusted to MS University, Vadodara to be completed in Oct., 1991. Aquatic life study is being done by Central Inland Fishries Development Institute since Sept., 1989. The period of study is two and a half years. Carrying capacity study and wildlife study is being done by Shri Sanat Kumar Chauhan. Chairman suggested that the report should be ready by 1991. Regarding fisheries, GOG representative mentioned that they do not have any details of the mechanised lift. Chairman desired that some literature may be provided by Ministry of Environment and Forests if required so that provision of a mechanised lift could be made in the dam structure before it is too late.

Archaeological and Anthropological Studies

It was reported that three temples, including Shoolpaneshwar, are to be relocated. The alternative sites for two temples have already been decided. GOG has taken steps to relocate two temples - Shoolpaneshwar and Hamfeshwar - at higher elevations at the project cost. It was desired to specify the methodology and the details proposed for relocation of the temples. Chairman suggested that for relocation/re-construction etc. each State should endeavour to statisfy the sentiments of the local people.

Seismicity and rim stability

The Gujarat part of the rim area was studied in 1983-84. The studies in the Madhya Pradesh and Maharashtra areas have been started in 1989 by GSI, Nagpur Division. The period of study is three years. Chairman desired that interim report on these studies should be made available.

[Action: GOG]

Health Aspects

The work plan has been prepared by the State Health Department in respect of surveillance and control of malaria and other water borne diseases and communicable diseases. It was informed that no screening of the labour force against communicable diseases has been done and indeed it may not be

practical to do so. Instead, it was suggested that periodical medical check-ups be carried out after the labour has joined the work force.

Madhya Pradesh

The Adviser (Environment), Ministry of E&F could not visit MP. However, the status of compliance of conditions stipulated in the forest and environment clearance regarding action plans is as under:

Catchment Area Treatment

The total catchment area of Sardar Sarovar in MP is 2429400 ha. GOMP representative indicated that construction work on Man and the Jobat projects has commenced. Therefore, the net free draining area of SSP for watershed management works out to 22,700,00 ha. The entire free draining area above SSP was divided into six watersheds and 69 sub-watersheds. Govindram Seksaria Institute of Technology & Science (GSITS), Indore was entrusted with the study of prioritisation of areas for treatment. The draft report is under examination. All India Soil and Land Use Survey (AISLUS) was also engaged in the prioritisation work. GOMP had requested MOWR to use its good offices to pursue the matter with Ministry of Agriculture to get the prioritisation work expedited through AIS&LUS.

As per the draft report, 1,99,062 ha (8.2%) is found to be under "Very High" and 4,86,874 ha (20.17%) under "High" category of erodibility and the remaining under medium, low and very low categories. The above areas need to be treated pari-passu with the dam construction and an average expenditure @ Rs. 7000 per ha will be required. Actual cost will be worked out after the detailed survey of each watershed is completed. Plans are

expected by Sept., 1990. MP Forest Development Corp'n. through the Forest Divns. at Dhar, Jhabua and Khargone will carry out implementation work. NVDA would create more divisions depending upon the work load.

The basic issues which emerged after the discussion were:

- i) cost sharing must be decided on priority,
- ii) a network of nurseries should be created to provide planting stock,
- iii) modification of plan prepared earlier on 1:250000 scale to be converted to 1:50000 scale would be ready by Aug., 1990 and;
- iv) components of a common CAT package to be devised by the 3 States as earlier agreed.

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Chairman noted that there was no progress as far as the CAT works are concerned because of the issue of cost sharing which in turn was related to the finalisation of the policy paper by MOWR.

Compensatory Afforestation

GOMP representative indicated that 8737 ha (6547.23 forest and 2189.79 ha non-forest land) has been identified. The work in Dhar and Jhbuva Forest Divn. has been assigned to MP Rajya Van Vikas Nigam Ltd., Bhopal. The afforestation work in non-forest and degraded forest in Khargone district has been entrusted to Forest Officer, Kavary Forest Divn. Against the total of 1,195 ha of non-forest area of Khargone, 245 ha has already been planted (in 1989) and 471 ha is being prepared for planting in the rainy season of 1990. It was also mentioned that Territorial Divisions would be created and planting stock is available with the Kavary Division. The felling will be done in 2-3 years. Detailed project report was expected by June, 1990.

Flora and fauna and, Carrying Capacity of Surrounding Areas

State Forest Research Institute, Jabalpur has commenced the study in April, 1990 and it will take 3 years time for its completion. Chairman expressed his doubts whether GOMP would be able to work out action plans within a year after the studies are over?

Archaeological & Anthropological Studies

The State Archaeological Deptt. is carrying out the survey work. The Archaeological Survey of India (ASI) has been entrusted the responsibility for the protected monuments. GOMP informed that surveys would be completed by June, 1990. Monuments have been identified but further report is awaited. Tribal Research Institute has been requested to undertake anthropological studies. Time-frame and terms of reference are to be finalised by the State Government.

Narmada Sagar Project

No discussion took place on environmental aspects of Narmada Sagar Project.

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Item No. XIII-3(50) - ENVIRONMENTAL ISSUES DISCUSSED IN THE
NCA MEETING HELD ON 4.4.90 AND 10.4.90

Chairman, NVDA stated that preparation of base paper on sharing of cost of catchment area treatment was a major item on environment which needs to be brought out by MOWR. Dr. Maudgal, Adviser, Ministry of E&F informed that the draft paper has been prepared and was discussed in two recent meetings and is under finalisation in the Ministry of Water Resources.

Shri R.S. Khanna expressed his doubts on the issues and the various components needed to be considered in the base paper. He also mentioned that in the catchment of SSP in Madhya Pradesh, surveys are going on, but how far they could implement the CAT depends on the clearcut policy of the Government.

Secretary, NCA explained that Ministry of Agriculture has undertaken watershed development schemes in whole of the country irrespective of project construction activities.

Shri N.K. Dikshit, Ex-Member (Civil), NCA mentioned that in the earlier meetings, it was decided that the draft paper would be prepared by Ministry of Water Resources and it would be put up to the Committee of Secretaries, if considered essential.

Chairman, NVDA stated that the catchment in Madhya Pradesh being too large, the catchment treatment activities should have been included under the centrally sponsored schemes. Prof. Katti opined that the idea of catchment area treatment was to arrest silt and to improve the land productivity. Past experience has shown that siltation cannot be eliminated altogether even after catchment area treatment works are implemented since it was a natural phenomenon.

Chairman expressed his dissatisfaction over the delay in finalisation of the policy paper by the Ministry of Water Resources and advised Dr. Maudgal that a letter should go to Secretary (WR) emphasising the urgency of completing the policy paper in time for the Chief Ministers' meeting on 18.5.1990.

[Action:MOWR, MOE&F]

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**Item No. XIII-4(51) - WORK SCHEDULE FOR FINALISATION OF
ENVIRONMENTAL ACTION PLANS**

This item was not discussed again separately as the relevant details conveyed by Dr. Maudgal and the State representatives had been covered under Item No. VII-2(49). The State Governments were requested to furnish the information in detail as desired in the Annex-VIII-IV of the agenda.

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Item No. VIII-5(52) - SETTING UP OF AN ENVIRONMENTAL
DEVELOPMENT CENTRE

Shri N.K. Dikshit, Ex. Member (Civil), NCA explained that a draft proposal on Environment Development Centre (EDC) was prepared by Prof. Katti. He had two meetings with Prof. Katti and Dr. Ramaseshan for finalisation of the paper. He briefly outlined the objectives of EDC and requested the members to express their views.

Prof. Katti explained the necessity of such a centre to provide basic information and data concerning natural resources and environmental problems. Chairman stated that it may not be possible to carry out multi-disciplinary activities and to avoid duplication, the operations have to be decentralised by using existing facilities.

Dr. Ramaseshan stated that the Centre has to play a vital role in keeping a balance between optimum utilisation of natural resources and environmental conservation. He also said that modern technology is now available in the country and the Centre is to be equipped with latest technological tools in the area of information system, socio-economic planning, environmental aspects and engineering. The data is to be collected from several sources to be stored and retrieved.

NCA has proposed to develop EDC in two phases. In the first phase, the organisational structure of the proposed centre is envisaged as a semi-government organisation. The centre may be located at Indore where a computer centre is proposed to be set up for hydrometeorological network of Narmada Basin. The tentative cost of the set up of the first phase is estimated to be Rs. 1 crores.

Members desired to have some time to study the document circulated during the meeting. The Chairman agreed that the member may study the proposal which would be discussed in detail in the next meeting.

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ANY OTHER ITEM

It was agreed that Dr. Shekhar Singh who had earlier been inducted as a member of the Environment Sub-Group with the approval of the Chairman, should be invited to the meetings well in time and agenda papers made available.

DATE AND VENUE OF THE NEXT MEETING

Chairman suggested holding of the next meeting of the Environment Sub-group at Bhopal in the middle of July, 1990

**PARTICIPANTS OF THE 8TH MEETING OF THE ENVIRONMENT
SUB-GROUP HELD ON 14.5.1990 AT 1430 HOURS IN PARYAVARAN
BHAWAN, CGO COMPLEX, LODI ROAD, NEW DELHI-110003.**

1. Shri Mahesh Prasad, Secretary to the Govt. of India, Ministry of Environment & Forests, New Delhi.
2. Shri R.S. Khanna, Chairman, Narmada Valley Development Authority, Bhopal.
3. Shri N.B. Lohani, Vice-chairman, Narmada Valley Development Authority, Bhopal.
4. Shri D.R. Thapliyal, Member (E&F), NVDA, Bhopal.
5. Shri D.V.S.R. Sarma, Member (Engg), NVDA, Bhopal.
6. Shri O.P. Sharma, Dy. Conservator of Forest, NVDA, Bhopal.
7. Shri K. Nalinaxan, Secretary (Reh.), Govt. of Maharashtra, Bombay.
8. Shri K.G. Sankhe, Joint Secretary, Govt. of Maharashtra, Bombay.
9. Dr. S. Ramaseshan, Professor, IIT, Kanpur.
10. Prof. R.K. Katti, Expert, Bombay.
11. Shri C.V. Sarma, Member (Power), NCA, New Delhi.
12. Shri S.M. Pai, Secretary, NCA, New Delhi.
13. Shri A.V. Gururaja Rao, Specialist (Env.), SSNNL, Gandhinagar.
14. Shri Ashok Kumar, Conservator of Forest, SSNNL, Gandhinagar.
15. Shri N.K. Dikshit, Ex-Member (Civil), NCA, New Delhi.
16. Dr. S. Maudgal, Adviser, Ministry of E&F, New Delhi.
17. Shri S.S. Patnaik, DIG Forest, Ministry of E&F, New Delhi.
18. Shri T.K. Mukhopadhyay, Specialist (Hydrology), NCA, New Delhi.
19. Shri O.P. Saxena, Dy. Director (Env.), NCA, New Delhi.

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नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उप-दल की Environment Sub-Group नौवीं बैठक की कार्यसूची Agenda for Ninth Meeting

स्थान : पर्यावरण भवन,
नई दिल्ली
Venue : Paryavaran Bhawan
New Delhi

दिनांक 7: सितम्बर, 1990
Date : 7th September, 1990
समय : 11 बजे सुबह
Time : 11 A.M.

इन्दौर
Indore
अगस्त, 1990
August, 1990

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**ITEM NO. IX-1(53) - CONFIRMATION OF THE MINUTES OF THE EIGHTH
MEETING OF ENVIRONMENT SUB-GROUP**

The minutes of the 8th meeting of Environment Sub-group of Narmada Control Authority were circulated to all members and invitees vide letter No. D-34(8)/90/880 dated the 4th June, 1990.

No comments have been received from any members, as such the circulated minutes of the 8th meeting of Environment Sub-group may be confirmed.

ITEM NO. IX-2(54) - PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENT ACTION PLANS

IX-2(54)(1) - PHASED CATCHMENT AREA TREATMENT

NARMADA SAGAR PROJECT

Government of Madhya Pradesh

The progress of work undertaken so far is indicated in the status report of June, 1990 at Annex-IX-1. Further progress made in the prioritisation survey and preparation of action plans phase-I and II may be indicated by GOMP.

Based on the Dewan Committee's recommendation of 1985, pilot studies have been entrusted with the Agricultural Finance Corporation in two catchments namely Datuni and Godapachar and the treatment is expected to be completed by 1994. GOMP was requested to send a detailed write up on the pilot studies giving the year-wise programme of financial and physical targets and achievements together with a detailed map of the area. The note would cover the type of programme attempted in the pilot studies. These are not yet received. These may be supplied by the State Government and the present position may also be indicated.

SARDAR SAROVAR PROJECT

Government of Madhya Pradesh

- i) GOMP has to furnish the present position regarding preparation of action plans for each watersheds for treating the areas based on the report of GSIT&S. These plans are expected to be ready by September, 1990. GOMP may indicate the present position.
- ii) GOMP has to indicate the detailed plan of action, type of treatment proposed, year-wise physical and financial targets in respect of pilot project in the watershed of river Man.

Government of Gujarat

GOG was to circulate a note detailing the methodology adopted, for discussion amongst the states, to workout a common treatment package. GOG vide their letter dated 6.7.1990 appended at Annex-IX-2 has forwarded a work plan for Catchment Area Treatment in forest and non-forest area. This may be discussed.

Government of Maharashtra

GOM may indicate the progress on review/finalisation of report prepared by Govind Ram Seksaria Institute of Technology and Science (GSITS) in Consultation with Soil Survey Department, GOI. The present position regarding finalisation of priority areas and the treatment works taking taken up may also be indicated by GOM.

SHARING OF COST OF CATCHMENT AREA TREATMENT OF SSP BY PARTY STATES

The issue of cost sharing was related to the finalisation of policy paper by MOWR. Ministry of Water Resources has finalised and circulated two papers viz (i) Guidelines for Action Plan for Catchment Area Treatment of Reservoirs and (ii) Catchment Area Treatment for Narmada Project's share of cost. These are enclosed at Annex-IX-3 and Annex-IX-4. These were to be discussed in the 35th meeting of NCA held on 20.7.1990, but this could not be discussed due to want of time. Ministry of Environment & Forests after discussion with Ministry of Water Resources in this regard, has prepared a modified draft paper on the subject "Catchment Area Treatment as an integral component of river valley projects". This is enclosed at Annex-IX-5. The Sub-group may discuss and decide the extent of area to be treated in relation of Sardar Sarovar Project and mode of sharing of cost.

ITEM NO. IX-2(54)(ii) - COMPENSATORY AFFORESTATION

NARMADA SAGAR PROJECT

Since no discussion took place on environment aspects of Narmada Sagar Project in the last meeting, Members may discuss the note already circulated by Dr. Maudgal, Adviser, Ministry of E&F. This is enclosed at Annex-IX-6.

The details of number of nurseries established and the annual targets fixed may be indicated by GOMP.

SARDAR SAROVAR PROJECT

Government of Madhya Pradesh

GOMP was expected to furnish the detailed plans for felling by June, 1990. GOMP may also indicate the progress achieved regarding plantation during rainy season and transfer of remaining 475 ha of non-forest land from the Revenue Department.

Government of Gujarat

The progress achieved by GOG has been indicated in the status report of June, 1990 (Annex-IX-1). GOG may like to indicate the outlay for 1990-91 and the present progress on compensatory afforestation.

Government of Maharashtra

GOM in their letter dated 2nd June, 1990 stated that a plan for compensatory afforestation was sent to MOE&F on 14th May, 1990. Ministry of E&F may comment on the proposal. GOM may furnish a copy of the plan for compensatory afforestation to NCA also.

ITEM NO. IX-2(54)(iii) - COMMAND AREA DEVELOPMENT

NARMADA SAGAR PROJECT

GOMP was to furnish the information on the command area surveys with yearwise targets for development both physical and financial. The present position may be indicated. Members may like to discuss the issue as stated at Annex-IX-6.

SARDAR SAROVAR PROJECT

In the last meeting, GOG intimated that the interim report about the studies would be made available. GOG representative may like to furnish the present position about action plans, time frame, year-wise surveys with year-wise targets (both financial and physical) and achievements.

ITEM NO. IX-2(54)(iv) - SURVEY OF FLORA AND FAUNA AND ARCHAEOLOGICAL STUDIES

NARMADA SAGAR PROJECT

Flora and Fauna

The Indian Institute of Wild Life, Dehradun has started the work in December, 1989 regarding Flora and Fauna studies. The MOU stipulates submission of half yearly report on the progress made. GOMP may like to indicate the position.

Archaeological & Anthropological Studies

GOMP may like to furnish the present position of steps taken by ASI for relocation and strengthening of monuments and also the action plan for shifting and strengthening of the monuments identified in Dewas and Hoshangabad district by State Archaeological and Museum Department. The progress of survey in the 167 villages of Khandwa and Harsud may also be indicated.

SARDAR SAROVAR PROJECT

GOVERNMENT OF MADHYA PRADESH

Flora and Fauna Studies

The progress made by State Forest Research Institute may be indicated by GOMP.

Archaeological and Anthropological Studies

In the last meeting, GOMP informed that the survey by State Archaeological Deptt. and the Archaeological Survey of India (ASI) would be completed by June, 1990. The present position needs to be indicated by GOMP. Funds have been provided to ASI to shift certain monuments. The expenditure incurred so far and progress achieved may be indicated.

Tribal Research Institute was requested to undertake anthropological studies. GOMP may like to indicate the present position about the time-frame, TOR etc.

GOVERNMENT OF GUJARAT

Flora & Fauna

GOG may like to intimate the present status of studies by MS University, Vadodara and the outcome of the second interim rfeport discussed on 21st July, 1990.

Archaeological Studies

GOG was to specify the methodology and details proposed for relocation of the temples.

GOVERNMENT OF MAHARASHTRA

Flora and Fauna

GOM was to finalise TOR with Sagar University and State Forest Research Institute, Jabalpur. The present position needs to be indicated.

ITEM NO. IX-2(54)(v) - CARRYING CAPACITY OF SURROUNDING AREAS

NARMADA SAGAR PROJECT

This work has been entrusted to Indian Institute of Wild Life, Dehradun. GOMP may indicate the time-frame, the date of start of work and the present progress.

Friends of Nature Society is to give report by end of December, 1990 on relocation of animals. The present progress may be indicated.

SARDAR SAROVAR PROJECT

The present position may be intimated by GOMP regarding the studies being done by State Forest Research Institute, Jabalpur.

GOM has to finalise TOR with State Forest Research Institute, Jabalpur to undertake the studies. The present position may be indicated.

GOG entrusted such studies also to MS University, Vadodara. Further progress needs to be intimated.

ITEM NO. IX-2(54)(vi) - SEISMICITY AND RIM STABILITY OF RESERVOIR

NARMADA SAGAR PROJECT

The case of import of instruments for seismological observation has been approved by GOI. The present position needs to be indicated.

NVDA has sent the report regarding rim stability of NSP to Ministry of E&F in Jan., 1990, as desired by the Ministry.

SARDAR SAROVAR PROJECT

GOG is implementing the programme for setting up of seismic instruments in Gujarat, Madhya Pradesh and Maharashtra. Regarding the studies in Madhya Pradesh and Maharashtra by GSI, in the last meeting, Chairman desired for the interim report. Further development and present position need to be indicated.

ITEM NO. IX-2(54)(vii) - HEALTH ASPECTS

NARMADA SAGAR PROJECT

Public Health Department of GOMP agreed to modify the report on Health Aspects as per the comments of Ministry of E&F. Present position needs to be indicated.

SARDAR SAROVAR PROJECT

Further progress on the position indicated in the status report of June, 1990 at Annex-IX-1 may be indicated by GOMP & GOG.

Ministry of E&F may like to offer their comments on the note on action plan for Public Health Sector circulated during the seventh meeting of Environment Sub-group held on 19.12.1989.

ITEM NO. IX-2(54)(viii) - FISHERIES DEVELOPMENT IN SSP/NSP RESERVOIR**NARMADA SAGAR AND SARDAR SAROVAR PROJECTS****Government of Madhya Pradesh**

GOMP reported that all the three Universities viz. Rani Durgavati University, Barkatullah University, Bhopal and Vikram University, Ujjain have initiated studies as per MOU. The quaterly report for quarter ending March, 1990 is still awaited.

Central Inland Capture Fisheries Research Institute (CICFRI), Barrackpore, Calcutta was also involved. Director, CICFRI was requested to finalise an approach paper for short-term and long-term studies. The present position needs to be indicated.

Government of Gujarat

CICFRI has undertaken studies in respect of aquatic life upstream and downstream of SSP in Narmada River in Gujarat State. GOG indicated that the report of the first phase of pre-impoundment survey has been received. Further progress needs to be intimated. Since the provision of fish lift was not considered feasible, Chairman in the last meeting suggested for provision of mechanised lift in the dam structure.

**tem No.IX-3(53): TIME FRAME FOR PREPARATION OF ACTION PLAN AND
IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD
MEASURES**

Ministry of Env. & Forests accorded environmental clearance to the Sardar Sarovar and Narmada Projects in June, 1987 subject to the following conditions:

- i) The Narmada Control Authority (NCA) will ensure that environmental safeguard measures are planned and implemented pari passu with progress of work on projects.
- ii) The detailed surveys/studies assured will be carried out as per the schedule proposed and details made available to the Department for assessment.
- iii) The Catchment Area Treatment Programme and the Rehabilitation Plans be so drawn as to be completed ahead of reservoir filling.
- iv) The Department should be kept informed of progress on various works periodically.

The items on which action has to be taken are as detailed below:

- 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 Area;
- vii. Seismicity; and
- viii. Health Aspects.

It was noted in the clearance that field surveys had not been completed and only first set of information was made available with an assurance that complete details would be furnished by 1989.

As per the conditions stipulated at the time of clearance, the preparation of Environmental Action Plans and their implementation is periodically being reviewed by the Environmental Sub-

group. The latest review shows that a number of studies and services are still being carried out based on which Environmental Action Plans would be formulated. In the absence of a definite time frame for each of the studies, surveys or action plans, the implementation of the requisite safeguards and action plans pari-passu with the construction of engineering works, would obviously not be possible. Under the circumstances, the approval granted must be deemed to have lapsed.

The Ministry of Environment and Forests have been pointing out with concern that if the field surveys are completed only by 1993, the action plans could be formulated thereafter and, as such, the formulation and implementation of the environmental action plans is not receiving the attention it deserves. On the other hand, notices are being received from the concerned NGOs to initiate action under Environment (Protection) Act, 1986 because of the failure of the project authorities to ensure formulation and implementation of the environmental action plans pari-passu with the engineering works.

It is, therefore, considered imperative that project authorities be directed to:

- (a) Seek renewal of environmental and forestry clearance beyond December, 1989. The project authorities to submit Time-bound environmental and forestry Action Plans with realistic target dates for completion of studies/surveys and implementation of Action Plan, Revised schedule of Environmental Action Plans to be dove-tailed with revised construction schedule for SSP/NSP. In the absence of these documents, supported with facts and reasons for lapses, the approval granted earlier would automatically lapse.

It may be mentioned that SSP is to provide partial benefits by 1995, but the dam is to be filled to full height only by 1997-98. Similarly, the NSP dam is proposed for completion by May, 1998. The environmental safeguard measures have, therefore, to be completed conforming to the schedule of construction of the dam in terms of the conditions of clearance. State Governments are, therefore, requested to furnish their definite programme for completion of the requisite studies, preparation of Action Plans and their implementation consistent with the construction

programme for discussion in the present meeting so that the date upto which extension is sought from the Ministry of Env. & Forests by the individual States can be finalised.

In the 34th meeting of the Narmada Control Authority held on 10th April, 1990, the Chaiman had desired that a few items like (i) relocation of temples and archaeological monuments; (ii) Felling programme of trees in the submergence area; and (iii) compensatory afforestation may be identified after detailed discussion in the Environmental Sub-group for initiating immediate action. Detailed programmes in this respect may also be furnished by the State Governments in the form given at Annex.VIII-4 in the agenda notes of the 8th Meeting (again enclosed as Annex-IX-7(a) to 7(b)).

Item No. IX-4(54): SETTING UP OF AN ENVIRONMENTAL DEVELOPMENT CENTRE

A detailed proposal for the establishment of an Environmental Development Centre was circulated to all Members of the Sub-group for discussion in the 8th Meeting enclosed at Annex-IX-B. However, as the Members required more time to study the same, the Chairman had agreed that this could be discussed in the next meeting.

The World Bank is considering provision of an assistance of US \$ 200 million for the proposed Narmada Basin Development Project which contains the following components:

- (i) Catchment Area Treatment - Support a seven year time slice of a continuing program in M.P. and Maharashtra to improve the production of crops, fodder and wood through soil and moisture conservation and improved land management, beginning in the initial stages with a carefully selected and manageable number of high priority sub-watersheds;
- (ii) Fisheries Development - Support for fisheries development in the SSP reservoir (M.P. and Gujarat and possibly Maharashtra), the SSP estuary area (Gujarat) and the SSP command area (Gujarat);
- (iii) Wildlife Sanctuary Development - Support for wildlife sanctuary development and management in Gujarat, beginning with the Shoolpaneshwar sanctuary in the SSP catchment area and one other sanctuary in the SSP command area and extending eventually to other sanctuaries in and around the SSP command; possible support for pilot wildlife sanctuary development scheme in M.P.;
- (iv) Narmada Basin Environmental Management - Support for establishment of the proposed Narmada Environmental Management and Research Centre for the basin to be based in M.P.; possible support for archaeological/cultural property protection and/or preservation in the SSP reservoir area in M.P.;

- (v) Technical Assistance - Support for specialized research, selected institutional strengthening and training in the fields of catchment treatment (watershed management), participatory techniques to increase village involvement, compensatory afforestation, environmental planning and management, wildlife protection.

From the above it will be seen that the assistance is mainly confined to activities related to environmental safeguards and one of the items is "Providing support for establishment of the proposed Environmental Management and Research Centre for the Basin" to be based in M.P. The World Bank Mission which visited the 3 States in June, 1990 has also desired that the NCA should provide to the Bank by October 1, 1990 a revised concept paper for the proposed Narmada Environmental & Research Centre. The proposal may, therefore, be considered in detail so that the concept paper can be finalised and presented to the World Bank before the target date.

ANY OTHER ITEM

DATE & VENUE OF NEXT MEETING

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NARMADA CONTROL AUTHORITY

STUDIES AND ACTIVITIES REGARDING ENVIRONMENTAL ASPECTS OF SARDAR SAROVAR PROJECT & NARMADA SAGAR PROJECT

STATUS REPORT

New Delhi

June 1990

**STATUS REPORT OF STUDIES AND ACTIVITIES REGARDING THE
ENVIRONMENTAL ASPECTS OF SARDAR SAROVAR PROJECT (SSP)
JUNE, 1990**

At the time of environmental clearance of SSP in June, 1987, the Ministry of Environment & Forest stipulated certain conditions for implementation of environmental safeguard measures alongwith the construction of engineering works under the project. Before implementation of these measures, studies were to be carried out by the participating States of Gujarat, Maharashtra and Madhya Pradesh on the various environmental aspects and action plans were to be prepared and submitted to the Ministry of E&F before actual implementation. Similarly, at the time of signing of the agreement with the World Bank by the participating States and the Govt. of India, the Bank also stipulated that "a work plan for the environmental effects anticipated regarding implementation of the project would include suitable training programmes for responsible staff of the participating States, including plans, schedules, syllabi and provision of funds, and studies and implementation therefor, covering fish and fisheries, forest and wildlife and public health aspects and, thereafter, the participating States should implement the approved work plan and training programmes."

2. The present status of studies/preparation of action plan and implementation in respect of environmental safeguard measures is indicated in the succeeding paragraphs in respect of following environmental concerns:-

- (1) Phased catchment treatment.
- (2) Compensatory afforestation
- (3) Command Area Development.
- (4) Archaeological and Anthropological studies.
- (5) Flora and Fauna.
- (6) Carrying capacity of surrounding areas.
- (7) Seismicity and Rim stability of reservoirs.
- (8) Health aspects.
- (9) Fisheries.

3. Phased Catchment Area Treatment

GOMP

The total catchment area of SSP below the NSP is estimated to be 25971 sq.km. The free draining catchment area of SSP for drawing up the water management shed plan works out to 22700 sq.

km. after allowing for the areas in Maharashtra and Gujarat and the catchments of the Man and Jobat projects. The entire area below NSP was divided into 6 water sheds and 69 sub water sheds. The Govindram, Seksaria Institute of Technology and Science, Indore (GSIT & S) was engaged as consultant to survey the catchment area below NSP. The GSIT&S has worked in collaboration with the All India Soil and Land Use Survey Organisation, New Delhi, the Space Application Centre, Ahmedabad and the MP State Agriculture Department. The draft report prepared by GSIT&S has recently been received in the NVDA and is under examination and finalisation.

As per the draft report of GSIT&S 1,99,062 ha (8.2%) area of the SSP catchment is found to be under "Very High" category of silt yield index (SYI), 4,86,874 ha (20.1%) under "High" category, 8,31,873 ha (34.2%) under medium category 6,24,375 ha (25.7%) under "low" category and 2,87,188 ha (11.8%) under very low category and 2,87,188 ha (11.8%) under very low category of SYI.

For treating the areas under very high and high priority which constitute 28.3% of the total catchment area, it is estimated that an average expenditure of Rs. 7,000/- per ha will have to be incurred. In addition, an average of Rs. 1,000/- per ha would be needed for treating the medium category areas. A total cost of Rs. 563.34 crores is likely to be involved. Firm estimates have to be drawn up after detailed surveys of each catchment and preparation of detailed action plans for each sub water shed. These plans are expected to be ready by September, 1990.

The State has also undertaken the preparation and implementation of a pilot project in about 10000 ha. area in the watershed of river Mann, a tributary of the Narmada in the Lower Narmada zone. The works envisaged under the pilot Project are expected to be completed by 1994.

GOM

During the 8th meeting of Environmental Sub-group held on 14th May, 1990, GOM reported a preliminary report prepared by GSITS has been received on 12th March, 1990 and this report is to be reviewed in consultation with the Soil Survey Deptt. of GOI by end of May, 1990. One Division is being diverted for preparation of micro plans. Creation of nursery would be decided after micro plans are ready.

GOG

A work plan following the recommendations of Dewan Committee was prepared and submitted in 1986. The Catchment area of Sardar Sarovar lying in Gujarat is 423 Sq. Km.(42300 ha). The Catchment

area treatment measures have been planned separately for forest area and non-forest area as under:

Forest Area:	31707 ha. (including forest area under submergence)
Non-forest area	5483 ha.
Total:	<u>37190 ha.</u>

Present Status

i) Planning of Treatment

Catchment Treatment only in forest areas are being executed by the State Forest Deptt. as in the non-forest areas by the State Agriculture Deptt. The progress of planning is as below:

a) Forest Area -

1. Works have been planned in 19386 ha priority area.
2. Stock mapping survey has been completed of the catchment treatment over the entire forest area of 27204 ha. Details are being worked out.
3. A nursery has been set up.
4. The entire work is planned to be completed in 5 years from 1987-88.

b) Non-forest area

The following measures are contemplated in the work plan:

i) Survey and planning	6686 ha
ii) Contour bunding	1692 ha
iii) Terracing	1044 ha
iv) Land Shaping	394 ha
v) Nala Plugging (in nos.)	100 no.
vi) Pasture development	355 ha
vii) Afforestation/ Reclamation	2933 ha

ii) Implementation

a) Treatment in Forest areas

Time frame of Catchment Treatment plans is 5 years.

Particulars	Years	Targets	Progress achieved	Remarks
1) Soil and moisture conservation	1987-88 1988-89	250 ha. 2000 ha.	250 ha.	Advance works are in progress.

	tion works and	1989-90	2000 ha.		Plantation
	afforestation	1990-91	2000 ha.		will be done
	in forest areas	1991-92	2001 ha.		in monsoon.
	with density		-----		
	less than 0.4		8251 ha.		
2)	Soil and Mois	1987-88	278 ha.	278 ha	Advance works
	ture conserva-	1988-89	1050 ha.		are in prog-
	tion works and	1989-90	1050 ha.		ress. Planta-
	afforestation	1990-91	1050 ha.		tion will be
	in forest areas	1991-92	1050 ha.		done in mon-
	with density		-----		soon.
	between 0.4&016		4478 ha.	-	
3)	Fence building	1987-88	1330		
	and nala plug-	1988-89	1330	700 ha	
	ging in forest	1989-90	1330		
	areas with den-	1990-91	1330		
	sity above 0.6	1991-92	1337		

			6657		

b) Treatment in non-forest Area

The methodology of implementation essentially follows the guidelines issued by AIS&LUS. The plan is phased for completion in 5 years. The progress achieved is as under:

Contour bunding	177 ha
Terracing	162 ha

After re-classification of the forest areas in the catchment area, the non-forest area needing treatment measures will be to an extent of 3025 ha.

4. Compensatory Afforestation

GOMP

The State Forest Department has already submitted to the Ministry of E&F in Jan., 1989, the action plan of compensatory afforestation for 8737 ha covering 6547 ha of forest land and 2190 ha of non forest land for their consideration. The State Government is implementing the programme. The State Forest Deptt. has received no comments or directives from the Ministry of E&F. The NVDA is going ahead with the implementation of the plan. The organisational set up to undertake the work has already been finalised. The work of compensatory afforestation in District Dhar and Jhabua has been assigned to Madhya Pradesh Van Vikas Nigam Ltd., Bhopal (MPRVVN). MOU has been finalised with MPRVVN

and they have started nursery work for raising stock for afforestation. The compensatory afforestation work in non-forest and degraded forest land identified in Khargone district has been entrusted to the Divisional Forest Officer (NVDA) Kaveri Forest Division. This Division has already planted 245 ha of non-forest land. Thus against the total of 1195 ha of non-forest area in Khargone district 245 ha has been completed by July, 1989 and 471 ha is being prepared for planting in the rainy season of 1990. It is expected that the remaining 475 ha of non-forest land would also be taken over from the revenue department by the end of June, 1990. The present position is awaited from State Govt. Divisional Forest Officer, Kaveri is to prepare the detailed plan for reafforestation of the 2390 ha of degraded forest area of this district. The work is expected to be completed by the end of December, 1990. The field work would commence from 1991 rainy season onwards at the rate of 500 ha per year for completion by 1996.

GOM

The preliminary plan was submitted by the State Govt. in June, 1988. The total area to be covered would be 19,205 ha of which 6,205 ha are in non-forest land and the remaining area under degraded forest land. In respect of non-forest land the State Forest Deptt. has taken over possession of land from Revenue Deptt. in Akrani Tahsil. Declaration of this area as forest land is to be issued by the State Govt. A detailed project is being formulated. As regards degraded forest land, suitable proposals are to be submitted shortly. GOM in the meeting on 14.5.1990 reported that the proposals were ready and would be sent shortly. The present position needs to be indicated by the State Govt.

GOG

- (a) A work plan, prepared and submitted to Govt. of India is under implementation. Govt. of India permitted diversion of 4523 ha of forest land. In lieu of 4523 ha of forest land going under submergence, Compensatory Afforestation has been planned in 4650 ha of non-forest land in 9 villages of Kutch District. Non-forest lands have been identified and transferred to the Forest Deptt. Implementation is spread over a period of 3 years from 1987-88 including advanced preparatory work.

b) The present progress is as under:

- i) Plantation has been completed in 1100 ha by Sept., 1989.
- ii) During the monsoon of 1990, plantation will be done over 1100 ha for which advance preparatory work is in full swing.
- iii) A total number of 27,50,000 saplings have been raised in plantations.

- iv) Tree species planted are of mixed type with emphasis on locally adaptable trees, at the same time ensuring utility from the point of view of forage, fuel wood, food, medicines, minor forest produce like gum and honey and also shade.

Dam Vicinity Planation

Afforestation Programme in the Dam vicinity has been planned in 235 ha as follows:-

Rainfed plantation 110 ha
Irrigated plantation 125 ha

Progress achieved is as under:

	Plantation done	Advance works in progress
Rainfed Plantation	30 ha	40 ha
Irrigated plantation	5 ha	35 ha

Forest Plantation

Apart from these SSNNL has also decided to take up a model forest plantation programme in Gandhinagar District. An area of 500 ha of ravine lands on the left bank of the Sabarmati has been identified for the purpose. The State Revenue Deptt. has been approached for transferring these lands to SSNNL.

Additional Plantation in Non-forest Areas

In addition to compensatory afforestation planned over an area of 4650 has, SSNNL in Oct., 1989 decided to carry out afforestation in an additional area of 1088 ha of non-forest in Kachchh District. Lands have already been released by the Revenue Department for this purpose in seven villages. A detailed plan is being worked out and plantation would be done in next 3-4 years.

5. Command Area Development:

GOG

- i) Soil surveys and ground water studies as well as drainage studies have been completed in the command area upto the Mahi river crossing.
- ii) GOG indicated that 6 studies have been commissioned beyond Mahi Crossing and the timeframe for carrying out these studies will be intimated in due course. Further progress needs to be indicated by GOG.

6. Archaeological and Anthropological Studies:

GOMP

Archaeological Survey

The State Archaeological Department was entrusted with the survey work for cataloging the artifacts, monuments etc. The Archaeological Survey of India (ASI) would be responsible for the protected monuments coming under submergence in SSP. In Madhya Pradesh, 193 villages are affected by the SSP project. Commissioner, Archaeology & Museum has completed the survey of 75 villages so far. They will complete the total survey by June, 1990 and in 2nd phase, they will formulate proposals for relocation of monuments according to submergence schedule.

Certain monuments which have to be shifted have been identified and adequate funds have been provided to Archeological surveys of India for this part. GOMP has proposed to create museum to house the artifact which are found in the valley.

Anthropological Survey

GOMP has decided to hand over this work to the Tribal Research Institute. Time-frame and terms of reference are to be finalised by the State Government.

GOM

GOM has stated that only Shoolpaneshwar temple, on the border of Maharashtra and Gujarat States, which is the property of Gujarat is coming under submergence. GOG has agreed to relocate the temple. The site for the relocation has been finalised but the mode of relocation is to be decided.

GOG

From the list of the protected monuments obtained from Directorate of Archaeology it is seen that no protected monuments are located in submergence area of SSP in Gujarat. However, the Director of Archaeology of GOG has undertaken an inventory survey of 19 villages coming under submergence of SSP in Gujarat. According to the survey report, the Shoolpaneshwar Mahadev temple and surrounding temple known as Kamleshwar Rajeshwar and Ranchobji at village Surpan, Taluka Nanded of Bharuch District and (2) Hamfeshwar Mahadev temple village Hamf Tal. Chhotaudepur of Vadodara District are important monuments and they should be shifted at suitable places nearby.

GOG has already taken steps to relocate two temples viz Shoolpaneshwar & Hamfeshwar at higher elevation at the project cost. The sites have been finalised to relocate the Shoolpaneshwar and Hamfeshwar Temple as per the wishes of the trustees. There is also another temple at Dhumana which will also be shifted similarly at the cost of the project.

7. Flora and Fauna Studies:

GOMP

It has been decided to entrust this study to the State Forest Research Institute, Jabalpur, which would carry it out in collaboration with the University of Sagar and the Rani Durgawati University, Jabalpur. This Institute also would take about 3 years to complete the study.

GOM

GOM has entrusted the flora and fauna studies for the SSP submergence area in Maharashtra to the Sagar University and State Forest Research Institute, Madhya Pradesh with the same TOR as finalised by GOMP. The period of study would be 2 years and the terms of reference is being finalised.

GOG

This study for the SSP submergence area in Gujarat has been entrusted to M.S. University, Vadodara and is planned to be completed in 2 years from 1989-90. The inception report (Nov. 15, 1989-Jan 15, 1990) prepared by the University was discussed in a meeting held on 17.1.90 at Vadodara.

8. Carrying Capacity of Surrounding Areas

GOMP

The State Forest Research Institute, Jabalpur has commenced these studies in April, 1990 and it will take three years for its completion.

GOM

GOM has authorised GOMP to negotiate with the State Forest Research Institute, Jabalpur with the same TOR as finalised by the GOMP. A copy of the finalised TOR is awaited from the State Government.

GOG

As a part of the flora and fauna studies in the submergence area of SSP in Gujarat entrusted to MS University, Vadodara, phytosociological studies will be conducted in the adjoining forest, which will help in determining the carrying capacity, of forest with a view of assessing impacts of inevitable wild life transfer following the project implementation. Also the measures needed to release the pressure on the carrying capacity of adjoining forest will be suggested.

Wildlife Conservation Measures

The area of the Sloth Bear Sanctuary, (called Dumkhal Sloth Bear Sanctuary), has been enlarged from 151 Sq.km. to 448 Sq.km. and the extended limits reach upto the shoreline of the reservoir. This will ensure free access to waterfront for the animals. Providing stone wall fencing and other conservation measures such as check dams, habitat improvement measures and firelines have been undertaken in the enlarged Shoolpaneshwar Wildlife Sanctuary to foster the flora and fauna of the area for completion in 5 years.

Besides this sanctuary adjoining the reservoir area, the following three sanctuaries are located in the command area of the project.

1. Nal Sarovar - A sweet water lake famous for attracting 120 to 150 species of migratory birds from far off lands.
2. Wild Ass Sanctuary in the Rann of Kutch.
3. Black Buck Sanctuary at Velavadar.

These sanctuaries would also benefit from copious sweet water availability in the command area. The State Forest Department has been working out the engineering infrastructural facilities needed for these sanctuaries.

9. Seismicity and Rim Stability of Reservoir

Reservoir Induced Seismicity:

GOG have identified locations for installation of seismological instruments at 9 stations. GOG is implementing the programme for setting up of seismic instruments in Madhya Pradesh and Maharashtra also. Instruments have been installed and commissioned at Kevadia, Karjan, Naswadi and Kawat observatories. While observatories at Alirajpur and Barwani are ready for installation, the same are under construction at Sagbara, Shahda and Kukshi.

Reservoir Rim Stability:

Geological Survey of India (Nagpur Division) has already started the work in the areas of Maharashtra and Madhya Pradesh and proposes to complete it in 3 years. GSI has already completed the work in Gujarat state.

10. Health Aspects:

GOMP

The State Director of Health Services has conducted detailed surveys during 1982-84 and according to the data collected, diseases like malaria, guinea worm, goiter, gastro-enteritis and

worm infections have been found in the districts falling under the submergence area. With the construction of the dam, the incidence of malaria is likely to increase and suitable control measures will have to be adopted by the Health Department. The State Director of Health Services has agreed to monitor at intervals the incidence of water borne diseases and NVDA would keep in touch with the Directorate of Health Services to ensure implementation of preventive measures.

GOM

GOM had circulated a note covering an action plan for Public Health Sector during the seventh meeting of Environmental Sub-group held on 19.12.1989. The comments of Ministry of E&F are awaited.

GOG

The work plan has been prepared by the State Health Department in respect of:

- i) Surveillance and control of water related and communicable diseases.

Total implementation will take about 17 years time as and where irrigation under the canal system is developed. The programme also covers the villages on the periphery of reservoir. Two studies relating to schistosomiasis had been carried out in 1985 by the National Institute of communicable diseases and concluded that there was no risk to the project on account of this. Subsequently a team led by Chief of Schistosomiasis Division WHO, Scientist from British Council, London and Environment Advisor, World Bank carried out investigations. The analysis revealed that the project area did not have any risk of Schistosomiasis entering the area. The report (work plan) has been furnished to Min. of E&F & World Bank.

- ii) Surveillance and Control of Malaria.

The operation of the reservoir itself inhibits the proliferation of malaria larvae. While the reservoir builds up the storage during the monsoon rains, the larvae, which prefer to stay around the periphery, get drowned and thus are destroyed. On the contrary when the water is with drawn for power generation and irrigation the larvae are stranded and destroyed.

11. Fisheries

GOMP

GOMP studies of important aquatic fauna/fishes, especially the migratory species has been included in the Limnological studies being conducted by the three Universities of the State respectively for the Upper Narmada - (Bargi reservoir) - Rani Durgavati University, Jabalpur, Middle Narmada (Tawa, Barna and

Kolar reservoirs) -Barkatullah University, Bhopal and Lower Narmada zone - Vikram University, Ujjain (preimpoundment studies on selected revewrine stretches on 10 centres).

All the three Universities have initiated the studies in their respective areas as per MOU. The quarterly report for the quarter ending March, 1990 is expected shortly.

The matter of finalisation of approach paper by the Central Inland Capture Fisheries Research Insitute (CIFRI) is under corresnodence and a suitable date will be fixed in consultation with the Director (CIFRI) for finalising the project paper. While finalising the approach paper, the requirements of Govt. of Maharashtra to include the Maharashtra portion of SSP will be kept in view.

GOM

The Director of Fisheries, Maharashtra has requested the Director, Fisheries, Madhya Pradesh to request Central Inland Capture Fisheries Research Institute to take up studies in Maharashtra area also. Since the approach paper with CIFRI has not yet been finalised the aforesaid institute has not been requested to take up studies in Maharashtra area yet. The matter was however discussed with Dr. K.S. Rao, Principal Investigator, Vikram University, Ujjain, Dr. K.S. Rao is willing to establish one observation centre in the Maharashtra zone preferably near Dhulia at no extra cost.

GOG

Central Inland Capture Fisheries Research Institute, Barrackpore, Calcutta (Local Office at Vadodara) has undertaken the studies in respect of aquatic life upstream and down stream of Sardar Sarovar in Narmada River in Gujarat State. Report of the first phase of pre-impoundment survey has been received.

The design plans and estimates for the 10 ha Fish Farm and Fish Hatchery complex have been finalised. The plan is to be implemented in 9 years and will include Hydrobiological studies, establishment of Fish Hatchery and fish farm, training of Fishermen, establishing and assisting primary fishermen's cooperatives, establishing and assisting an Inter-state Fisheries Development Board and a Cell at Directorate for monitoring.

There are two well recognised migratory species Hilsailisa and Giant Fresh Water Prawn. Provision of fish lift is not considered feasible due to height of dam.

**STATUS REPORT OF STUDIES AND ACTIVITIES REGARDING THE
ENVIRONMENTAL ASPECTS OF NARMADA SAGAR PROJECT (NSP)
JUNE, 1990**

a) Phased Catchment Area Treatment

The free draining catchment area of the Narmada between Bargi dam and NSP is 47059 sq. km. Prioritisation survey of the catchment was done by involving the Space Application Centre, Ahmedabad, and the AIS&LUS, New Delhi, the State Agricultural Department and the Agricultural wing of the NVDA.

The AIS&LUS has divided the catchment area downstream of the Bargi dam and upto ISP into 9 sub-catchment. These sub-catchments are further divided into watersheds and sub-watersheds. Survey work in five sub-catchments covering an area of 16747 sq. km. has been completed. The prioritisation at sub-watershed level in the remaining four sub-watersheds is in progress. The field survey work has been completed in 3 out of the remaining 4 sub-watersheds. It is likely to be completed by June, 1990. Action plan for Phase-I is likely to be ready in September, 1990. For phase-II and III prioritisation survey by AIS&LUS is in progress. Two circles and 15 sub-divisions are in position. It is estimated that an expenditure of Rs. 124 crores will be incurred on the treatment of the priority watersheds of phase-I. The costing of the treatment is being attempted on the basis of the different categories of watersheds. The data is being processed and the exercise was expected to be completed by the end of May, 1990. Further report has not been received from the Stat Govt.

Based on the Dewan Committee's recommendation of 1985, pilot studies have been entrusted to Agricultural Finance Corporation in two catchments namely Datuni and Godapachar and the treatment is expected to be completed by 1994.

b) Compensatory afforestation

GOMP has identified 10143 ha of non-forest and 70800 ha of degraded forest land in Dewas, Hoshangabad, Harda and Khandwa forest division for compensatory afforestation. 3992 ha of non-forest land has been transferred to the NVDA.

As regards the progress of afforestation work, it may be stated that NVDA has already formed nine compensatory afforestation divisions with headquarters at Hoshangabad (one), Harda (one), Khandwa (four), Dewas (two) & Bhopal (one) and two Conservator Circles for the execution, control and supervision of the work.

The DFOs shall attend to the compensatory plantations/ compensatory afforestation works together with the Catchment Area Treatment works within their territorial jurisdictions. The programme of afforestation work is given in statement (page-13).

STATEMENTPROGRAMME OF AFFORESTATION WORK (END OF April 1990)

Sl. No.	Name of NVDA Forest Division	I T E M O F W O R K								
		Plantation done in July 1989			Preparation of afforestation area for 90 Plantations in Ha.			Preparation of Nurseries		
		Plantation/RDP in Ha.			Development of Pasture in Ha.			Total		
		Forest land	Non-Forest land	Total	Forest land	Non-Forest land	Total	Derelict Forest land	Non-Forest land	Number
1.	Ichhawar	-	-	-	-	-	-	-	125	3
2.	Daulatpur	44	4	48	-	-	-	650	370	9
3.	Khatgaon	-	-	-	-	-	-	940	107	7
4.	Kaveri	1175	550	1725	-	-	-	505	940	7
5.	Ghodapachhad	-	68	68	200	150	350	1080	308	5
6.	Sukta	-	-	-	-	-	-	515	687	11
7.	Chhotatawa	-	-	-	-	-	-	1500	92	4
8.	Magardha	-	-	-	-	-	-	425	-	4
9.	Sukhtawa	10	-	10	10	-	10	840	70	8
TOTAL		1229	622	1851	210	150	360	6455	2699	58

- Note :
1. The revenue area and forest area of Ghodapachhad Division and Kaveri Division shown in status report of Oct'89 has been reallocated amongst Ghodapachhad, Kaveri and newly formed divisions of Sukta and Chhotatawa.
 2. The revenue area of Daulatpur division has been reallocated between Daulatpur and newly formed division of Khatgaon.
 3. The area of 880 ha. shown under C.A. against the Ichhawar division pertains to Catchment Area Treatment and hence has been down in status catchment area treatment.

One Conservator and the chief Conservator have already joined NVDA during May, 1989.

Following plantations in non-forest lands have already been raised by the NVDA during 1987 and 1988-89 under Narmada Sudhikaran programme:

1. Limbaditya (near Maheshwar)	-	50 ha
2. Maked Kheda (Opposite Maheshwar)	-	50 ha
3. Hoshangabad	-	10 ha
4. Rudrasagar (near Ujjain)	-	22 ha

Total		132 ha

Afforestation work has been carried out in July, 1989 on 1229 ha of forest land and 622 ha of non-forest land. Pasture development work on 210 ha of forest land and 150 ha of non-forest land has also been done. During the year 1989-90, all the nine divisions have started functioning.

c) Command Area Development

GOMP had submitted command area development plan. The project on completion will provide an annual irrigation of 1.69 lakh ha of cropped area over a net C.C.A. of 1.23 lakh ha. The implementation of the plan would be taken up in three phases covering construction of main canal, distribution and drainage system. The proposal for irrigation in Phase-I, phase-II and Phase-III are to cover an area of 36100 ha, 46800 ha and 40100 ha respectively. For Phase-II it will start in 1993 and would be completed by 2002-2003. Phase-III would be taken up after completion of the project i.e. in 1997-98 and would be taken up after completion of the project report for CAD would be completed by 1992 and the work will be started by 1993-94. GOMP has to furnish information on command area surveys with year-wise target (both financial and physical) and achievements.

d) Flora and Fauna

ZSI had completed fauna studies on the basis of secondary data & limited field survey and the report was submitted to Ministry of E&F. The work of the survey of flora and fauna of the area affected by the Indira Sagar Complex of reservoir (i.e. the submergence areas and the surrounding area of the Indira Sagar, the Omkareshwar and the Maheshwar reservoirs) has been negotiated with the Indian Institute of Wildlife, Dehra Dun and the MOU is finalised.

The Institute has started the work in December, 1989. The team of five persons each for flora and fauna and one in respect of human aspects particularly regarding tribal people affected by the project would visit the submergence area shortly for carrying out the survey. Before the visit it is proposed to collect the

data from the aerial photographs and remote sensing imagaries available to identify several aspects concerning the study.

The study is expected to extend over a three year period and the estimated cost is about Rs. 20 lakhs. In the first two years, field work will be undertaken on the basis of the data already analysed and the third year would be devoted for data analysis and drawing conclusions for preparation of action plans. The MOU stipulates submission of six monthly report on the progress made.

e) Archaeological and Anthronological Studies

Archaeological Survey of India has identified 40 artifacts in Narmada Valley earlier. But only four monuments namely Chaubis Awtar Temple, Jaga Fort, Sidheshwar temple and Chatri of Baji Rao Peshwa will be affected. Steps have already been taken for relocation and strengthening of these monuments by ASI. State Archaeological and Museum Department has completed the survey of 87 villlages of Dewas and Hoshangabad districts and have identified monuments. Programme for shifting and strengthening of these monuments is being prepared. Archaeological Survey of India, Govt. of India was entrusted with the survey of 167 villlages of Khandwa and Harsud tehsils in 1987. Report is still awaited.

f) Carrying capacity of surrounding areas

It was informed that the work has been negotiated with the Indian Institute of Wild Life, Dehradun. TOR has been finalised and the Institute has started the field work and will take about three years time to complete the studies.

Friends of Nature Society has also been entrusted with the studies on relocation of animals. Final report on this is expected by end of Dec., 1990.

g) Seismicity and Rim Stability

NVDA has sent the report regarding rim stability of NSP to Ministry of E&F in January, 1990 as desired by the Ministry.

Ten seismological observation stations have to be set up on the basis of studies carried out by CW&PRS for NSP and Maheshwar. NVDA had proposed the instruments as are being adopted on SSP. The firm M/s Sprengnether, USA was contacted through SSP, GOG and the firm has submitted its financial offer for Narmada Sagar Package which was finalised in consultation with IMD, New Delhi. The case has been processed for final approval by GOI for their clearance to import the instrument.

h) Health Aspect

The note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and the comments were sent for modifying the report. Review meeting was held by the Secretary, Deptt. of Health and Family Welfare on 25.1.1990. The public health department has agreed to modify the report as per the comments of the Ministry of E&F.

i) Fisheries Development

The aspect relating to study of the availability of important aquatic fauna/fishes, especially the migratory species has been included in the Limnological studies being conducted by the 3 Universities of the State respectively for the Upper Narmada - (Bargi reservoir) - Rani Durgavati University, Jabalpur, Middle Narmada (Tawa, Barna and Kolar reservoirs) - Barkatullah University, Bhopal and Lower Narmada Zone - Vikram University, Ujjain (preimpoundment studies on selected riverine stretches on 10 centres).

All the three Universities have initiated the studies in their respective areas as per MOU. The quarterly report for the quarter ending March, 1990 has still not been received.

For finalisation of approach paper by the Central Inland Capture Fisheries Research Institute (CICFRI), a suitable date was to be fixed. Subsequent development is yet to be reported by NVDA.

Annex-IX-2

NO:NPG/ENV/150/A/2/134
Environment Cell
Sardar Sarovar Narmada Nigam
Ltd., New Sachivalaya,
Gandhinagar-382010
Dt:6-7-1990

To

Shri S.M.Pai
Secretary
Narmada Control Authority
Palika Bhavan, Sector-XIII,
R.K.Puram, NEW DELHI-110066.

Sub: Work Plan for Environmental effects
Sector - Forests and Wildlife

Sir,

With reference to decision taken during the 8th meeting of Environment Sub Group, Narmada Control Authority. I am directed to send herewith the work Plan prepared by Government of Gujarat on Forests & Wildlife Sector. This contains the methodology followed by Government of Gujarat for catchment area treatment in Forest area and non-forest area.

The area of treatment in both the category will be undergoing change in view of the new stock mapping carried out by Forest Department, Government of Gujarat.

Modified Work Plans are yet to be prepared.

Yours faithfully
Sd/-

SPECIALIST ENVIRONMENT
SSNNL

D.A:As above.

Project for treatment of catchment areas of Narmada Project

Narmada Project is one of the biggest and important Project in Gujarat. For deriving full benefits of the project over a long period of time, among other measures it is necessary to carry out elaborate soil conservation works in the catchment area of the project. This calls for integrated efforts in all the catchment areas including forest areas, cultivated areas and waste lands. The catchment is spread over the States of Madhya Pradesh, Maharashtra and Gujarat.

The catchment area of the reservoir in Gujarat is incharge of the Revenue Department, Panchyat and Forest Department. Out of the total catchment area of 31707.34 has coming under forest, it is proposed to tackle 20,000 ha. on priority basis during a period of 5 years. The forest areas, according to vegetation can be classified in three different categories (i) area having tree cover with density about 0.6, (ii) areas with tree cover with density between 0.4 to 0.6 and (iii) barren degraded areas. These areas would therefore be required to be treated in different manner taking into consideration the requirement of the locality. It is therefore, proposed to treat the areas in the following different manner.

- (1) Soil and moisture conservation works followed by planting 2000 seedlings per ha.

It is proposed to carry out soil conservation works such as construction of gradonies, nala bunding and fence the area for effective protection against biotic interference. It is proposed to plant 2000 seedling per ha. During a period of 5 years an area of 8250.63 ha. is proposed to be treated under the above treatment.

- (2) Soil and moisture conservation works followed by planting 400 plants per ha.

The forest areas which are having tree density between 0.4 to 0.6 are proposed to be treated under

this category. These areas have tree growth interspersed with blanks and also get blank areas. It is proposed to carry out soil moisture conservation works such as construction of gredonies, nala bunding etc. 400 plants per ha. would be planted in these areas, preferably on the gradonies. The forests area as well as the plantations would be protected from biotic interference either by trench-cum-live hedge or by stone well fence. It is proposed to treat an area of 4478.15 ha. during a period of 5 years.

(3) Fencing and Nala bunding

Some areas in the catchment have good tree growth and the density is around 0.6. No efforts of afforestation are therefore required. It would however be necessary to carry out nala bunding works in the area so as to reduce run off water and prevent soil erosion. These forest areas would be protected from biotic interference either by trench-cum-live hedge fencing or by stone wall fencing. An area of 6657.54 ha. is proposed to be treated during a period of 5 years.

The catchment area lies in Rajpipla East Division and Chhotaudepur Division. The proposed works are therefore concentrated only in 2 divisions and cannot be handled by existing staff. It is therefore proposed to create one full fledged division for this work.

The details of expenditure on afforestation works, establishment and other expenditure are given in enclosed statement. An amount of Rs.6.91 crores would be required during a period of 5 years for implementation of the above programme. The project cost has been estimated at present cost and is likely to increase due to increase in cost of daily wage rate etc.

DRAFT

Ministry of Water Resources
CENTRAL WATER COMMISSION
(Reservoir Sedimentation Directorate)

GUIDELINES FOR AN ACTION PLAN
FOR THE CATCHMENT AREA TREATMENT OF RESERVOIRS

FOREWORD

Presently catchment area treatment is being carried out by respective State Governments under the centrally sponsored schemes of soil conservation measures in the catchments of river valley projects, handled through the Ministry of Agriculture, Government of India. These centrally sponsored schemes were started in the Third Five Year Plan and now extend to 27 River Valley Projects in the country. There are certain guidelines for this work prepared by the Indian Standards Institution e.g. IS:674 B(Part-I) - 1973 Code of Practice for "Recommendations of Watershed Management Relating to Soil Conservation" and IS:6518 - 1972 Code of Practice for "Control of Sediment in Reservoirs". Ministry of Agriculture have issued certain further guidelines also.

The major objectives of these measures in the catchment are expected to be (i) reduction of silt load that flows into the reservoirs and (ii) moderating the peaks of the floods generated from these catchments. The actual hydrographic surveys conducted at various major/medium reservoirs in the country during the last 30 years and the evaluation studies carried out so far indicate that though these measures are useful over the Small Watersheds, for large catchments, the land treatment measures carried out over a limited area do not help either in reducing the silt flowing into the rivers in any significant way or in moderating the peaks of the flood in the major rivers.

Based on the studies and the surveys carried out so far by the All India Soil & Land Use Survey Organisation (AIS&LUSO) and the observations on silting of the reservoirs and the silt contents in the river flows, the following guidelines are suggested for adoption while preparing river valley projects.

I. CLASSIFICATION OF RIVER VALLEY PROJECTS

Projects are generally divided into two categories as under:-

A. STORAGE PROJECTS: These are further classified into:

- a. Major projects having a command area above 10,000 ha which is equivalent to storage of above 100 MCM (approx.)
- b. Medium projects having a command area between 2000 to 10,000 ha which is equivalent to a storage of 20 to 100 MCM.
- c. Minor projects including irrigation tanks having a command area less than 2000 ha which is equivalent to a storage of less than 20 MCM.

B. DIVERSION PROJECTS: These may be with/without live storage used for irrigation and/or other purposes e.g. Navigation, flushing of estuaries, hydropower etc.

II. DEFINITION AND OBJECTIVES

Catchment area treatment can be defined as improved land management in the watershed to arrest movement of soil and also improve its hydrological behaviour. It is meant to:

- prevent degradation of land,
- increase productivity of the land; and also
- improve ecological balance between land, water and the plant and animal life in the area.

In the case of tanks and small reservoirs having small catchments, Catchment Area Treatment helps in reducing the silt load flowing directly into the reservoir and in moderating the normal flood flows in the local small streams. Over large catchments which support a variety of activities including extensive cultivation of land, principal objective of land treatment activities is restoration of degraded land for improving its productivity.

III. IDENTIFICATION & PRIORITISATION OF AREAS NEEDING TREATMENT

Presently, work of studying the watersheds is carried out by All India Soil and Land Use Survey Organisation (AIS&LUSO) under the Ministry of Agriculture, Government of India. The AIS&LUSO has prepared a WATERSHED ATLAS OF INDIA (Compendium of Watersheds) indicating watershed delineation and codification. The entire country has been divided into six regions as under:

Region 1	: Indus Drainage
Region 2	: Ganga Region
Region 3	: Brahmaputra Region
Region 4	: Rivers flowing into Bay of Bengal
Region 5	: Rivers flowing into Arabian Sea
Region 6	: Ephemeral drainage (Western Rajasthan)

The above Atlas gives details about the Region, Basin, Catchment, Sub-catchment, Watershed, Stream Names, Area (000 ha) and Districts covered (States). A sub-watershed varies between 2,000 to 4,000 ha approximately. AIS&LSUD studies each sub-watershed on the basis of Satellite Imageries and also sends survey parties to the areas to determine its physical characteristics such as type of soil, land slope, land use and climatological conditions.

After detailed study, each sub-watershed is assigned a value depending upon its erodability called Silt Yield Index and the delivery ratio which is inversely proportional to the distance of the sub-watershed from the reservoir. But the assigned value of each sub-watershed is only a relative term for that particular catchment. It is difficult to quantify from that the amount of silt which is likely to travel upto the reservoirs, as the silt movement depends on a variety of factors including the stream hydraulic and the obstructions on the way.

The sub-watersheds of a catchment are, therefore, empirically grouped into five categories with reference to their silt contribution potential - as very high, high, medium, low and very low. The areas under very high and high categories are to be selected for catchment area treatment. While formulating a reservoir project, the state Government/Project Authorities may take direct assistance from AIS&LUSO for identifying the areas needing catchment area treatment.

IV. CATCHMENT AREA TREATMENT MEASURES

These can be of the following four types:

- a. Engineering measures such as check dams, contour bunding, trenches, bench terracing, gully plugging and bank protection etc.
- b. Agronomic measures such as contour farming, strip cropping and crop rotation etc.
- c. Forestry measures: these include (i) Forest conservancy, (ii) Control of grazing, lumbering operation and forest fires along with management and protection of various plantations and (iii) afforestation etc.
- d. Grass Cover & Pasture: pasture development and protection by vegetation including grass cover.

The type of the Catchment Area Treatment will depend on the actual site conditions as verified by field visits. For this purpose, a group of experts identified by the Basin authority/the Project Authority in consultation with the Department of Agriculture should make joint visits and decide the type of measures necessary and the quantum thereof for the various sub-watersheds in the catchment. In case of the reservoir projects, all direct draining sub-watersheds of the catchments should be identified and their yield indices assessed. For those that have high silt yield potential, the nature and quantum of treatment should be identified in accordance with para III above.

In the case of diversion schemes, silting is not of direct relevance for the life or the operation of the project and hence Catchment Area Treatment need not form a part of the project report.

V. COST OF CATCHMENT AREA TREATMENT

During the last 28 years (1960-1988) an area of 2.18 million ha has been treated at a cost of Rs.201.40 crores in 27 catchments of river valley projects under the Centrally Sponsored Schemes of Soil Conservation measures being executed by Ministry

of Agriculture, Government of India. The average cost during the last 28 years works out to Rs.964/- per ha and at the end of 1988 Rs.3,300 per ha. This will work out to 9.65 per cent of inflation per year. The average cost varies from zone to zone as under: (Also please see Fig. 1)

Zones	Area treated (1000 ha)	Cost of treat- (Rs.lakhs)	Average cost for 28 years (Rs./ha)	Present cost as in 1988 (Rs./ha)
1. Himalayan Region (Indus, Ganga Brahmaputra basin)	235.80	4393.85	1863.00	6775
2. Indo-Gangetic Plains	789.90	6092.85	771.34	2800
3. East flowing rivers (excluding Ganga upto Godavari)	409.40	2368.43	578.51	2100
4. Deccan Peninsula East flowing rivers including Godavari	482.90	4675.58	968.23	3325
5. West flowing rivers upto Narmada	168.70	1205.25	714.43	2600
6. Narmada Tapi basin	88.90	843.96	949.34	3450
7. West flowing rivers	-----	N.A.	-----	3450 (assumed)

Based on the location of the catchment, the average cost indicated above may be adopted for purposes of estimation while preparing the project reports. These costs are at 1988 level and may need upgrading by about 10% each year for the projects to be prepared hereafter.

VI. SHARE OF COST

Soil conservation measures preventing degradation of the land increases the local productivity of the land, improves socio-economic conditions of the population and also improves ecology of the area. These costs should, therefore, by and large form a part of the general land improvement programme of the country.

The cost to be directly shared by the river valley projects should be limited to the cost of treatment of sub-watersheds along the reservoir shore directly draining into the reservoir and the cost of land treatment necessitated for making good the damages caused on account of the borrow areas, road communication network and other construction activities. The storage is otherwise designed to cater for sedimentation that is expected to take place during its full useful life and the relevant cost is thereby already inbuilt into the project. Hence, no other costs on account of land treatment in the upstream be charged to the project. The cost to be charged to the project should be provided under the head 'B-Land' - item: Catchment Treatment measures.

VII. PACKAGE OF ACTIONS

As recommended by the Planning Commission, holistic approach is to be kept in view in formulation of project reports and measures for the catchment area treatment for areas upstream of the dam should also be clearly indicated in the project reports though its cost is not to be borne by the project. The Action Plan for catchment area treatment will thus consist of two parts.

- (1) Action Plan for the land areas directly affected by the construction of the project and for the sub-watersheds directly draining into the reservoir.

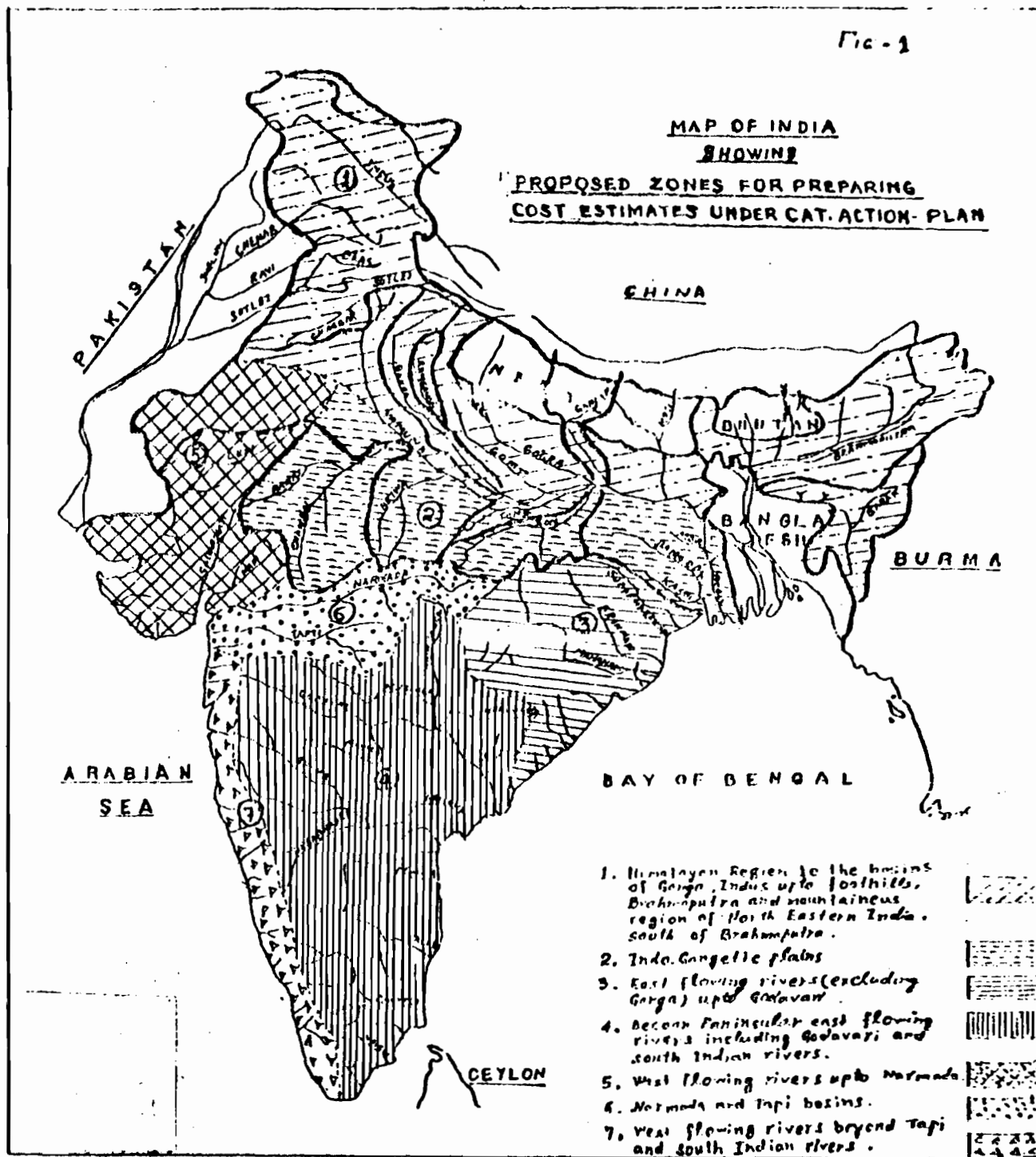
- (ii) Treatment of upstream sub-watersheds not directly draining into the reservoir.

In case of (ii) above, the Catchment Area Treatment may be planned with as great a priority as feasible in the general development programme of the state. But the Catchment Area Treatment of category (i) should be completed before the full impoundment takes place. It would be necessary to formulate a time schedule of the Catchment Area Treatment activities of category I along with that of the project construction activities.

VIII. IMPLEMENTING AGENCY

In the case of general improvement of the upstream areas of the project, the implementation agency for catchment area treatment would be the concerned departments of respective State Governments under the guidance of the Ministry of Agriculture. However, for the Treatment of the sub-watersheds on the reservoir fringe and for the land affected by the project activities, the responsibility shall rest with project authorities. They may engage an appropriate expert agency/organisation to carry out the work.

Fig - 1



Ministry of Water ResourcesCatchment Area Treatment for the Narmada Projects
- Sharing of Cost

Draft guidelines on catchment area treatment with reference to the reservoir projects have been prepared by the Ministry of Water Resources in consultation with the Ministry of Agriculture, Ministry of Environment, Ministry of Energy and the Planning Commission. Based on these guidelines, it is proposed to bear the cost of the catchment treatment works in the Narmada Valley on the following lines.

2. The guidelines lay down that for purpose of catchment treatment, sub-watershed will be considered as a unit for planning and development. The identification of the vulnerable sub-watersheds will be done by the All India Soil & Land Use Survey Organisation (AIS&LUSO) and the remedial activities for these sub-watersheds will be carried out according to the manual issued by that Organisation. The guidelines further lay down that the cost of treatment works in the sub-watersheds directly draining into the reservoir will be charged to the cost of the project along with the cost of treatment works in the land disturbed on account of the borrow areas and other project associated construction activities. The Planning Commission's circular No.16(12)/85-I&CAD dated 28.10.1985 has already clarified that the general catchment area treatment will not be charged to the project but will be treated as a separate supplementary developmental activity.

3. The guidelines issued by Deptt. of Environment & Forests in January, 1985 lay down that the cost of compensatory afforestation should be included as a part of the cost of the project under the sub-head 'B-Land'. It is expected that as far as possible this compensatory afforestation will take place on the sub-watersheds which have been identified as vulnerable for erosion, priority being given to the sub-watersheds draining directly into the reservoirs. To that extent, separate additional costs for the land treatment will not be required to be charged to the project.

4. In the case of Sardar Sarovar Project, the All India Soil & Land Use Survey Organisation has identified tentatively about 1.1 lakh ha of area draining directly into the Sardar Sarovar as vulnerable for erosion. At an average rate of about Rs.4000 per hectare (at current rates) as experienced elsewhere under similar situations, the net cost of treating this vulnerable area along the fringe of the reservoir will amount to Rs.44 crores. In addition, about 1000 hectares of land used for the borrow areas and other project activities will have to be covered by the land treatment measures at an approximate cost of Rs.10,000 per hectare. Thus the cost of catchment area treatment to be charged directly to the Sardar Sarovar Project under the head 'B-Land' will amount to Rs.45 crores. This will get reduced to the extent compensatory afforestation is carried out in the sub-watersheds draining directly into the reservoirs as mentioned in para 3 above.

5. The cost to be borne by the Narmada Sagar, Omkareshwar and Maheshwar projects on similar lines will be worked out separately by the Government of Madhya Pradesh on the basis of identification and assessment of directly draining sub-watersheds by the AIS&LUSO.

6. In the proposals for the Sardar Sarovar and Narmada Sagar Projects, enough silt trap has already been provided on the basis of the silt expected to be produced from the catchment under the existing conditions. As the project has already borne the cost on account of the provision for the silt to be received from the general catchment, it is not necessary to charge again the cost of the general catchment treatment to the project, except that for the direct draining sub-watersheds.

7. Thus, for the Narmada Valley as a whole, the works of catchment treatment will be financed through three separate sources as below:

- 1) The treatment measures on the directly draining sub-watersheds will be funded by the concerned reservoir projects, namely, SSP, NSP, Omkareshwar and Maheshwar.

- ii) On similar lines, the works for the directly draining sub-watersheds for the other reservoir projects (major, medium or minor) to be undertaken in the Narmada Valley will be financed by the respective projects.
- iii) Treatment works in watersheds which are not directly draining into either Narmada Sagar, Omkareshwar, Maheshwar or Sardar Sarovar or any of the reservoir projects in the Valley identified in the Master Plan of the Narmada Valley will be carried out as a measure of general land improvement by the concerned State authorities.

8. The stipulations laid down by the Ministry of Environment & Forests for the Narmada Sagar and Sardar Sarovar projects require the implementation of the land improvement measures in the catchment pari passu with the construction activities of the dams. In view of that, simultaneous activities should be planned on the sub-watersheds directly draining into these reservoirs synchronous with the work on the reservoir. The other watersheds linked with the other projects will also correspondingly be dealt with in a synchronous manner with those reservoir formations. The land treatment measures on the rest of the area will follow according to the general development plans of the respective States with as much priority to the Narmada basin areas as possible.

MINISTRY OF ENVIRONMENT & FORESTS

Subject: Catchment Area Treatment as an integral component of river valley projects

I. NEED FOR CATCHMENT AREA TREATMENT

Excessive soil erosion with consequent high rate of sedimentation in the reservoirs and decreased land fertility have become serious environmental problems with disastrous economic consequences. An estimated 5334 to 6000 million tonnes of soil is eroded every year and carried out to the sea.

Of the 16 rivers of the world which experience severe erosion and carry heavy sediment load, five rivers, namely, Ganges, Brahmaputra, Indus, Irravadi and Kosi of the sub-continent have the unenviable record of occupying the 2nd, 3rd, 5th, 9th and 12th position respectively. If the present trends are not arrested, indeed reversed, many other catchments of the Indian rivers may also become equally problematic as is already evident from the ever increasing Central assistance released to States for floods, droughts and other natural calamities (average assistance per year at current prices has increased from 5.64 crores during the first Five Year Plan to about Rs.1100 crores during the 7th Five Year Plan).

Keeping these aspects in view, there is an urgent need for treatment of various catchments, in parallel with the development of water resources, in the country. Some of the main benefits accruing from catchment area treatment include:

- Decrease in sedimentation;
- moderation of floods; and
- Increased land fertility.

[2]

The paper circulated by the Ministry of Water Resources on the Catchment Area Treatment, however, states that soil conservation measures or integrated watershed management packages, though useful for small watersheds, are not of help when applied to large catchments and, therefore, are not considered necessary. Nevertheless, the paper goes on to recommend that treatment of watersheds/sub watersheds which drain directly into the reservoir should be taken up at project cost. These conclusions are contrary to:

- i. Fundamental principles of the processes of Hydrology and Sedimentation which are applicable equally to small, medium and large watersheds/catchments.
- ii. Results from a large number of experimental watersheds and research studies in many countries of the world as well as in India at all levels such as micro, meso and macro.
- iii. Historical evidences covering almost 6000 years of human civilisation; and
- iv. Recommendations/decisions of various National Commissions/Councils, Committees etc.

The fallacy has arisen due to:

- overlooking the cause and effect logic as well as source area-receipient area relationship;
- Adoption of the unscientific assumption that drainage units of different scales have no bearing and linkages

[3]

in the chain of sedimentation or water flow systems leading to the totally erroneous conclusion that processes at macro level are independent of processes at meso level and the latter, in turn, have no bearing on those at micro level incidences.

A brief review of the sedimentation process, findings of the experimental and research studies and recommendations of various national Commissions and Committees would clearly show that scientific watershed management must be a pre-requisite for sustainable development of the river basin.

2. PROCESS ANALYSIS

Sediment, coming into the streams, rivers and finally into the sea, is the product of watershed degradation processes. Watershed degradation comprises of deforestation, soil erosion, land degradation due to land slides, torrents, mining, desertification and consequent hydrological deterioration. The source areas, which generate the potential sedimentation i.e. eroded soil, earth mass or rock, also yield the chief agent namely water which during its flow transports, deposits and consolidates fragmented materials.

These sub-processes of the sedimentation are not one time processes but repetitive and sequential ones. The geomorphology and the land uses determine the quantum of potential sediments created in the source area while the hydraulic distance and enroute storages determine finally the portion of eroded materials reaching a particular reservoir or sea. Not going into too much details, it would suffice to say that the quantum of sediment reaching finally into the reservoir is a function of the catchment area, its land use condition and the quantum of discharge.

3. EXPERIMENTAL AND RESEARCH RESULTS

A. Findings from India

Assessment of the effectiveness of catchment area treatment in reducing sedimentation and flood hazards has to be concurrently studied on the following levels to arrive at rational conclusions:

- i. Ability to reduce gross erosion and run off from the source area.
- ii. Ability to modify favourably the flow characteristics of the streams and silt load concentration in the channel flows draining small or micro watersheds.
- iii. Ability to moderate the flow characteristics and silt load in streams draining bigger watersheds and sub-catchments.
- iv. Ability to reduce sediment production into small storages designed to trap and hold sediments, and
- v. Ability to reduce sediment production in big reservoirs.

CBIP Studies

The analysis carried out under coordinated project of reservoir sedimentation surveys (B.N. Murthy, 1983) in respect of Maithon reservoir showed that by treating 22% of the total area, silt rate was reduced by 15% during a period of 10 years. Similarly, for Panchet reservoir of D.V.C. the sediment load has been reduced by 25% by treating 15% of the watershed area over 18 years.

[5]

Department of Agriculture & Cooperation (DAC)

Catchment area treatment programmes are in implementation in 35 catchments throughout the country including D.V.C. About 392 stations and observation posts are in operation. The sites are spread out as a network in 33 out of 35 catchments. The smallest of these watersheds is of 0.4 sq.km. in Gomti and largest is of 8,985.65 sq.km. in Hirakund catchment. The maximum size of the watersheds in some catchments is as follows:

<u>Watershed gauged in the Catchment of</u>	<u>Area in sq.km.</u>
1. Hirakud	8985.6
2. Beas	4739.0
3. Chambal	2862.6
4. Upper Yamuna	2070.8
5. Nizam Sagar	1588.0
6. Mayarakshi	1514.4
7. Dantiwada	1355.1
8. Pohru	1379.00

It may be pointed out that at the International Conference on Watershed Hydrology held at Moscow in 1970, it was the general consensus that the size of watersheds for precise observations through adequate instrumentation should normally be around 10,000 ha or 100 sq.km. (Hewlett, 1970).

Observations collected from this network are documented and analysed for multiple purposes. Some of the results are as follows:

- (1) The trend analysis made in respect of 3 Chambal watersheds in Rajasthan, showed that watershed treatment could moderate the sediment production into streams ranging from 0.62 to 1.65 ha.m/100 sq.km/year.

- (2) Data from 14 major reservoirs given in Table-I is based on Sediment Production Rate (SPR) obtained through successive reservoir sedimentation surveys. The reduction in sediment production ranges from 6.9% in case of Ramganga to 68.20% in case of Tungabhadra (Singh et al, 1990).
- (3) The Table-2 provides the trend in the fall of SPR in respect of Bhakra, Machkund, Hirakud catchment with the progressively increasing area under treatment by Soil and Water Conservation measures during successive plan periods.

B. International Findings

CHINA

Siltation problems of Guanting Reservoir in China on Yongding river with a catchment area of 43,400 sq.km. have been analysed by the National Institute of Hydrology (NIH). The average and maximum erosion from the catchment are 3000 t/sq.km/year and 18000 t/sq.km/year respectively. The storage capacity of the reservoir is 2.29 mill.cub.m. The annual sediment load is 81 m tonnes.

The soil conservation measures resulted in a reduction of both runoff and sediment yield as shown in Table-3.

TABLE-3
Reduction in Runoff and Sediment Yields in
Guanting Reservoir (China)

Period (Year)	Annual Precipitation (mm)	Annual Runoff ₃ (10) ⁶ m ³	Annual Discharge (10) ⁶ tonnes
1950-1960	444	1863	79.54
1961-1970	410	1266	19.33
1971-1980	427	---	13.00

TABLE 1 :
ASSUMED AND OBSERVED SEDIMENT PRODUCTION RATE COMPARED TO PERCENTAGE AREA TREATED UNDER
SOIL CONSERVATION

Name of catchment	Assumed	Observed SPR in the year				SPR in ha.m/100km ² per year			Type of Survey
		Year		SPR		Percent reduction	Percentage priority watershed area treated (1987-88)		
		Year	SPR	Year	SPR				
1. Chambal . (Gandhi Sagar)	3.60	1962	6.19	(a) 1976 (b) 1976	5.29 9.64	14.50 -55.73	45.60	I-O H	
2. Maithon .	1.60	1963	15.27	1979	12.39	18.86	54.50	H	
3. Panchet .	2.50	1962	13.16	1966	10.48	20.36		H	
4. Hirakund .	2.50	1954	4.91	(a) 1977 (b) 1978	3.58 6.60	27.10 40.33	12.35	I-O H	
5. Kangsabati .	3.30	1967	5.86	1972	2.16	63.10	37.50	I-O	
6. Lower Bhawani .	N.A.	1965	4.32	1977	3.69	14.60	19.80	H	
7. Machkund .	3.90	1959	3.38	1978	2.19	35.20	53.00	I-O	
8. Matatilla .	1.30	1964	5.28	1974	3.82	27.70	10.00	H	
9. Nizamsagar .	0.30	1965	6.91	1973	6.34	8.20	7.00	H	
10. Ramjanga .	4.30	1958	18.59	1974	17.30	6.90	60.50	I-O	
11. Sutlej (Bhakra) .	4.29	1962	8.04	(a) 1978 (b) 1981	5.95 54.56	26.00 ?	27.50	H H	
12. Tawa .	3.60	1977	6.25	1980	2.67	49.10	10.50	I-O	
13. Tungabhadra .	4.30	1963	18.85	1972	6.00	68.20	23.50	H	
14. Mayurakshi .	3.75	1965	14.25	1970	17.30	-21.40	66.67	I-O	

H - Hydrographic

I-O Inflow outflow method

SPR - Sediment Production Rate.

Table 2 Declining Trends in SPR VIS-A-VIS Area Treated by Soil Conservation

Name of the RVP	Catchment Area Sq. Km.	Year Upto	SPR, ha. m/km.	Prog. Area Treated 000 ha.
I. Bhakra	56876 (18200 in India)	1962	8.04	—
		1966	6.52	32.67
		(III Plan)		
		1968	6.32	53.85
		(Annual Plan)		
		1972	6.08	77.86
		(IV Plan)		
II. Machkund	2222	1976	5.99	81.43
		(V Plan)	(Percent reduction : 25.5)	
		Upto 1959	3.38	—
		1966	2.43	22.53
		(III Plan)		
		1969	2.67	36.54
		1972	2.50	53.68
III. Maithon Panchet		(IV Plan)		
		1976	2.30	58.66
		(V Plan)	(Percent reduction : 31.95)	
		1962	Maithon Panchet	Total for DVC
		1963	15.27	13.16
		1964	—	—
		1965	13.98	12.21
IV. Hirakud	83390	1966	—	10.78
		1966-67 to 1969-70		140.64
		1971	13.02	160.65
		1974	—	9.92
		(71-74) (Percent reduction 14.73	24.62)	195.86
		Upto 1947	4.91	—
		1952	4.03	—
		1957	3.73*	—
		1961	4.47**	—
		(II Plan)	+++	
		(III Plan) 1966	4.12	80.04
		(Annual Plan) 1969	4.00	136.41
		(IV Plan) 1974	3.84	245.73
		(V Plan) { 1975	3.80	255.01
		{ 1976	3.69	257.81
		{ 1977	3.58	256.10
		(Percent reduction : 13.11)		

+++From silt inflow data. Results from partial capacity survey of 1bb area have shown SPR 958 ham /km.

* Due to extreme dry years preceeding.

** Due excessive rainy year preceeding.

[7]

This had a remarkable reduction in the amount of sedimentation and the rate of silting. (Table-4) [Unesco, 1985].

TABLE-4
Reduction of Sedimentation Rate in
Guanting Reservoir (China)

Period	Total amount of Deposition (10 m/year)	Rate of Siltation (10 m/year)
1956-1960	350.0	70.0
1961-1970	82.0	8.2
1971-1981	73.0	6.6

U.S.A.

In the Catchment of Lake Issaqueena sediment production rate of 840 tonnes/sq.km/yr between 1938 and 1941 was reduced to 402.5 tonnes/km²/yr in 1949 because of catchment treatment coverage being increased from 53 to 73%.

In the 4315 km² catchment of Lake Waco, Texas sediment yield was reduced by 33% as a result of improved watershed management measures. In case of the catchment of Lake Newman, Georgia the soil conservation measures reduced the sediment yield by 78%.

4. IMPACT OF DEFORESTATION ON SEDIMENTATION

The influence of forests on soil erosion, land degradation through land slides etc. is best

realised from the observations taken following extensive deforestation on catchments and then making comparative studies with forested sub-catchments.

i. Alajuela Watershed, Panama (Larson 1984):

Alajuela Lake and Lake Gatun together provide needed water for Panama Canal Operation. Sediment soundings were made in 1957, 1972, 1973 and 1978. The watershed was cleared of forest extensively between 1972 and 1973. The sediment yield and rate prior to and after deforestation were recorded as follows:

	<u>Sediment yield</u> <u>(000 cub.m/yr)</u>	<u>SPR</u> <u>(t/ha/yr)</u>
Pre-deforestation and pre-development of Watershed(1934-73)	937	10.5
Post deforestation and Post development or with current land use (1973-78)	2595	29.1

It is 2.77 times more now.

5. IMPACT OF AFFORESTATION & CATCHMENT ON FLOOD MODERATION

The effects of afforestation and catchment treatment on flood moderation have been studied through observing the influence on different processes in the hydrologic cycle, namely, interception, surface detention, surface runoff, hydrologically operative soil depth, antecedent moisture conditions, watershed retention capacity etc.

Results from relatively large watershed based studies are given below.

- i. In the Nilgiris, through extensive afforestation of Grasslands by Bluegum and Black Wattle as well as bench terracing, annual watershed retention increased by 30 cm since 1950.
- ii. The report on the status of hydrological behaviour of forested catchment (SR-6, NIH, 1985-86) states:

"Forests reduce the surface runoff, both volume and peak rates, sediment yield and regulate the stream flow during dry weather due to slow release mechanism and soil moisture."
- iii. Data from Indonesia and Thailand illustrates the ability of increased forest cover to provide better streamflow conditions with minimum silt load. Silt load of the Citaurn river in Indonesia increased sevenfold in a period of three years consequent to heavy deforestation of this catchment. Satellite pictures indicated that as little as 12% of the catchment is under tree cover including plantations of teak and other species. Whereas Chao hya river of Thailand having 40% of its catchment area under good forest cover has shown low silt load and little changes in the silt load with the seasonal water flows over the past decade (Das and Singh, 1979).

iv. The best results from a network of watershed studies covering various aspects have, however, been obtained by Bochkov (1970). The salient aspects are as follows:

- (i) Runoff from small forested watershed is 50 to 95% less than from open catchments because more water in forest areas escapes into deeper aquifer.
- (ii) In case of medium and large watersheds, the total streamflow is, however, dependent upon sub-surface flow. Due to the physiographic location of the streams draining such watersheds, the sub-surface flow can reach such channels more easily and in larger volumes. Increased forest cover is associated with more and deeper roots which help in longer and deeper percolation. The portion of water which is induced to go into deeper profile on the small watersheds (within the medium and large watersheds), comes out later into their channel systems as sub-surface flow. This delayed release assures longer and larger dry weather flow.

The results clearly showed that forests decrease to a great extent the surface flow and the runoff from small catchments while forests usually increase dry weather flow as well as minimum (base) flow and that forests decrease the maximum discharges while increasing the total runoff in the medium and large watersheds.

6. DEAD STORAGE AND DESIGN ALTERNATIVE TO SOLVE PROBLEMS OF RESERVOIR SEDIMENTATION

Dead Storage is the extra storage created to hold the sediments arriving at a reservoir and therefore, concedes in effect that the sedimentation hazard is a reality. Dead storage is neither a curative nor a preventive measure. It is only a means to act as garbage hold to obviate the unwanted sediments from interfering with the operation of reservoir and utilisation of the assets created as water.

Even though dead storage is not the solution, it is, nevertheless, a measure to accommodate sediment inflow under natural conditions. It, however, should be remembered that every extra unit of storage increases the cost exponentially. The need for a higher dam and a deeper reservoir with a large waterspread requires more capital investment in structures as well as for compensating the losses due to large submergence. Moreover, the silt accumulation does not take place only in the "dead storage" area but affects the live storage as well as is clear from the detailed studies on the deposition pattern of sediments in the reservoir such as Maithon and Panchet of D.V.C., Nizamsagar, Matatila, Shivaji sagar and Bhakra etc.

In case of Maithon and Panchet reservoirs relative losses of dead and live storages through sedimentation are quite revealing as given in Table-5

TABLE-5

Year of capacity Surveys	Maithon Loss of storage in %		Panchet l o s s of Storage	
	Live	Dead	Live	Dead
By				
1962	--	--	10.0	22.0
1963	5.5.	16.0	--	---
1964	--	--	11.0	26.0
1965	6.4	19.0	---	---
1966	---	---	13.0	27.0
1977	10.0	25.0	---	---
Total	21.9	60.0	34.0	75.00
As % of dead storage.	36.5%	43		45.3%

In case of Tungabhadra 12.39% of live storage and 81.23% of dead storage were lost (Chadha, 1977). In a specific case of Mayurakshi reservoir over 60% of silt was deposited in the live storage (Sinha, 1984). Thus, it may be seen that a substantial portion of the sedimentation eats up the live storage.

The excessive sediment yield into the reservoir has, therefore, to be avoided and this can be achieved if contributing source areas are put under good permanent vegetation such as forests or managed by an integrated watershed management plan.

It would, therefore, be seen that sedimentation has to be reduced -

- to ensure that live storage is saved to perpetuate the benefits down stream.
- to minimise the requirement of dead storage and thus economise on the project cost and ensure continuity of benefit stream.

THE CONSEQUENCES OF CATCHMENT AREA TREATMENT ARE:

- Reduction in siltation.
- Moderation of floods; and
- Increased land productivity.

7. IDENTIFICATION & PRIORITISATION OF AREAS NEEDING TREATMENT

Presently, work of studying the watersheds is carried out by All India Soil and Land Use Survey Organisation (AIS&LUSO) under the Ministry of Agriculture Government of India. The AIS&LUSO has prepared a

WATERSHED ATLAS OF INDIA indicating watershed delineation and codification by dividing the country into six regions. This Atlas gives details about the Region, Basin, Catchment, Sub-catchment, Watershed, Area (000 ha) and Districts covered. A sub-watershed varies between 2000 to 4000 ha approximately. AIS&LSUO studies each sub-watershed on the basis of Satellite Imageries and field survey data to determine its physical characteristics such as type of soil, slope, land use and climatological conditions etc.

After detailed study, each sub-watershed is assigned a value depending upon its erodability called Silt Yield Index and the Delivery Ratio. The sub-watersheds of a catchment are then grouped into five categories with reference to their silt contribution potential - very high, high, medium, low and very low. The areas under very high and high categories are to be selected for catchment area treatment. Sediment Yield Index is the key of the methodology evolved by AIS&LUSO where computation finally depends on:

- weightage assigned to erosion intensity mapping unit; and
- delivery ratio assigned to the mapping units.

The paper circulated by the Ministry of Water Resources makes a drastic assumption of assigning zero value to the delivery ratio to all mapping units except those draining directly on the reservoir periphery. Such an assumption cannot be sustained because of the following:

- A bulk of the sediments arriving into the reservoir follow the channel flows, which are much faster than

[14]

the over-land flows, draining through the main river and its tributaries. These channel flows and by implication their catchments through which bulk of the sediments are entering cannot be ignored.

- The flow dynamics determine the Hydraulic distance of a source area which affects the calculation of Delivery Ratio.
- The hydraulic distance affects the weighted LAG of the entire catchment.

The flow dynamics used in estimation of sediment yield do not permit the adoption of an assumption which excludes all areas except those directly draining into the reservoir.

Therefore, it is essential to take up catchment treatment of the Very High & High category areas in the Free draining catchment and not just the Directly draining catchment on the reservoir periphery. This has been well established by field data in many areas in India.

8. CATCHMENT AREA TREATMENT MEASURES

These can be of the following four types:

- a. Engineering measures such as check dams, contour bunding, trenches, bench terracing, gully plugging and bank protection etc.
- b. Agronomic measures such as contour farming, strip cropping and crop rotation etc.

- c. Forestry measures: these include (i) Forestry conservancy, (ii) Control of grazing, lumbering operation and forest fires along with management and protection of various plantations and (iii) afforestation etc.
- d. Grass Cover & Pasture: pasture development and protection by vegetation including grass cover.

The type of the Catchment Area Treatment will depend on the actual site conditions. For this purpose, a group of experts identified by the Basin authority/the Project Authority in consultation with the Departments of Agriculture/Forest/Soil Conservation should make joint visits and decide the type of measures necessary and the quantum thereof for the various sub-watersheds in the catchment. In case of the reservoir projects, all free draining sub-watersheds of the catchments should be identified and their yield indices assessed. Areas falling under category "Very High" and "High" should be taken up for treatment in such a way that its completion coincides with the impoundment.

In the case of diversion schemes, silting is not of direct relevance for the life of the pondage created but may affect the operation of the turbines etc. and hence Catchment Area Treatment may be restricted only to the "Very High" category areas.

9. COST OF CATCHMENT AREA TREATMENT & IMPLEMENTING AGENCIES

Cost of catchment area treatment would be controlled by the prevailing ground conditions.

[16]

As a general guideline the following average cost may be adopted for purposes of estimation while preparing the project reports.

	<u>Very High & High Categories</u>	<u>Medium & others</u>
Himalayan region	Rs.6000/ha	Rs.6000/ha
Indo gangetic Plains	Rs.7000/ha	Rs.2000/ha
Deccan Peninsula	Rs.6000/ha	Rs.1500/ha
Narmada Basin	Rs.7000/ha	Rs.1000/ha

COST SHARING & IMPLEMENTING AGENCY

Cost sharing of catchment area treatment may be done on the following lines:

(i) Very High & High Category Areas

°To be treated at cost of River Valley Project.

°In case more than one project is being taken up in the basin, the cost will be shared among these projects with the proviso that the share cost incurred by project in hand will be approximately debited to a project as and when it is taken up in future.

°A development cess may be levied on the already existing projects in the basin.

(ii) Medium, Low & Very Low Category Areas

°Forest Land.....(Forest Department)

°Agricultural & Revenue
Lands.....(Land improvement
programmes, Soil
Conservation Deptt.)

Past experience shows that taking up catchment treatment through half hearted attempts is not conducive to improve the health of catchments

[17]

in the country. It is, therefore, considered necessary to create Basin Management Authorities charged with the responsibility to implement all the land and water resources development projects in the basin for its sustainable development. Until such authorities start functioning, critically degraded areas in the free draining catchment must be taken up for treatment at the cost of river valley projects directly.

MINISTRY OF ENVIRONMENT & FORESTS**Catchment Area Treatment for the Narmada Projects**
Cost Sharing

1. Draft guidelines prepared by the Ministry of Water Resources have been examined. Considering that:

- the fundamental principles of the processes of Hydrology and sedimentation are equally applicable to small, medium and large watersheds as corroborated by studies in India and other countries;
- sedimentation carried into a reservoir is dependent upon the Silt Yield Index and the Delivery Ratio;
- the flow dynamics determine the hydraulic distance considered in priority delineation survey of vulnerable areas

it was noted that the assumption made in the draft guidelines are contrary to the natural principles and processes of hydrology, sediment production and its dispersal etc, a revised set of Guidelines has been prepared. Guidelines are, therefore, still to be finalised.

2. The revised guidelines stipulate that:
- Subwatershed will be considered as a planning unit;
 - Critically eroded & vulnerable areas will be identified & demarcated as per the All India Soil & Land Use Survey Organisation methodology.

[2]

- Very High & High priority areas will be treated at project cost in the Free draining catchment and not the direct draining catchment on the reservoir periphery.

3. The free draining catchment for Sardar Sarovar Project (SSP) falls in the States of MP, Maharashtra and Gujarat.

MADHYA PRADESH

- Free draining catchment of SSP below Narmada Sagar Project: 22700 sq.km.
 --Catchment under Very High category: 1990 sq.km. (8%)
 --Catchment under High category: 4868 sq.km. (20.1%)

Total area needing treatment in MP: 6859 sq.km.
 Cost of treatment @ Rs.7000/ha for Very High category areas.....Rs.480.15 crores.

This cost will presently be charged to the Sardar Sarovar Project but part of the cost shall be later debited to Onkareshwar and Meheshwar projects.

MAHARASHTRA

Degraded areas needing treatment are under identification. Approximately 400 sq.km. costing Rs.280 crores may need treatment.

GUJARAT

Free draining catchment area: 423 sq.km.
 Area identified for treatment: 371.9 sq.km.
 Cost of treatment @ Rs.7000/ha: Rs.26 crores

00

[3]

4. The catchment area treatment in the Narmada project will be funded through:

- i. Treatment of Very High & High category vulnerable areas in the free draining catchment to be funded by the concerned project.
- ii. Sardar Sarovar will be charged catchment treatment to the extent of Rs.534 crores. Part of the cost would subsequently be debited to Onkareshwar & Maheshwar projects.
- iii. Catchment treatment of Medium & other two categories of vulnerable areas shall be done by the State Departments of Agriculture, Forest and Soil Conservation.

5. The catchment area treatment shall be completed ahead of or simultaneously with the commencement of impoundment.

STATUS REPORT
(MARCH, 1990)

Annex-1x-5

NARMADA SAGAR PROJECT

S.NO.	ITEM	PREREQUISITES	PRESENT STATUS
/1/	/2/	/3/	/4/

1. CATCHMENT AREA TREATMENT

-Total catchment area -
61,648 sq.km. (divided in 53
watersheds)

-Treatment to be done in three
phases.

-Implementation period is 10 years.

-First phase to cover 11,022 km²
in 13 priority watersheds in the
vicinity of reservoir.

°Total degraded area needing treat-
ment to be surveyed and demarca-
ted.

°Prioritisation of watersheds for
treatment.

°Action Plans to be formulated
for Phases-I, II and III.

°Mobilisation of such inputs as

-creation of nurseries of
indigenous plants & grasses.

-manpower.

-irrigation facilities of nurseries
& plantations.

-after care of the planta-
tions.

Details of engineering structures
like check dams, retaining walls,
etc. and other soil conservation
measures.

Phase-I

-Seven watersheds out of the 13
identified covering an area of
2420 sq.km. surveyed.

-Action plan for phase-I likely to
be ready in Sep., 1990.

-No action initiated yet for phase-II
& III even for survey.

-Two circles and 15 sub-divisions
in position.

-Two pilot projects in Daturi and
Godapachar initiated and treatment
expected to be completed by 1994.

°PHASE-I ACTION PLAN AWAITED BY SEPTEMBER, 1990. TIME TARGETS NOT FIXED

°PHASES-II & III SURVEYS & PLANS NOT KNOWN.

°COMPLETION OF CATCHMENT TREATMENT BEFORE IMPOUNDMENT NOT LIKELY.

NARMADA SAGAR PROJECT

<u>1/</u>	<u>2/</u>	<u>3/</u>	<u>4/</u>
-----------	-----------	-----------	-----------

2. COMPENSATORY AFFORESTATION

-Area to be covered 80,940 ha (10,413 ha non-forest and 70,800 ha degraded forest).

-Inputs required are nurseries, irrigation, follow-up arrangements, etc.

-Resolve issues arising out of Forest (Conservation) Act, 1980 violation involving 75 ha for land area without approval.

-Identify & ascertain suitability of land for afforestation with time targets.

-Action plan to be prepared.

-Creation of nurseries.

-Mobilisation of manpower to complete plans in 10 years.

-Provision of irrigation facilities for nurseries & plantations.

-5 compensatory afforestation Divisions created.

-3772 ha of non-forest land has been transferred by NVDA for afforestation.

-Afforestation work taken up in 1229 ha of forest land and 622 ha of non-forest land.

-8 out of 16 proposed nurseries established.
Details not known.

-Annual targets not known

•ACTION PLANS AWAITED

•COMPENSATORY AFFORESTATION PLAN NOT EXPECTED TO BE COMPLETED IN TIME AT PRESENT PACE.

NARMADA SAGAR PROJECT

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
----------	----------	----------	----------

3. COMMAND AREA DEVELOPMENT

-Net culturable command area to be covered 1.23 lakh ha.

-Command area development proposed in 3 phases:

Phase-I: 36100 ha

Phase-II: 46800 ha

Phase-III: 40100 ha

*Survey of command area for land capability, water availability and cropping pattern.

*Demarcation of areas prone to waterlogging and salinity etc.

*Action Plans for ground levelling, grading and drainage.

*For optimal utilisation of natural resources, both land and water.

*Infrastructure creation for marketing etc.

*Training facilities for farmers to switch over to new cropping pattern and use of improved seeds and other inputs.

-The command area surveys with year-wise targets, both physical and financial, yet to be received from the G.O.M.P.

-Quantum of "On-farm" works to be ascertained with Action Plans.

-Action Plans for salinity/waterlogging prone areas not available.

*SURVEYS BEING CARRIED OUT

*PLANS AWAITED

*TIME FRAME NOT KNOWN.

Annexure - IX - 7(a)

**SARDAR SAROVAR AFFORESTATION PROGRAMME
MADHYA PRADESH/MAHARASHTRA/GUJARAT**

Item	Total Qty.	Target Year				
		1990-91	1991-92	1992-93	1993-94	1994-95
Expected level of submergence.						
Identification of coups.						
Identification of alternative area for afforestation.						
Access to coups.						
Establishment of depots.						
Fixation of feeding agencies.						
Development of nurseries.						
Plantation						
Removal of roots and clearance for submergence.						
Organisational strengthening for implementation of the programme.						

**SARDAR SAROVAR RELOCATION OF MONUMENTS
MIDHYA PRADESH/GUJARAT/MHARASHTRA**

Item	Total Quantity	1990-91	1991-92	1992-93	1993-94
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Level of expected
submergence.

Number of Monuments
to be relocated.

Selection of site for
alternative location.

Fixing agency for
reconstruction.

Reconstruction
activity.

Removal of existing
structure.

Organisational
strengthening for
implementation of
the programme.

**DRAFT PROPOSAL
ON
SETTING UP OF A
CENTRE FOR ENVIRONMENTAL STUDIES
FOR NARMADA BASIN
(ENVIRONMENTAL DEVELOPMENT CENTRE)**

**NARMADA CONTROL AUTHORITY
May, 1990, New Delhi**

C O N T E N T S

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4.1	Data for Management Information System	67-77
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1. Introduction

1.0 Narmada Basin is bounded ~~on~~ the North by Vindhya, on the East ~~by~~ Maikla Range, on the South by the Satpuras and on the West by the Arabian sea. The basin has a elongated shape with a well-defined physiographic zones. They are:-

- i) The upper hilly areas covering the districts of Shahdol, Madla, Durg, Balaghat and Seoni.
- ii) The upper plains covering the districts of Jabalpur, Narsimpur, Sagar, Damoh, Chhindwara, Hoshangabad, Betul, Raisen and Sehore.
- iii) The middle ~~plains~~ covering the districts of East Nimar, part of West Nimar, Dewas, Indore and Dhar.
- iv) The lower hilly areas covering the part of West Nimar, Jhabua, Dhulia and parts of Baroda.
- v) The lower covering mainly the district of Broach and parts of Baroda.

The hilly regions are well forested. The drainage basin extends over an area of 98,796 sq. km. and lies between East longitude 72° 30' and 81° 45' and North latitude 21° 20' to 23° 45'. The drainage basin covers the States of Madhya Pradesh and Gujarat and comparatively a smaller area in Maharashtra. The gross area of the basin is 98.8 lakh hectares of which 31.7 lakh ha are under forest. The culturable area is 59 lakh ha and the net sown area is 45 lakh hectares. The irrigated area in the basin is very small and the total water utilisation in the year 1987-88 was about 12% of the annual flow at Garudeshwar at the lowest end of the river basin.

1.2 The population of the Narmada basin according to 1971 census was 10.6 million of which 8 million was in Madhya Pradesh, 2.3 million in Gujarat and 0.2 million in Maharashtra. The Narmada Water Disputes Tribunal in its award of 1979 allocated the utilisable quantum of water at Garudeshwar of 34,537 m.cum (with 75% dependability) to the basin States as follows:-

<u>States</u>	<u>M.cum</u>
Madhya Pradesh	22,511
Gujarat	11,101
Maharashtra	308
Rajasthan	617

1.3 Although the water resources development in the Narmada Basin is in the initial stages, the Basin States have embarked on major river valley projects on the basis of the recommendation made by the Tribunal, besides taking up minor and medium projects also for irrigation development. The large projects which have been taken up are Sardar Sarovar (a multi-purpose project for development or irrigation and power), Narmada Sagar (Irrigation & Power), Omkareshwar (Irrigation & Power) and Maheshwar. Since these large projects have considerable impact on the ecology of the basin certain environmental safeguard measures have to be taken by the project authorities on the basis of conditions stipulated by the Ministry of Environment & Forest at the time of their environmental and forest clearances.

1.4 Water resources of the Narmada Basin have not been developed very much till now. Their development is an economic

-3-

necessity and their sustainable development taking into account socio-economic and environmental aspects is a virtuous necessity. Planning, development, operation and management of water resources systems taking into account the complex interactions between systems and processes in space and time is extremely difficult and requires a high level information system and methodologies for analysis and decision making. The Environmental Development Centre of NCA is proposed to provide information and data concerning complex resources and environmental problems, and also technologies and methodologies for sustainable economic development of the region using water as a critical input for economic sustenance and development of the region encompassing the basin.

2. Need for setting up of Environmental Development Centre for the Basin.

2.1 In India, the present ecological balance and pattern of human habitat in the Indo-Gangetic plain is due to post diversion effects caused by the river Bhagirathi. There is no authentic and scientific data base available regarding the nature of ecological changes that have taken place in the region due to diversion by the King Bhagirath. The only conclusion one can draw from the history is that the whole area is fertile and is giving shelter and food to millions of people and living organisms.

2.2 It is well known that diversion of huge quantities of water from present Narmada basin would bring about ecological changes both in the region where the water would flow due to diversion and also at the present basin from where the water is diverted.

-4-

This would necessitate restructuring of the habitat both in the existing basin and also in the new region. Unlike in the days of Bhagirath, the present civilisation is equipped with better facilities and technological tools to gather information, store it and retrieve it for proper planning phasing, implementing and monitoring the systems going to be influenced by changes brought about by the water. Much better scientific and engineering methods are available to the society to control and avoid drastic ecological changes those may result into catastrophe to human habitat.

2.3 It is essential for the humanity for its survival to interact with environment and natural resources and use them for human upliftment to the extent possible with considerable imagination and scientific proficiency and do not exploit to such an extent that the surrounding environment would become counter productive for human upliftment.

2.4 The proposed centre has to play a major role in keeping balance between optimum utilisation of natural resources and environment in a scientific framework, by developing imaginative management systems without causing any adverse effect on the present earth crust systems and environment which may become counter productive to human upliftment. The centre has to deal with factors influencing ecological balance and those relating to human habitat with a aim to inter link them effectively. The main aim of such a massive investment oriented projects would be to improve the economic level of the regions and also improve the quality of life of human habitat in such region.

2.5 Human habitat as such in a rural sector is a balance between man and surrounding natural resources including environment. Socio-economic profile of a rural setting is an interactive phenomenon between surrounding environment and the community. Their day to day ritual and social aspects are derived from the existing environmental in which they live.

2.6 For this purpose, there is a need to study the profile of the human habitat in relation to surrounding environmental and natural resources at a micro level for locations specific. It is necessary to develop and project probable planned socio-economic profiles of the future generations emerging from the present human habitat.

2.7 To handle such a sensitive issue the centre has to be equipped with latest technological tools in the area of information system, socio-economic planning, environmental aspects and engineering.

2.8 In this report an effort is made to analyse various major factors needed to be considered to deal with this problem and to indicate the probable infrastructure and set up of the institute.

3. Objectives for setting up of Environmental Development Centre

It is not easy to answer quickly a number of socially relevant questions concerning water resources development and its impact on environment using conventional engineering tools and methods used in India today Development of technology in the areas of computerisation, real-time data acquisition, storage

and retrieval, remote sensed data, image processing, computer graphics, data base management systems, geographic information systems etc. have brought answers to several such questions within the realm of possibility within a reasonable cost. For e.g., it is believed that questions of the following type can be easily and quickly answered:

- a) What are the areas flooded during a historical or design flood with or without a system of reservoirs, levees etc.?
- b) What should be the plan for developing migration routes and protected areas for wildlife during floods and drought?
- c) Are the areas to be submerged cleared of timber?
- d) What are the degraded forest areas in 2020 with and without development?
- e) How can real-time operation of canals be done to conserve water given rainfall in some part of the basin?

The centre should develop capacity to present derived meaningful information to decision makers on various environment, socio-economic and other factors to help them plan and manage the system. In turn it should be processing and utilising relevant data concerning various aspects of the systems.

Hence the objectives of the EDC should be:

- 1) to develop capability to forecast future environmental and resources conditions of the basin and its parts realistically and with or without development;
- 2) to develop and present consequence of diverse actions on the basin and its environment;
- 3) to advise the administrators/decision makers on the

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implications of economic and development activities and in particular the economic aspects of the environmental impacts;

- 4) to develop a data-base management system and a geographic information system perhaps in the framework of a management information system to help in rational evolution of the consequences of man's intervention with or without specific structural systems;
- 5) to organise training programme for professionals at all levels;
- 6) to develop mass communication techniques for creating public awareness and economic and environmental aspects of the projects so as to enable people to appreciate the steps taken for achieving sustainable development from the projects undertaken with suitable environmental safeguard measures; and
- 7) to prepare an Environmental Management Plan on macro basis for achieving integrated basin development.

4. Formation

4.1 DATA FOR MIS(Management Information System)

4.1.1. Planning and management of water resources systems and assessment of their environmental impact is a technical scientific activity and is based on different types of data from several sources. For e.g., the different data types include

- a. Data recorded in registers perhaps in tabular columns
- b. Continuous records from clock operated pen recorders
- c. Figures and drawings
- d. Maps and toposheets
- e. Aerial and satellite photographs, imageries and colour composites, and
- f. Computer compatible data in cassettes, tapes, floppies etc.,

The data may in turn deal with

- a. Resources including land, soil, water, population, machinery, money, etc.,
- b. Quality including those of water(surface water, ground water, soil water); air; and land(soil, crop, forests)
- c. Land Use, settlement, population and health
- d. Ecology - Vegetation, flora, fauna, wildlife, bioenvironment
- e. Socioeconomic, political, anthropological, legal religious and other factors
- f. Problems (floods, droughts, water logging etc.) and disasters (severe floods and droughts, fire, crop damage and failure, etc.) and

g. Planning, management and policy

4.1.2. DATABASES

In order that the above data are taken into account in analysis and design, it is necessary to develop a system of collection, storage and retrieval of data using a digital computer. Data in registers and recorders can be converted into computer compatible forms. They should be stored in different files in such a way that relevant data may be retrieved from the data bases as and when required. Several sets of data are available in magnetic tapes or in data bases. For e.g., C.W.C. and state irrigation departments collect and store daily and monthly rainfall data some of which are available in magnetic tapes. NCA and governments of Gujarat and M.P. have collected extensive data concerning several characteristics of the basin and its processes. Computerised District Data Base with Remote Sensing Facility is being developed as part of Natural Resources Data Management System by DST and is a ready source of sectoral and infrastructural data at microlevel. EDC may use all available data sources within and outside NCA. It can use data available with other agencies of NCA and M.P. and Gujarat State governments in a distributed data base to the extent possible and otherwise develop a centralised data bank.

4.1.3 REMOTE SENSED DATA

Remote sensed data from various satellites are available from NRSA in CCT's or floppies. As modern methods of satellite remote sensing collect data both from accessible and inaccessible areas on a repetitive basis, one may consider that the remotely

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sensed data can offer the possibility of automated updating of geo-data base and if much of the context such as topography, soils, land use, geology, etc., can be expressed as pseudo-channels and merged with digital image data from remote sensors, the quality of the data base updating is enhanced considerably.

There are several reasons why remotely sensed imagery should be an integral component of geo-information system. Most data bases are produced by digitizing map products. The maps might have been originally produced by using rigorous photogrammetric techniques and there may be several levels of abstraction and generalization between the final product and original data (mostly remote sensing data) used to produce it. By integrating remote sensing data (as source data) along with derived results, the accuracy gets improved. As remote sensing data contains more details than a digitized map, a user can orient himself to the geographic area using image data than a map display. Being temporal and repetitive, remote sensing data can act as a main source to add features of temporal interest (including updation) to the baseline geoinformation system and playback the changes over time. Currently there are several ways in which attempts are being made to incorporate remotely sensed data into a geo-data base.

Remote sensing data has greatly helped in various field surveys including geological, zoological, botanical, forest, soil survey etc.

Broad synoptic view has helped in studying terrain conditions, drainage network, large geomorphological units and

geological structures. Data obtained through repetitive coverage has been utilized to study dynamic changes such as flood monitoring, crop pattern study etc. Applications of Landsat data in the various Natural resources disciplines are listed in Table 1.

The accuracy of this data as of today for Landsat products in terms of mapping accuracy is about 250m. for MSS and about 120 m. for TM data. With the advent of superior sensor technology, mapping accuracy (i.e., resolution) is improving (SPOT data). But still there is lot of scope to improve present status if technology for which proper Science and Technology inputs should be pressed into service.

In short, satellite remote sensing is a viable tool which collects earth surface data on repetitive basis. Finally, a system should be developed to integrate the remotely sensed data directly with other resources data base so that automatic updating of information and continuous monitoring of resources, forecasting etc., become feasible.

Maps, figures, toposheets etc. are also used in engineering design. They can be converted into digital data stored in computers using digitizers and scanners.

4.1.4 Geographic Information System (GIS)

Earth resources data vary in space and also perhaps in time and so is to be indexed spatially in terms of the geographic coordinates of the point of observation. A geographic information system (or geodata base) is a computerised data system of spatially indexed data for their efficient compilation, storage,

Table - 1

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Application of Landsat Data in the Various Earth Resources Disciplines

Agriculture, forestry and range resources	Landuse & mapping	Geology	Water Resources	Oceanography and Marine resources	Environment
1. Discrimination of vegetative types.	1. Classifica- tion of land uses.	1. Recognition of rock types.	1. Determination of water bound- aries and surface water area & volume.	1. Detection of living marine organisms.	1. Mapping surface mining & reclama- tion.
2. Measurement of crop acreage	2. Cartographic mapping and map updating.	2. Mapping of major geo- logical units.	2. Mapping of floods and flood plains.	2. Determination of turbidity patterns and circulation.	2. Mapping and monitoring of water pollution.
3. Measurement of timber acreage and volume by species.	3. Categorization of land capa- bility.	3. Revising geologic maps.	3. Determination of areal extent of snow and snow boundaries.	3. Mapping shore line changes.	3. Detection of air pollution & its effects.
4. Determination of range readiness.	4. Separation of urban & rural categories.	4. Mapping land forms, linears, igneous intrusions and recent volcanic surface deposits.	4. Measurement of glacial features.	4. Mapping of shoals and shallow areas.	4. Determination of effects of natural disasters.
5. Determination of vegetation vigor & stress.	5. Regional planning.	5. Search for surface guides to mineraliza- tion.	5. Measurement of sediment and turbidity patterns.	5. Mapping of ice for shipping.	5. Monitoring environmen- tal effects of man's activities (lake entr-
6. Determination of soil condi- tions and associations.	6. Mapping of land-water boundaries.	6. Determina- tion of regional structures.	6. Determination of water depths.	6. Study of tides and waves.	
7. Assessment of grass and forest fire damage.	7. Mapping of wetlands.		7. Delineation of irrigated fields.		
			8. Inventory of lakes.		

representation and retrieval. The data may be accessed on the basis of a vector model in terms of the coordinates of line segments; and tessellation or grid or raster data in terms of a mesh into which the space is divided. Data compression techniques including Quadtree and Octree representations and their extensions may be used. Spatial data including remote sensed data may be available repetitively in time and in several bands of information.

Development of data bases for hydrologic, water resources, environmental, agricultural, population and infrastructural data in an integrated manner is very difficult. Natural Resources Data Management System(NRDMS) is a computer based geographic information system for planning and management of natural resources at a microlevel (district and below). Software for analysing and using satellite remote sensed data have been developed by SAC, Ahmedabad, and SACIMAGE and related programs are available easily for freely using in India to analyse such data.

A georelational data base model integrates tabular geographic data with cartographic data and may involve overlays of several layers. NNRMS of ISRO deals with the integration of satellite remote sensed data into existing systems with appropriate technical, managerial and organisational linkages. Any information system in India should avail itself of existing data bases and image and information processing tools.

The integration of remote sensed data with other data concerning resources, environment, socioeconomic and infrastructural factors etc. at macrolevel is very much needed

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for planning and management of resources and environment in Narmada Basin. This requires integration of data, information and technical tools for analysis of data at the basin and interstate level.

4.1.5 PLANNING AND MANAGEMENT

Decision makers dealing with planning and management of environmental resources systems need prompt, realistic and meaningful answers to practical questions dealing with development strategies and approaches, and their socioeconomic and environmental implications. This, in turn, requires

- i. A data storage and retrieval system from a centralised or distributed data bank of a variety of relevant data and their presentation in terms of tables, reports, imageries, colour composites and overlays;
- ii. Analysis and design of structured systems;
- iii. Development of long term and short term developmental plans and long term, short term, real time and disaster operational rules based on specified social value system and risk criteria leading to efficient or optimal (water) resources development; and
- iv. Communication and publication of study results and training.

A new approach to computer applications is sometimes referred to as the "GARDEN" concept. Just as one can put together many salads using vegetables and fruits in a garden, it is now possible to pick and choose from a huge assortment of computer programs in the analysis of data. The data may be obtained from files, digitizers, scanners, image processing system, vector or

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raster GIS, BMB, CAD, Video etc. The programme may deal with DBMS; computer graphics; numerical, statistical, time series, simulation and optimisation packages; special purpose programs in higher level languages like FORTRAN, C or Simula; report writers, spreadsheets, word processors, image processing software, GIS, MIS etc. An interactive menu based system makes the analysis user friendly. Distributed data bases and distributed processing through LAN (Local Area Networks) are also possible. Taking into account the hierarchy of and multiple decision makers, it is necessary and possible to develop a MIS for environmental and resource management of Narmada basin.

4.1.6. E D C

An inventory of data and problems in Narmada basin with special reference to the centre is yet to be made. But keeping in mind the resources and time required for developing a highly technical core group, the following broad recommendations are made concerning the Environmental Development Centre of NCA. It is proposed to develop the centre in two phases. Phase I details (1990-1995) only are given here.

4.1.7. Equipment

The major equipment will be a sufficiently versatile but mini computer system or workstation and peripherals with appropriate software:

Hardware:

- a. Intergraph Interpro 340 or 3000 or Sun SPARC Station 302 with equivalent capabilities
 - 16 MB RAM
 - 19" 9 bit plane monitor & Graphics Board
 - 355 MB internal hard disk
 - 355 M. external hard disk
 - 1/4 " cartridge tape system
 - Mag Tape System
 - 4 port Serial Board

Software:

- Fairchild System V.3 Software, mouse, FMU, XNS
- Unix System V.3 & Manuals
- Fortran and C compiler
- Digitizer 36" X 48" (backlit)
- Plotter, Printer
- COM-31 or equivalent 35 mm colour film hard copier
- Colorscan say by Tanjent Engg.
- b. PC 386 / 486 system with 8 MB RAM, 135 MB hard disk
 - MS or G Mouse, VGA Colour graphics card (orchid card with Pro Designer upgrade kit)
 - NEC Multisynch Plus monitor,
 - 8 port serial board
- c. 3 IBM PC XTs with 80 MB hard disk and EGA/VGA monitors.

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Special Software

Several software are available for developing and managing GIS/MIS; for conducting relevant technical studies and for visual presentation of the results.

They include

- i. DBMS

- ii. Remote sensed data analysis

- iii. GIS tools

- iv. Numerical, statistical, simulation, optimisation and special purpose packages

- v. Word processor, Report Generator.

Two software packages i) ARC-INFO developed by ESRI, USA and ii) GRASS (Geographic Resource Analysis Support System) developed by USACERL, USA have been used extensively in the analysis of GIS data in the areas of water resources and environment. Typical environmental applications include

- i. Derivation of soil cover, land use, topography, surface water, groundwater, forest etc. maps

- ii. Groundwater maps including water table, depth to water table, drafts and water level changes

- iii. Water spread area of reservoirs, flooded areas, water logged areas, saline water areas, drought prone and drought affected areas etc.

- iv. Three dimensional topographic drainage, or aquifer map showing land cover, land use, soils etc.

- v. Forestry, vegetation, crop etc. management map

- vi. Agricultural resources map

- vii. Overlays for problem/ solution identification

- viii. Engineering analysis and planning and management studies

ix. Eco-system modelling, and

x. E.I.A. . . .

ARC-INFO and GRRASS alongwith a suitable RDBMS package say ORACLE OR INGRESS; SACIMAGE programme, BLISS, NAG software for numerical analysis and the engineering analysis and optimisation programme available with CWC, IMD, IIT's, Universities, NIH etc. in FORTRAN, will constitute a versatile software environment for applying the "GARDEN" concept of computer applications in environmental resources management of the Narmada Basin.

4.2 Organisation

The organisational structure of the proposed Centre is envisaged as a semi-Government organisation. The Centre will have the following divisions:

(a) Technical Divisions

1. Information Systems Division including DBMS, remote sensed data, GIS and GIS tools, forr conventional engineering, hydrometeorology, soil, land use, water resources, sectoral, infrastructural and remote sensed data, maps, drawings, design reports and library.
2. Technical Studies Divisionon (say)
 - a. Analysis and forecasting including hydrology, hydrometeorological, groundwater, sediment, river control etc.
 - b. Environmental studies including land, water soil and air quality; man's influence on hydrologic cycle and environment; environmental changes with or without development.

- e. Ecological studies including vegetation, flora, fauna, wildlife, bio-environment and their interactions.
- d. Planning and management studies including planning, design, construction, operation and management over long term, short term, real-time and during disasters using concepts of economic values, multiple objectives, multiple decision makers, risk etc.
- e. Training Division.
- b. Non/Semi Technical Divisions
 - 1. Administration and Finance
 - 2. PR, Communication and Publication

During the first phase for 5 years from 1990-1995, the strength of officers will be around 20 and other staff will be around 30. The organisation will be expanded in the second phase to around double the strength to meet its full commitments. A detailed organisations tructure including divisions, activities, staffing pattern etc. can be developed after EDC is approved is principle by NCA.

Organisational structures

The Centre will be headed by a Director and each of the six divisions (including non/semi technical division) by a Deputy Director. Each Division will consist of scientists in the various relevant fields. The Centre may be developed in stages depending on the need and availability of necessary personnel in the various disciplines.

4.3 Location

The Centre may be located in Indore where a Computer Centre

is proposed to be set up for hydromet of Narmada Basin. Since land for the office of NCA has already been purchased, infrastructural facilities may be available by the time this Centre is set up.

4.4 Budget

The tentative cost for setting up the first phase of the Centre is estimated to be of the order of Rs. 1.0 crore. Further details will be worked out in the Detailed Project Report if the proposal for setting up of EDC is accepted in principle.

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नर्मदा नियंत्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

पर्यावरण उपदल
Environment Sub-Group

नौवीं बैठक का कार्यवृत्त
Minutes of the Ninth Meeting

7 सितम्बर, 1990
नई दिल्ली में हुई

Held at New Delhi
7th September, 1990

नई दिल्ली
अक्टूबर, 1990

New Delhi
October, 1990

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MINUTES OF THE 9TH MEETING OF ENVIRONMENT SUB-GROUP HELD ON
7TH SEPTEMBER, 1990 IN PARYAVARAN BHAWAN, NEW DELHI

Shri Mahesh Prasad, Secretary, Ministry of Environment & Forests and Chairman of the Environment Sub-Group of NCA welcomed the Members and Invitees to the 9th meeting of the Environment Sub-Group. The list of participants is enclosed at Annex-IX-Min-1.

Discussion on the agenda items was taken up thereafter.

Item No. IX-1(53): CONFIRMATION OF THE MINUTES OF THE EIGHTH MEETING
OF ENVIRONMENT SUBGROUP

The Minutes of the 8th meeting of Environment Sub-Group of Narmada Control Authority held on 14th May, 1990 were confirmed, as circulated, since there were no comments/objections from any Member.

Item No. IX-2(54): PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENTAL ACTION PLANS

(1) PHASED CATCHMENT AREA TREATMENT

SARDAR SAROVAR PROJECT

M.P. Catchment

Shri N.B. Lohani, Vice Chairman, NVDA stated that Govindram Seksaria Institute of Technology and Science (GSIT&S) has submitted to NVDA a draft report regarding prioritisation survey at watershed level. This report is presently under study by Government of Madhya Pradesh and the final report is expected to be available by October, 1990. All India Soil & Land Use Survey (AIS&LUS) is engaged in prioritisation survey at sub-watershed level. The survey work is expected to be completed by December, 1990. Treatment plan can be prepared in three months after getting the final report. The questions relating to extent of catchment to be treated and cost sharing etc. have to be resolved on priority.

Gujarat Catchment

Shri A.W.P. David, Secretary (R&E), GOG stated that GOG is implementing the 5 year work plan with another three years required for aftercare. Necessary manpower mobilisation has been done to complete the work in time.

Maharashtra Catchment

No representative of GOM could attend the meeting because of transport dislocation due to Bandh. GOM in their letter dated 18th August, 1990 has requested Director, GSITS for early completion of prioritisation maps so that action plan for catchment treatment could be prepared. Time frame is, therefore, not yet known.

NARMADA SAGAR PROJECT

GOMP intimated that AIS&LUS has completed survey work in 5 sub-catchments out of 9 covering an area of 16747 sq. km. Survey work in the remaining sub-catchments, i.e., Phase-II and Phase-III is likely to be completed by December, 1990. Preparation of the final report may take further 3 months. Thereafter, the treatment plan for Phase-I can be finalised in about 3 months.

Dr. Maudgal, Adviser, Ministry of Environment & Forests pointed out that the condition imposed for pari-passu implementation of CAT programme while according Environmental approval, is not fulfilled as we still do not have a time frame for action plan.

Hence, completion of catchment area treatment before impoundment does not seem likely in NSP.

POLICY PAPER ON CATCHMENT AREA TREATMENT AND COST SHARING

The draft guidelines prepared by MDWR as well as the modified draft paper prepared by the MOE&F were discussed. Main issues raised in these papers were brought to the attention of the Committee by Dr. Maudgal, who elaborated the following points:

- Identification and demarcation of critically degraded pockets in the free draining catchment as per the All India Land Use Survey Organisation classification at project cost and the other three categories (Medium, Low and Very Low) by the State Soil Conservation Department.
- The contribution of silt load depends on the erodability of the area and the Silt Delivery Ratio.
- The Silt Delivery Ratio has been assumed to be zero for all areas in the catchment except those lying on the reservoir periphery and draining directly into the reservoir. This

assumption is a negation of the basic principles of sedimentation and its transport and has to be suitably corrected by accounting for the critically degraded areas in the catchment along with their Silt Delivery Ratio.

It would not be correct to say that catchment treatment is not effective simply because past experience is based on a very limited area being treated. The only practical lesson to be learnt is that all the critically degraded area in the catchment adding to silt load in the reservoir must be treated at project cost before impoundment commences.

Dr. Abrol was of the firm view that realistic planning of the life of the reservoirs can be done only on the basis of ensuring that the critically degraded areas are treated on priority in the free draining catchment and these conditions are maintained by taking suitable steps so that the assumptions made while designing a project are by and large maintained.

Shri V.B. Patel agreed with the need for catchment area treatment but opined that this task has so far been done by the State Soil Conservation Departments, who could perhaps continue to do the job. It was, however, pointed out that accountability becomes a casualty if too many agencies, not under the control of Project Management, are entrusted diverse tasks.

Shri D.C. Debnath, Executive Member, NCA also pointed out to the concern of the Ministry of Agriculture regarding loss of millions of tons of top soil lost every year and referred to Centrally sponsored scheme of catchment area treatment in some 27 river valleys. There was general agreement on the need for catchment area treatment but a consensus has to

be reached on the operational details.// Chairman suggested that MOWR may circulate a paper detailing all the issues involved among the four States as well as Ministry of Agriculture and Ministry of Environment & Forests so as to arrive at a working arrangement on the following:

- (1) Types of areas to be treated (Very High priority and/or High priority areas in the free draining catchment depending on the silt delivery ratio).
- (2a) Sharing of treatment cost among the project authorities, the State Departments of Soil Conservation, Forest and Agriculture, etc.
- (2b) Debiting of cost of area treated on to the projects likely to be taken up in future in the free draining catchment.
- (3) Responsibility and accountability of the agencies entrusted with the task.
- (4) Sharing of expenditure by party States.

An urgent meeting of the Chief Secretaries of the States and the Secretaries of Ministry of Agriculture, Ministry of Environment and Forests and Ministry of Water Resources and representatives of the Planning Commission was suggested to examine the paper once finalised. Ministry of Water Resources was requested to convene the above meeting as early as possible, preferably within a week or at best in September itself. //

(ii) COMPENSATORY AFFORESTATION

SARDAR SAROVAR PROJECT

Madhya Pradesh

The representative of GOMP stated that identification of degraded forest area for compensatory afforestation is in progress. An area of 816 ha. (716 ha. non-forest and 100 ha. degraded forest) has been planted

upto July 1990. The programme is to plant 1930 ha. per year during the next 4 years. DFO, Kavery is to prepare afforestation plan for 2390 ha. of degraded forest by December 1990.

Gujarat

GOG indicated that compensatory afforestation has been planned over 4650 ha. and plantation was completed in 1100 ha. by September, 1989 and over another 1100 ha. upto August 1990. Shri Shekar Singh reiterated his two queries raised earlier in previous meetings, namely; why not take up afforestation in the project impact area rather than in the Kutch area; and suitability of the identified land for afforestation purposes.

Chairman enquired from the Additional Inspector General of Forests about the suitability of land taken up for afforestation in Kutch area. It was informed that the survival rate of plantation done in 1989 varies from 30-50%. The project authorities also reported survival rate between 60-90% and stated that subsequently better areas have been identified for plantation. GOG was requested to give final schedule within a week and also the report regarding diversion of 1080 ha. of revenue land for compensatory afforestation.

Maharashtra

Regarding proposal of compensatory afforestation from GOM it was informed that no proposal has so far been received even though GOM vide their letter dated 23rd August, 1990 are reported to have submitted the proposal to MOE&F. MOE&F is to verify so that the proposal could be examined on priority.

Now that an additional 2700 ha. of forest land in Dhule district of Maharashtra has been diverted for rehabilitation, Chairman desired that the State Government should be directed to prepare compensatory afforestation plan for this forest land use as well.

It was brought to the notice of the Sub-Group that the request for permission for clear felling of trees from submergence area has not been granted and that work is held up for want of permission from Government of India and any further delay will affect the entire programme. Representative of Ministry of E&F stated that the clearance for felling of trees is being issued separately. Chairman directed to write to all the States that no further clearance would be given to new projects unless the compensatory afforestation required for the sanction already given is carried out.

NARMADA SAGAR PROJECT

Madhya Pradesh

GOMP was to cover an area of 80,945 ha. (10,143 ha. non-forest area, 70,802 ha. degraded forest). It was intimated that NVDA has taken over 4223 ha. of non-forest land in addition to degraded forest land. Afforestation work has been completed in 8674 ha. of forest land 2609 ha. of non-forest land (total 11,283 ha.) and 58 nurseries have been established. GOMP purposes to cover 13,900 ha. every year for the next 5 years.

(iii) COMMAND AREA DEVELOPMENT

SARDAR SAROVAR PROJECT

GOG intimated that one interim report has been received from the consultant in June, 1990 and the 6 studies are likely to be completed by 1991. It was also informed that construction of field channels has also been taken up. Chairman, CWC observed that it might not be fruitful to

do so at this stage as it would be difficult to retain them intact till commencement of irrigation. These will get filled up, silted or damaged by the time water is available. Shri Shekhar Singh desired that the terms of reference of the studies commissioned as well as copy of the interim report may be sent to the Members for which GOG agreed. Dr. Ramaseshan (IIT, Kanpur) suggested that on the basis of interim reports some action plans are to be prepared and action started in anticipation. Plans so prepared should be made available to the Sub-Group Members. Chairman noticed that there was no active participation of Rajasthan and suggested that Executive Member, NCA will write to GOR. Secretary, NCA pointed out that the matter had already been taken up with the GOR.

NARMADA SAGAR PROJECT

GOMP informed that command area development plan had been outlined in November, 1989. Command area surveys for 36,000 ha. would however be completed by 1994-96 (Phase-I). Shri Shekar Singh wanted that observations/recommendations of Indian Institute of Science and Institute of Management, Bangalore should be kept in view while drawing the action plans. It was intimated that this was covered in the provision for environment development for which a provision of Rs.25 crores exists. Further microplans and agency for carrying out the same is to be fixed. Areawise physical and financial programme of command area development given by GOMP is at Annex.IX-Min.3.

(iv) SURVEY OF FLORA AND FAUNA AND ARCHEOLOGICAL STUDIES

BARDAR SAROVAR PROJECT

GOMP informed that State Forest Research Institute, Jabalpur has been entrusted with the studies. The Institute would take 3 years time commencing from April, 1990 upto March, 1993. Regarding Archeological

studies, surveys of 75 villages out of 197 villages to identify the monuments and artifacts have been completed by June 1990. After surveys, rehabilitation plan will be finalised. It was also mentioned that Tribal Research Institute is assisting State Forest Department and no separate anthropological studies are being carried out. Action Plans are expected to be ready by March 1992.

GOG informed that M.S. University, Vadodara was carrying out these studies to be completed by 1993-94. Prof. Ramaseshan suggested that the interim reports, if any, may be made available and it should be possible to develop tentative action plan based on the interim report so that implementation can also proceed. MOE&F was also of the same view. As decided in the last meeting, GOG was to specify the methodology and details proposed for relocation of temples with the interaction of trustees and local people. It was informed that even though the trustees have selected the sites in the project areas, the Mahants do not agree and desire the same to be in the forest area. Architectural designs have been finalised for the Shoolpaneshwar temple by Shri Davendra Patel. GOM was to finalise the terms of reference for a 2 years study to be carried out by the Sagar University and the State Forest Research Institute. Status could not be reported.

NARMADA SAGAR PROJECT

The Indian Institute of Wildlife, Dehradun is on the job and the flora and fauna studies are in progress. The studies are expected to be completed in 3 years' period.

ASI had earlier identified 40 artifacts in Narmada valley. But only 4 monuments namely Chaubees Avtar Temple, Joga Fort, Siddeshwar Temple and Chhatra of Bajirao Peshwa will be affected. Steps have already been taken for relocation and strengthening of these monuments by

ASI. State Archaeological Survey and Museum Department is preparing the programme for relocation/strengthening of the monuments surveyed in 87 villages. A report from ASI who were entrusted with the studies in 1987 for the survey of 167 villages of Khandwa and Harsud tehsils is still awaited. Action Plans will be made available for discussion when ready.

(iv) CARRYING CAPACITY OF SURROUNDING AREAS

This study covers the item included in (iv) above. Members desired that the TORs for this study should be circulated alongwith the status of progress achieved so far.

(vi) SEISMICITY AND RIM STABILITY OF RESERVOIRS

SAFDAR SAROVAR PROJECT

GOG indicated that GSI has already completed studies in 1983 for Gujarat part and the studies for Maharashtra part would be over by March 1992. Ministry of E&F desired that copy of TORs be circulated among the Members. Chairman, CWC mentioned that if the intervention of Government of India is required for expediting the studies, the matter may be taken up with Member (D&R), CWC.

(vii) HEALTH ASPECTS

SAFDAR SAROVAR PROJECT

It was indicated by GOG that a 10 year plan is proposed to become operational one year before impoundment. It will be implemented by the State Health Department and shall cover surveillance and control of malaria, water borne diseases and other communicable diseases. Shri Shekar Singh suggested for a comprehensive action plan. Original Report (1985) indicates vector control through massive use of pesticides. This method of control is not advisable without ascertaining the likely adverse impact of pesticides on environment. It was suggested that the

recommendations of the Ministry of Health regarding preventive steps and even reservoir level operation for control of Malaria etc. should be examined and used to the extent possible.

NARMADA SAGAR PROJECT

GOMP would send a copy of recommendation of the review meeting held by Secretary, Department of Health and Family Welfare. Services of Dr. David Para of Jabalpur Medical College have been obtained to prepare a modified report on Health Aspects. Action to be taken will be intimated in 2 months time.

(viii) FISHERIES DEVELOPMENT IN SSP/NSP RESERVOIR

NARMADA SAGAR AND SARDAR SAROVAR PROJECTS

Ministry of Environment & Forests observed that though the three Universities viz. Rani Durgavati, Barakatullah and Vikram University have initiated the studies for entire Narmada-Bargi to lower Narmada reaches - an approach paper outlining modalities of the short and long term studies is still being worked out.

GOG informed that State Fisheries Department, is reviewing the report of CIOFRI. Shri Shekar Singh suggested that CIOFRI should also look into the eco-system balance besides the economic and commercial aspects of fisheries production. Regarding the provision for mechanised lift in the Dam, it was pointed out by GOG that no details pertaining to the same were available in India. It was suggested that World Bank or foreign countries may be approached for the requisite information/literature so that the migratory aquatic life could be transferred over the dam(s) created. Shri K.M. Joseph, Member (Civil), NCA pointed out that the migratory nature of fish in the Narmada river is yet to be studied to necessitate provision of a mechanical lift. It was stressed

that the biological behaviour of the migratory fish should be studied on top priority.

Item No. IX-3(54): TIME FRAME FOR PREPARATION OF ACTION PLAN AND IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD MEASURES

Dr. Maudgal pointed out that the clearance of these two projects by the Ministry of E&F was specifically on the condition that the environmental action plans would be made available by 1989. It is seen that:

- A number of studies are still being carried out and to be completed by 1993.
- A number of surveys are also in hand based on which action plans will be prepared.

The implementation of environmental safeguard measures pari passu with the construction schedule therefore appears to be difficult with the present engineering construction schedule. Under the circumstances the pace of studies and implementation of action plans has to be expedited or the schedule of engineering works has to be modified to conform.

Shri N.B. Lohani explained various constraints physical, financial lack of strategy and cost sharing aspect of the CAT works, etc. He also mentioned that catchment area in M.P. is 24294 sq. km. and the area under "Very High and High" category of degradation constitutes 28.3% of the total catchment requiring an amount of Rs.261.50 crore for treatment. Hence it appears that Catchment Area Treatment works cannot be completed pari passu with the engineering works. He stated that except the CAT works, other studies/implementation of action plans is going on as earlier explained.

Chairman, CWC suggested that NCA should pursue the matter and obtain from the States definite time frame for each study, survey and action plans.

Chairman desired that the participating States should be directed to submit latest by middle of October the following:

- Revised and final time frame for completion of environmental studies, surveys which will be basis of detailed Action Plans.
- Final time targets for formulation and implementation of Environmental Action Plans.
- Revised construction schedule to coincide with the pari passu implementation of environmental action plans.

Based on the revised action plan schedules, the project authorities should seek renewal of environmental and forestry clearance. //

Item No. 1)-4(55): SETTING UP OF AN ENVIRONMENTAL DEVELOPMENT CENTRE
 (EDC)

Chairman, CWC enquired whether it was a pre-requisite of World Bank to set up the EDC. It was informed that World Bank was considering provision of assistance of US \$ 200 million for the proposed Narmada Basin Development Project which consists of various components including this item.

Prof. Ramaseshan, who was associated with the preparation of draft paper, in consultation with Prof. R.K. Katti and Member (Civil), NCA explained the necessity for setting up of such a centre for the basin to have the database through adoption of geographic information system and to prepare an Environment Management Plan for achieving integrated basin development.

Dr. Maudgal stated that during presentation to the Prime Minister it was stressed to take up integrated Narmada Basin Development and accordingly the scope of NCA was enlarged. The main objective of this Centre would be to provide inputs for assessment of NSP & SSP and also to develop alternate Development scenarios for the basin. The realistic data base would also help in effective monitoring. The Committee agreed in principle to have such a Centre with a network approach. Chairman, CWC suggested that instead of creating a new Centre, de nouveau, it would be better to build upon an existing facility, say at NEERI, Nagpur, which would be able to benefit from the network structure right away. It was, therefore, decided to form a sub-group consisting of Shri D.C. Debnath, Executive Member, NCA, Shri Shekar Singh (IIPA), Dr. Maudgal, Adviser, MOE&F, Prof. Ramaseshan and Shri K.M. Joseph, Member (Civil) to examine in depth the various aspects and finalise the modalities for setting up a Centre.

Annex-IX-Min.1

List of participants attended the ninth meeting of Environment Sub-group held on 7th September, 1990 at Paryavaran Bhawan, CGO Complex, Lodi Road, NEW DELHI

1. Sh. Mahesh Prasad, Chairman, Env.sub-group and Secretary to the Govt. of India, Ministry of Env.& Forest.
2. Sh. V.B. Patel, Chairman, Central Water Commission New Delhi.
3. Sh. N.B. Lehani, Vice Chairman, NVDA, Bhopal.
4. Sh. D.C. Debnath, Executive Member, NCA, Indore.
5. Sh. D.R. Thapliyal, Member(Reh.&Env.), NVDA, Bhopal.
6. Sh. A.W.P. David, Secretary(Reh.&Env.), Govt. of Gujarat, Gandhinagar.
7. Sh. A.V. Gururaja Rao, S.E., S.S.N.N.L., Govt. of Gujarat, Gandhinagar.
8. Sh. N.M. Prasad, Addl.I.G. Forest, Min. of Env.& Forest.
9. Dr. S. Maudgal, Advisor, Min. of Env.&Forest.
10. Sh.S.S. Patnaik DIG Forest, Min. of Env.& Forest.
11. Mrs. Nalini Bhat, Scientist, SE, Min. of Env.&Forest.
12. Sh. S.P. Sangar, DFO, NVDA, Bhopal.
13. Sh.K.C. Aggarwal, Joint Commissionary, Ministry of Water Resources, New Delhi.
14. Sh. A.K. Shangle, Director(Res.Sedimentation), CWC, New Delhi.
15. Dr. S. Ramaseshan, Professor IIT, Kanpur.
16. Dr.I.P. Abrol, Dy. Director, General, ICAR, New Delhi.
17. Sh. Shekar Singh, Project Director, IIPA, New Delhi.
18. Sh. K.M. Joseph, Member(Civil), NCA, Indore.
19. Sh. S.M. Pai, Secretary, Narmada Control Authority.
20. Sh. O.P. Saxena, Dy. Director, N.C.A., Indore.

**Ministry of Water Resources
Central Water Commission
(Reservoir Sedimentation Directorate)**

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Subj: Guidelines for an Action Plan for the Catchment Area Treatment of Reservoirs.

Ministry of Water Resources had prepared the above guidelines which have been discussed in various meetings held in Ministry of Water Resources with representatives of various Ministries and Departments including Ministry of Agriculture, Ministry of Environment and Forests and Ministry of Energy.

Based on the above discussions, final draft guidelines for an Action Plan for the Catchment Area Treatment of the reservoirs are circulated by Narmada Control Authority (N.C.A.) to all concerned in June, 1990.

Central Water Commission has now received a copy of the modified guidelines on Catchment Area Treatment prepared by Ministry of Environment and Forests. These modified guidelines have been examined and comments are as under:

1. Need for Catchment Area Treatment.

Soil erosion in the catchments is a matter of concern and requires treatment on account of the following:

- Prevent degradation of land
- Increase productivity of land and; also
- improve ecological balance between land, water and the plant and the animal life in the area.

The actual hydrographic surveys conducted at various major/medium reservoirs in the country during the last 30 years and the evaluation studies carried out so far indicate that though these measures are useful over the Small Watersheds, for large catchments, the land treatment measures carried out over a limited area do not help either in reducing the silt flowing into the rivers in any significant way or in moderating the peaks of the flood in the major rivers.

2. Process Analysis:

The process of soil erosion, its transportation and quantum of sediment reaching finally into the reservoir does not get significantly altered whether reservoir is constructed or not.

3. Experimental and research results:

A. Findings from India:

In order to determine the effectiveness of Soil Conservation Measures under the Centrally Sponsored Schemes, the rate of sedimentation of various reservoirs based on actual hydrographic surveys was studied by CWC and results are indicated at Annexure I.

The following observations are made in respect of 9 catchments of major reservoirs covered by the Centrally Sponsored Schemes:

- The rate of sedimentation in the 4 reservoirs viz. Ukai, Pong,

Nirakud and Bhakra has shown an upward trend even after 15 to 26 years of soil conservation measures in their catchments covering 2.79% total area at a cost of Rs. 52.16 Crores.

- The rate of sedimentation in the 5 reservoir viz. Nizamagar, Panchet, Maithan, Tungabhadra & Matatilla has shown downward trend. The total area treated is 6.79% of the catchment area at a cost of Rs. 66.68 Crores.

There is no effective monitoring system as well as reliable data available to evaluate quantitatively:

- i. Reduction in silt entry into the reservoir.
- ii. Availability of additional surface water; and
- iii. Recharge potential of groundwater on account of soil conservation measures in the catchments.

The studies carried out by Ministry of Agriculture to prove their effectiveness is mostly based on data collected from selected small watersheds (2,000 to 4,000 Ha.) and applied to the entire catchments. Moreover, the sediment monitoring stations are not well maintained so as to give reliable and sufficient data to arrive at any firm conclusion. The evaluation studies carried out by Administrative Staff College, Hyderabad (in respect of Machkund-Sileru and Pochampad catchments) and Agricultural Finance Corporation Ltd. Bombay (in respect of Nizamagar, Ukai and Matatilla) also support the above view point. Please see Annexure II.

Further, table 1 of the modified guidelines indicate that in spite of substantial percentage (45 to 60%) of the priority watershed area having been treated, the silt production rate (SPR) in Gandhisagar and Mayurakshi has increased by 56% and 22% respectively.

Thus, there is no conclusive evidence to show that the soil conservation measures carried out over a limited area of the catchments reduce the siltation rate in reservoirs.

B. International Findings:

The modified guidelines refer to the studies carried out in China for Guanting reservoir and U.S.A. for Lake Issaquena regarding reduction in run-offs and sediment yield on account of soil conservation measures in their catchment.

However, studies carried out recently by G.B. Pant University, Pantnagar and I.I.T. Delhi for Ronganga catchment indicate that soil conservation measures do not show any reduction in the peak flood flow and sediment yield.

Thus it is debatable whether international findings could be made applicable to Indian catchments.

4. Impact of deforestation on Sedimentation:

The deforestation in the catchments is not a consequence of reservoir construction, except to a negligible extent.

5. Impact of afforestation in catchment on flood moderation:

As mentioned at Para 3 (B), the Ronganga studies have clearly indicated that the soil conservation (including afforestation) have no effect in moderating peak flood flow.

6. Dead Storage and Design alternative to solve problems of Reservoir Sedimentation.

Silting of reservoir is a natural phenomenon. Silting takes place not only in dead storage but also in the live storage of the reservoir. This aspect is well taken care of in the design of reservoir so that desired benefits are achieved during the planned life of the reservoir.

As far as silting of reservoir is concerned, the soil conservation measures in the catchments of the ~~project~~ reservoirs except the area directly damaged due to construction of the project are not considered necessary in view of delayed impact and huge cost of catchment treatment.

7. Identification and prioritisation of areas needing treatment.

This has already been dealt with in the draft Guidelines prepared by Ministry of Water Resources.

8. Catchment Area Treatment Measures.

The position has already been made clear in the draft Guidelines prepared by Ministry of Water Resources. There are no two opinions that the areas falling under categories 'very high' and 'high' should be taken up for treatment. However, the share of cost for the free draining sub watershed and directly draining sub-watersheds into the reservoirs should be in accordance with Para.VI of the draft guidelines of Ministry of Water Resources. Similarly, the schedule of construction should be in accordance with para VIII "Package of Actions" of draft guidelines.

9. Cost of Catchment Area Treatment and Implementing Agencies:

(a). The MWR does not subscribe to the idea that the entire cost of soil conservation measures in the catchment areas should be charged to the River Valley Projects directly. As per the existing recommendations of the Planning Commission, the River Valley Projects should only make good the damages caused due to the construction of the project. However, in order to improve the environment and aesthetics around the reservoir periphery, the directly draining watersheds can also be treated at the cost of the Project. This should also be the guiding principle for Basin Management Authorities as and when established.

(b). Till the benefits of CAT particularly for Reservoirs are established, the cost of CAT as proposed by Ministry of Environment & Forest may be initially borne by Centrally Sponsored Schemes and subsequently depending on the extent of benefit accrued to the project, the proportionate cost of CAT may be charged to the Project.

(c) Any benefit accrued to the project in the form of volumetric content of silt reduction over the period of life of the project may be worked out as a %age of the total storage cost and this can be charged to the Project.

...

STATEMENT SHOWING RATE OF SEDIMENTATION OF VARIOUS RESERVOIRS
AND AREA TREATED UNDER CENTRALLY SPONSORED SCHEME.

ANNEXURE I.

Sl. No.	Name of Reservoir (Year of Impounding)	Catchment area (sq. km.)	Priority area (sq. km.)	% w.r.t. C.A.	Treated area (sq. km.) (upto 87-'88)	% w.r.t. C.A.	% area (treated) w.r.t. priority area.	Cost of treatment (Rs. Crores)	Year when Soil conservation started.	Silt rate in Ha.m./ 100 sq. km./year		Cost of project (Rs. Crores)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Nizam sagar (1930)	2169	320	14.75	44.60	2.05	13.93	4.145 (87-88)	1969	5.46 (1967)	4.298 (1975)	4.57	
2.	Panchat (1933)									12.13 (1962)	3.36 (1985)		
3.	Mailthani (1955)	1819	1204	55.20	277.22 (85-86)	15.24	27.613	42.833	1961	12.53 (1963)	9.056 (1979)	38.52	
4.	Tungabhadra (1953)	2828	851	30.45	200.05	7.07	23.23	11.098	1961	17.90 (1963)	9.16 (1985)	136.28	
5.	Matatila (1956)	2106	826	39.22	84.2	4	10.19	8.602	1969	11.82 (1982)	5.286 (1984)	12.52	
6.	Ukai (1972)	6240	605	9.70	66.3	1.06	10.96	6.746	1967	6.20 (1979)	8.90 (1984)	136.00	
7.	Pong (1974)	1251	452	36.10	22.3	1.78	4.53	6.02	1969	22.707 (1980)	39.121 (1986)	325.88	
8.	Mirakud (1957)	8320	2496	3.0	278.36 (85-86)	3.34	11.185	22.124	1961	5.568 (1979)	10.034 (1983)	69.32	
9.	Bhakra (1958)	1820	253	13.9	125.1	6.87	49.44	17.271	1951	6.287 (1963)	6.523 (1987)	49.44	

MATAZILA EVALUATION REPORT

Suggestions and Recommendations have been given throughout the Report for the various objectives. The one on organisation and other major ones are highlighted in this chapter.

(1) Make Soil Conservation an Integral Part of every River Valley Project: No River Valley Project should be sanctioned unless detailed plans and benefit cost ratios have been prepared and money found for all of the following three essential parts of the scheme:

- (a) dam and other major engineering works,
- (b) soil conservation in the catchment area, and
- (c) water management below the dam

The River Valley Projects should be sanctioned in an integrated way for all the above three components.

(2) Complete Catchment Conservation of Priority Areas within 7 years and total Soil Conservation within 15 years: There is no need to do soil conservation in the catchment area when the dam is already half silted up. Priority Area Determination methods should be improved by introducing hydrology and sedimentation data and mathematical modelling. All priority areas must be treated within 7 years and the total work in each catchment must be completed within 15 years. If this pace cannot be kept up due to constraints of money and men, it is better to delay building of a big dam rather than risk siltation of the reservoir, destruction of the site and depriving even the next

generation to do a better job of the whole dam building and soil conservation activities. Instead thousands of small dams can be built in such a situation.

(4) Improve Collection of Hydrology and Sedimentation Data: Reservoir Capacity Surveys should be done at least every alternate year. Siltation measurement studies should also be undertaken for tanks and other small dams.

UKAI EVALUATION REPORT

3.37 The two years data of one gauged small watershed (1345 ha) shows that when the treatment progressed from 142 ha in the first year to 292 ha in the second year, the silt production rate came down from 0.21 to 0.14 ton/100 sq km/year, i.e., a reduction of 33.3%. The data is, however, of a very small period and no firm conclusion can be based on it.

Protection of water Resources created in Ukai Reservoir

4.55 Out of the watersheds being treated under soil conservation programmes, no watershed is being gauged in the Ukai Catchment for any significant length of time. However, during the reduction of sediment production by a similar treatment in the catchment of Matatila the protection of water resources into Ukai catchment works out to Rs. 80 per ha/year. The cost of storage in the reservoir is Rs. 1,597 per ha at 1972 price level which is equivalent to Rs. 7,790 per ha at 1986 price level.

MACHKUND SILERU & PUCHAMPAD EVALUATION REPORT

(vi) Five silt monitoring stations were established in the catchment, three in 1980 two in 1983. They were located in close proximity, sometimes two stations in one watershed having similar physiography, land-use pattern, etc.

The data available are for a short period and do not provide any indication on the impact of the RVP programmes on reduction of silt out flow. The data are collected casually as could be seen in the high fluctuations in the SPR values.

There is need to spread out these silt monitoring station in the catchment to represent different conditions. Further, the staff involved in the collection of the data need to be trained properly so that they can gather the data more accurately.

NIZAM SAGAR EVALUATION REPORT

Conclusions

3.29 Soil conservation reduces sedimentation rates. This has been proved from the data. In the small watersheds the results are also showing the same trend that when 30 to 40% of the area has been treated, sediment curve starts coming down. However, the gauging station data need to be improved. The water discharge figures are so low that some rechecking appears to be indicated. The sediment figures are also too low. Methods of measurement, procedures, inspection and monitoring and evaluation all need to be brought up to a higher standard. More studies are needed to establish methods of determining the consolidation factor in the reservoir sediments. A State level Hydrology and Sedimentation Unit is required for more accurate and reliable gauging of watersheds. Even in the sedimentation surveys of the main dam, soil conservation organisation should be consulted since they also have to use the results. The hydrographic surveys should be done more frequently, at least once in 2 years. The pace of work needs to be accelerated so as to complete the whole catchment within the next 10 years.

MACHKUND SILERU & PUCHAMPAD EVALUATION REPORT

(iii) There are 10 silt monitoring stations, five in each of the two states. In Andhra Pradesh four out of five stations were located in the watersheds not included in the priority zone and no soil conservation works were carried out in these watersheds from 1974 onwards. Only in one watershed works were continued and data of the monitoring station located in this watershed indicate a declining trend in the annual silt loss and the SPR value.

In Orissa, in the watersheds where the five silt monitoring stations were established, substantial areas were covered by soil conservation measures. However, the data are erratic and do not provide any conclusion. Further, the data appear to have been collected casually. This is evident by the fact that run-off in certain years is more than the rainfall. The data of each year have to be analysed so that timely corrective steps can be taken.

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Physical Quantity in Thousand Ha.
Financial in Lakhs Rupees

YEAR-WISE PHYSICAL AND FINANCIAL PROGRAMME OF COMMAND AREA DEVELOPMENT

S.No.	Description of work	Phase of Const.	VIII th Plan				IX th Plan				X th Plan				XI th Plan				Total										
			1993-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000-01	01-02	02-03	03-04	04-05	05-06	05-07	P	F											
			Phy	Fin	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F									
1.	On Farm Development-Surveys	I	3	3	5	4	10	8	10	8	8	7	-	-	-	-	-	-	-	36	30								
		II	-	-	-	-	2	2	2	2	4	3	8	7	8	7	9	7	8	7	47	40							
		III	-	-	-	-	-	-	-	-	-	-	-	-	2	2	4	3	12	9	40	30							
	Total		3	3	5	4	12	10	12	10	12	10	8	7	8	7	9	7	10	9	123	100							
2.	On Farm Development-Construction	I	1	10	2	30	5	100	5	100	5	100	5	100	3	60	-	-	-	-	36	700							
		II	-	-	-	-	2	30	2	30	5	100	6	100	6	120	6	120	6	120	47	900							
		III	-	-	-	-	-	-	-	-	-	-	-	-	2	40	5	100	5	100	40	800							
	Total		1	10	2	30	7	130	7	130	10	200	11	200	11	220	11	220	11	220	123	2400							
3.	Constructive use Development-deep/shallow tube wells		-	-	-	-	-	-	-	5	50	5	50	10	100	10	100	15	150	20	200	20	200	20	200	8	50	173	1200
4.	Development of other Amenities																												
	a) Agro Industries		-	-	-	-	-	-	-	20	50	40	100	40	100	23	50	-	-	-	-	-	-	-	-	-	-	-	300
	b) Regulated market		-	-	-	-	-	-	-	20	30	40	70	40	70	23	30	-	-	-	-	-	-	-	-	-	-	-	200
	c) Ware Housing		-	-	-	-	-	-	-	20	30	40	70	40	70	23	30	-	-	-	-	-	-	-	-	-	-	-	200
	d) Roads		-	-	-	-	-	-	-	20	100	40	200	40	200	23	100	-	-	-	-	-	-	-	-	-	-	-	600
	Total			13	34	140	140	470	697	767	537	729	378	429	409	407	250	123	5000										

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नर्मदा नियंत्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

पर्यावरण उपदल
Environment Sub-Group

दसवीं बैठक की कार्यसूची
Agenda for Tenth Meeting

स्थान : पर्यावरण भवन, नई दिल्ली
Venue : Paryavaran Bhawan, New Delhi

दिनांक : 31 जनवरी, 1991, 10 बजे प्रातः
Date : 31st Jan., 1991, 10 A. M.

नई दिल्ली
जनवरी, 1991

New Delhi
January, 1991

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ANNEXES

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ITEM NO.X-2(58) - CONSIDERATION OF POLICY ISSUES

The minutes of the 9th meeting of Environment Sub-group of Narmada Control Authority were circulated to all members and invitees vide letter No. D-34(9)/90 dated the 13th October, 1990.

No comments have been received from any member. As such the circulated minutes of the 9th meeting of Environment Sub-group may be confirmed.

Subject: Consideration of Policy Issues

An additional Agenda Item covering the following policy issues needs to be added before Item No.X-2(58):

(A) Catchment Area Treatment and its Cost Sharing:

Optimisation of land and water resources calls for effective Catchment Area Treatment and Command Area Development along with the construction of engineering works. Therefore, the treatment of critically degraded catchment area to be completed before impoundment commences is a must. The project authorities were, therefore, to evolve necessary Catchment Area Treatment plans so that the same could be completed by 1994-95 when Sardar Sarovar Project is likely to be completed. Two main issues needed to be resolved are:

- Extent of catchment area to be treated on project cost; and
- Cost sharing of the Catchment Area Treatment by a number of projects likely to be taken up in the basin starting with Sardar Sarovar, Onkeshwar, Maheshwar and Narmada Sagar Projects.

The Ministry of Water Resources had taken the responsibility of preparing a base paper by July, 1989 so that these issues could be sorted out. The draft paper prepared by Ministry of Water Resources was circulated in May, 1990 and was discussed by the Environment Sub Group in its 8th meeting on 14th May, 1990. The matter was further discussed with Secretary (Water Resources) and Chairman,

Central Water Commission, on 25th May, 1990. The issues, however, still remain unresolved. The papers prepared both by the Ministry of Water Resources as well as the Ministry of Environment & Forests could be reviewed by the Working Group and if found necessary, referred to a Committee of Experts so that a common paper could be evolved.

(B) Extension of time for Environmental and Forestry approvals

The Ministry of Environment & Forests had accorded Environmental and Forestry approvals in 1987 subject to the condition that necessary plans would be available and submitted by 1989. Requisite Environmental Action Plans have not been forthcoming and the Ministry of Water Resources has been informed repeatedly since the end of 1989.

The Review Committee comprising of the Union Minister of Water Resources, Environment & Forests and the State Chief Ministers of Madhya Pradesh, Gujarat, Rajasthan and Maharashtra were apprised of this issue in the meeting held in September, 1990 at Bombay and the Committee of Ministers had directed that the Narmada Control Authority should approach the Ministry of Environment & Forests on behalf of the four representing States to seek extension. No proposal has yet been received.

ITEM NO.X- 3(59) - PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENT ACTION PLANS

The latest status report of studies and activities regarding environmental aspects of NSP and SSP is given in Annex-X-1. The progress/present position of the following aspects need review by the Sub-group.

NARMADA SAGAR PROJECT

GOVERNMENT OF MADHYA PRADESH

Phased Catchment Area Treatment

- Prioritisation survey and preparation of action plans for Phase-I and II.
- Financial and Physical targets of the pilot studies by Agricultural Finance Corporation.

Compensatory Afforestation

- Final targets, details of afforestation etc.

Command Area Development

- Physical and financial programme.

Flora and Fauna

- Studies made by Indian Institute of Wildlife, Dehradun.

Archaeological & Anthropological Survey

- Survey by Archaeological Survey of India in 167 villages of Khandwa and Harsud.

Carrying Capacity

- Studies by Indian Institute of Wildlife and Friends of Nature Society..

Seismicity & Rim Stability

- Financial offer for seismological instruments by M/s Sprengnether - Latest position.

Health Aspects

- Revised action plans for health and water quality aspects.

Fisheries Development

- Quarterly report of the studies made by three Universities.
- Short Term & Long Term studies by CICFRI.

SARDAR SAROVAR PROJECT

PHASED CATCHMENT AREA TREATMENT

GOMP

- Action plan for each water shed, based on final report of GSIT&S - Type of treatment and physical and financial targets of the pilot project in the watershed on river Mann.

GOG

- Progress of treatment work compared to targets.

GOM

- Finalisation of prioritisation; preparation of action plan for catchment area treatment.

NCA

- NCA had prepared a note for evolving a general policy on extent of catchment treatment to be done for river valley projects and submitted to MOWR on 19.10.1990.

The present position may be intimated by the MOWR.

COMPENSATORY AFFORESTATION

GOMP

- Plan of afforestation and clear felling.

GOM

- Identification of non-forest land in lieu of 2,700 ha released for R&R.

COMMAND AREA DEVELOPMENT

GOG

- Action plan giving physical and financial targets for studies and implementation.

FLORA AND FAUNA

GOMP

- Quarterly progress report of SFRI, Jabalpur.

GOG

- Inception and Interim reports submitted by MS Universities, recommendations of the workshops organised by Govt. of Gujarat.

GOM

- Finalisation of proposals for studies by Pune University

ARCHAEOLOGICAL AND ANTHROPOLOGICAL

GOMP

- Physical and financial targets for shifting of monuments by ASI. Compilation of data of significance from the records of Rashtriva Manava Sangrahalaya and preparation of report.

GOG

- Mode of relocation of the temples and time-frame.

CARRYING CAPACITY

GOMP

- Studies by SFRI, Jabalpur.

GOG

- Interim report of the MS University.

SEISMICITY & RIM STABILITY

GOMP

- Target for studies by GSI.

GOG

- Setting up of Seismic instruments by Govt. of Gujarat.

GOM

- Studies by Geological Survey of India.

HEALTH ASPECTS

GOG

- Action plan and recommendations for prevention of Malaria.
- Revised action plan of public health.

FISHERIES DEVELOPMENT

GOG

- Report on preimpoundment survey to be furnished to Sub-group. Study of migrating nature of Fish by CICFRI.
- Establishment of observation centre near Dhule by Dr. K.S. Rao.

GOM

- Proposal for formulations of plan for fisheries development.

NCA

- NCA has commissioned a study by CICFRI, Barrackpore for possible fisheries development in the entire Narmada

(basin below Bargi reservoir and upto the confluence of the Narmada in the Arabian Sea. The report is expected by March, 1991.

ITEM NO. X-4(60) - TIME-FRAME FOR PREPARATION OF ACTION PLAN
AND IMPLEMENTATION OF ENVIRONMENT SAFEGUARD
MEASURES

In the last meeting, it was suggested that the pace of studies and implementation of action plans has to be expedited or the schedule of engineering works has to be modified. Chairman of the Sub-group desired that the participating states should be directed to submit at the earliest the following.

- i) Revised and final time-frame for completion of environmental studies/surveys which will be the basis of detailed action plans.
- ii) Final time targets for formulation and implementation of environmental action plans.
- iii) Revised construction schedule to make it pari-passu with implementation of environmental safeguard measures.

NCA on 29.10.1990 had requested the participating states to furnish the above information urgently so that the Min. of Environment & Forest can be apprised of the position. Details are awaited from the State Governments.

Review.

ITEM NO.X- 5(61) - CONSIDERATION OF TOR & MOU OF THE STUDIES COMMISSIONED BY THE STATE GOVERNMENTS

Copies of the following TORs & MOU settled with different agencies by State Govts. have already been sent to the Members of the Sub-group vide letter No. D-34(10)/90/382 dated 3.12.190 and letter No. D-34(10)/90/494 dated 19.12.1990.

GOVERNMENT OF GUJARAT

1. Eco-environmental and wildlife management studies on the Sardar Sarovar submergence area in Gujarat.
2. Wildlife Management study for Sardar Sarovar submergence area.
3. Pre-feasibility level drainage study for SSP command beyond river Mahi.
4. Mathematical Modelling of ground water system for area beyond river Banas upto Rajasthan border in Narmada command area.
5. Mathematical modelling of ground water system for the area between rivers Sabarmati & Banas in Narmada command area.
6. Mathematical modelling of ground water system for the area between rivers Shedhi and Sabarmati in SSP command area.
7. A study on survey and investigation work of ground water resources beyond river Mahi in SSP command.

GOVERNMENT OF MADHYA PRADESH

8. MOU with Wildlife Institute of India, Dehradun for floral, faunal and carrying capacity studies of Narmada Sagar and Omkareshwar Project.
9. MOU with State Forest Research Institute, Jabalpur for floral, faunal and carrying capacity studies of SSP.
10. MOU with MP Rajya Van Vikas Nigam Ltd., Bhopal for Compensatory Afforestation work of SSP.
11. Memorandum of Understanding between the Narmada Valley Development Authority acting on behalf of Governor of Madhya Pradesh and the Gandhi Medical College, Bhopal for study on health aspects in project impact area of SSP and NSP through epidemiological surveillance system.

Members may suggest any essential modification, if necessary.

ITEM NO.X-6(62) - SETTING UP OF AN ENVIRONMENTAL DEVELOPMENT
CENTRE (EDC)

The issue was discussed in the last meeting and it was decided to form a Sub-committee consisting of Shri D.C. Debnath, Executive Member, NCA, Shri Shekhar Singh (IIPA), Dr. Maudgal, Adviser, MOE&F, Prof. Ramaseshan and Shri K.M. Joseph, Member (Civil), NCA to examine in depth the various aspects and finalise the modalities for setting up a centre.

The Sub-group met on 7.11.1990 at New Delhi for finalisation of the proposal. The issue was discussed in detail and it was suggested to have an Environmental Development Centre at Indore. In the meantime, MOWR also desired to form a high level advisory committee under the Chairmanship of Member (WP), CWC as Chairman with the representatives of various Institutions and experts from different fields as Members. As the notification from the MOWR, constituting the Advisory Committee was not published by 7.11.1990, the Sub-committee extended invitation to all members proposed in the Advisory committee to meet on 23.11.1990. The meeting of the extended committee was held on 23rd November, 1990 in Faryavaran Bhawan, New Delhi under the Chairmanship of Shri D.C. Debnath, Executive Member, NCA. After detailed discussions a draft proposal on setting up of an Environmental Development Cell at Indore was framed. This is given in Annex-X-2. NEERI, Nagpur was to be requested to provide details by 31st December, 1990.

World Bank has been given a preliminary reply as they asked for a reply by 30th November. 1990. They are sending some expert again to finalise the scheme. It is brought to the notice of NCA for guidance, if any.

ANY OTHER ITEM

DATE AND VENUE OF NEXT MEETING

ANNEXES

Annex. X-1

**STATUS REPORT OF STUDIES AND ACTIVITIES
REGARDING THE ENVIRONMENTAL ASPECTS OF
BARDAR SAROVAR PROJECT (SSP)
DECEMBER, 1990.**

At the time of environmental clearance of SSP in June, 1987, the Ministry of Environment and Forests stipulated certain conditions for implementation of environmental safeguard measures alongwith the construction of engineering works under the project. Before implementation of these measures, studies were to be carried out by the participating States of Gujarat, Maharashtra and Madhya Pradesh on the various environmental aspects and action plans were to be prepared and submitted to the Ministry of E&F before actual implementation. Similarly, at the time of signing of the agreement with the World Bank by the participating States and the Government of India, the Bank also stipulated that a work plan for the environmental effects, anticipated regarding implementation of the project, would include suitable training programmes for responsible staff of the participating States, including plans, schedules, syllabi and provision of funds, and studies and implementation therefore covering fish and fisheries, forest and wildlife and public health aspects and thereafter the participating States should implement the approved work plan and training programme.

2. The present status of studies/preparation of action plans and implementation, in respect of environmental safeguard measures is indicated in the succeeding paragraphs in respect of following environmental concerns :

- (1) Phased Catchment Treatment.
- (2) Compensatory Afforestation.
- (3) Command Area Development.
- (4) Archaeological & Anthropological Studies.
- (5) Flora and Fauna.
- (6) Carrying capacity of surrounding areas.
- (7) Seismicity and Rim Stability of Reservoir.
- (8) Health Aspects.
- (9) Fisheries.

3. Phased Catchment Area Treatment

GOMP

The total catchment area of SSP in Madhya Pradesh is 24.294 sq.km. The free draining catchment area of SSP for drawing up of the watershed mangement plan works out to 22,700 Sq.Km. after allowing the catchment areas of the Mann and Jobat projects. The entire area below NSP was divided into 8 watersheds and 69 sub-watersheds. The Govindram

Seksaria Institute of Technology and Science, Indore was engaged as consultant to survey the catchment area below NSP. The Institute has worked in collaboration with the All India Soil & Land Use Survey Organisation (AIS&LUSO), New Delhi, the Space Application Centre, Ahmedabad and the M.P. State Agriculture Department. The draft report prepared by GSIT&S has been received in the NVDA and the comments had been sent by them. The final report is expected shortly.

As per the draft report of GSIT&S, 1,99,062 ha. (8.2%) area of the SSP catchment is found to be under "Very High" category of silt yield index (SYi), 4,86,874 HA. (20.1%) under "High" category, 8,31,873 ha (34.2%) under "Medium" category, 6,24,375 ha (25.7%) under "Low" category and 2,87,188 ha (11.8%) under, "Very Low" category.

The State has also undertaken the preparation and implementation of a pilot project in about 10,000 ha. area in the watershed of river Mann, a tributary of the Narmada in the Lower Narmada Zone. The works envisaged under the pilot project are expected to be completed by 1994.

GOM

A preliminary report prepared by GSIT&S has been received on 12th March, 1990 by GOM. The catchment area treatment plan can be prepared only after the prioritisation area maps are received from the AIS&LUSO, New Delhi which is expected very shortly. Agriculture Department is fully prepared in terms of Staff and Machinery to deal with this work.

GOG

A work plan following the recommendation of Dewan Committee was prepared and submitted in 1986. The Catchment Area of Sardar Sarovar lying in Gujarat is 423 Sq.Km. (42,300 ha.). The Catchment Area Treatment measures have been planned separately for forest area and non-forest area. The area requiring treatment is as under :

Forest Area	27,204 ha.
Non-forest Area	5,483 ha.

Present status of works in Gujarat

1. Planning of Treatment

Catchment Treatment in forest areas is being executed by the State Forest Department and in the non-forest areas by the State Agriculture Department. The progress of planning is as below :

a) Forest Area

- i) Stock mapping survey has been completed and afforestation programme has been revised for the entire forest area envisaging completion before 1994 monsoons when the initial submergence takes place.
- ii) A nursery has been set up.

b) Non-Forest Area

The following measures are contemplated in the work plan :

- i) Survey and Planning 6,686 ha.
- ii) Contour and bunding 1,692 ha.
- iii) Terracing 1,044 ha.
- iv) Land Shaping 394 ha.
- v) Nala Plugging (in Nos.) 100 no.
- vi) Pasture Development 355 ha.
- vii) Afforestation/Reclamation 2,933 ha.

2. Implementation

a) Treatment in forest area

Revised schedule and up-dated progress is given below:

Category-wise Target

Year	A	B	C	Total
	Area with forest density less than 0.4	Area with forest density between 0.4 to 0.6	Area with forest density between 0.6	
	ha.	ha.	ha.	ha.
Work completed upto 1990 plantation season	1838	2030	660	4528

Year	A	B	C	Total
	Area with forest density less than 0.4	Area with forest density between 0.4 to 0.6	Area with forest density between 0.6	
	ha.	ha.	ha.	ha.
1991-92	3000	2500	500	6000
1992-93	3000	2500	500	6000
1993-94	3000	2500	500	6000
1994-95	1800	2392	484	4676
Total	12638	11922	2644	27204

b) Treatment of Non-forest area

The Methodology of implementation essentially follows the guidelines issued by AIS&LUSO. The plan is phased for completion in 5 years. The progress achieved is as under :

Contour bunding	177 ha.
Terracing	162 ha.

After reclassification of the forest areas, the non-forest area needing treatment measures will get reduced to 3,025 ha.

Extent of Area and Cost

According to the guidelines of the Ministry of Water Resources, only "Very High" and "High" categories of the catchment directly draining into the reservoir need to be treated. On the basis of the preliminary assessment made by AIS&LUSO, this area has been estimated as 1,10,000 ha. Including the cost of treatment of about 1,000 ha. that will be affected by the project works, the total cost of catchment area treatment has been estimated as Rs. 45.0 crores. A final decision on the extent and scope of the treatment and the mode of sharing of cost is to be taken.

4. Compensatory Afforestation

GOMP

The State Forest Department has already submitted to the Ministry of E&F in January, 1989 the action plan of compensatory afforestation for 8,737 ha. covering 6,547 ha. of forest land and 2,190 ha. of non-forest land. The NVDA is going ahead with the implementation of the plan. The organisational set up to undertake the work has already been finalised. The work of compensatory afforestation in District Dhar and Jhabua has been assigned to Madhya Pradesh Rajaya Van Vikas Nigam Ltd., Bhopal (MPRVVN). MOU has been finalised with the MPRVVN and they have started nursery work for raising stock for afforestation. The compensatory afforestation work in non-forest and degraded forest land identified in Khargone district has been entrusted to the Divisional Forest Officer (NVDA), Kavery Forest Division. This Division has already planted 245 ha. of non-forest land. Thus, against the total of 1,195 ha. of non-forest area in Khargone District, 254 ha. has been completed by July, 1989 and 471 ha. during the rainy season of 1990. It was expected that the remaining 475 ha. of non-forest land would also be taken over from the Revenue Department by the end of June, 1990. Divisional Forest Officer, Kavery is preparing the detailed plan for reafforestation of 2,390 ha. of degraded forest area for completion by end of December, 1990. The field work would commence from 1991 rainy season @ of 500 ha. per year for completion by 1996.

GOM

The total area to be put under compensatory afforestation scheme would be 19,205 ha. of which 6,205 ha. is non-forest land and the remaining is degraded forest land. The State Forest Department has taken over possession of non-forest land from Revenue Department in Akrani Tehsil. A detailed Compensatory Afforestation Scheme has already been prepared and submitted to the MOE&F, Government of India on 14.5.1990 for their concurrence. It is proposed to plant 3,600 ha. of land every year for 5 years w.e.f. 1990-91 and in the 6th year 1,000 ha. will be planted. In addition to the above areas, Compensatory Afforestation is also required to be undertaken in 2,700 ha. of non-forest land, in lieu of the forest land at Taloda, released for R&R works. In Nasik Revenue Division an area of 2,000 ha. of non-forest land has been identified and further work on identification of available non-forest is in progress and is scheduled for discussion in the Commissioner's conference to be held in January, 1991.

GOE

- (a) A work plan, prepared and submitted to Government of India is under implementation. Government of India permitted diversion of 4,523 ha. of forest land going under submergence. Compensatory Afforestation has been planned in 4650 ha. of non-forest land in 9 villages of Kutch District. Implementation is spread over a period of three years from 1987-88 including advanced preparatory work.
- (b) The present progress is as under :
- i) Plantation has been completed in 1,100 ha. by September, 1989 and another 1,100 ha. during monsoon of 1990.
 - ii) A total number of 27,50,000 saplings have been raised in plantations. Tree species planted are of mixed type with emphasis on locally adaptable trees, at the same time ensuring utility from the point of view of shade, forage, fuel wood, food, medicines, minor forest produce like gum and honey.

Additional Activities(a) Dam Vicinity Plantation

Afforestation Programme in the Dam vicinity has been planned in 235 ha. Out of this, rainfed plantation has been done over 30 ha. and irrigated plantation in 5 ha. Further work is in progress.

(b) Forest Plantation

SSNNL has also decided to take up a model forest plantation programme in Gandhinagar District. An area of 500 ha. of ravine lands on the left bank of the Sabarmati has been identified for the purpose.

(c) Additional Plantation in Non-Forest Areas.

In addition to Compensatory Afforestation planned over an area of 4650 ha. SSNNL in October, 1989 decided to carry out afforestation in an additional area of 1,088 ha. of non-forest land in Kutch District. Lands have already been released.

5. Command Area Development

GOG

Soil surveys and ground water studies as well as drainage studies have been completed in the command area upto Mahi river crossing. Services of 6 consultants have been engaged for carrying out studies beyond Mahi crossing.

6. Archaeological & Anthropological Studies

GOMP

Archaeological Survey

The State Archaeological Department was entrusted with the survey work for cataloguing the artifacts, monuments etc. The Archaeological Survey of India (ASI) would be responsible for shifting the protected monuments coming under submergence in SSP. In Madhya Pradesh, 193 villages are affected by the SSP. Commissioner, Archaeology & Museum has completed the survey of 75 villages so far. Relocation of monuments according to submergence schedule will be formulated after completing the survey.

Certain monuments which have to be shifted have been identified and adequate funds have been provided to Archaeological Survey of India for this part. Time frame for completion of the work is to be furnished by GOMP. GOMP has proposed to create a museum to house the artifacts which are found in the valley.

Anthropological Survey

Since Rashtriya Manav Sangrahalaya has already generated immense data of socio-anthropological significance, no separate study is required.

GOG

From the list of the protected monuments obtained from Directorate of Archaeology it is seen that no protected monuments are located in submergence area of SSP in Gujarat. However, the Director of Archaeology of GOG has undertaken an inventory survey of 19 villages coming under submergence of SSP in Gujarat. According to the survey report, temple known as Shoolpaneshwar Mahadev at the village surpan Taluka Nanded of Bharuch District and surrounding temple known as Kamleshwar Rajeshwar and Ranchobji and Hamfeshwar Mahadev temple at village Hamf Tal. Chhotaudepur of Vadodara District are important monuments and they should be shifted at suitable places nearby.

GOG has already taken steps to relocate two temples viz Shoolpaneshwar & Hamfeshwar at higher elevation at the project cost. The sites have been finalised to relocate the Shoolpaneshwar and Hamfeshwar Temple as per the wishes of the trustees. There is also another temple at Dhumana which will also be shifted similarly at the cost of the project.

7. Flora and Fauna Studies:

GOMP

The study has been entrusted to the State Forest Research Institute, Jabalpur, which would carry it out in collaboration with the University of Sagar and the Rani Durgawati University, Jabalpur. in about 3 three years.

GOM

Pune University under the supervision of Environmental Department is to carry out the work. Estimate and scheme given by that University is scrutinised and accepted by the forest, irrigation and environment departments but is pending with Finance/Planning Departments. of the Government of Maharashtra. The terms of reference have not been finalised yet. The work will commence on finalisation of TOR, and it is presumed that the work will be completed within a period of 24 months.

GOG

This study for the SSP submergence area in Gujarat has been entrusted to M.S. University, Vadodara and is planned to be completed in 2 years from 1989-90. An inception report and an interim report-I (Nov.15, 1989-June 15,1990) have been furnished by the University study team and have also been discussed in two workshops convened by GOG.

8. Carrying Capacity of Surrounding Areas

GOMP

The State Forest Research Institute, Jabalpur has commenced these studies in April, 1990 and it will take three years for its completion.

GOM

Pune University will take up this work as a part of their studies for Flora and Fauna. It is also proposed to get the area of 2,700 ha. of the forest land, released by the MOE&F recently, surveyed by the University which is likely to take 2 years time.

GOG

As a part of the flora and fauna studies in the submergence area of SSP in Gujarat entrusted to MS University, Vadodara, phytosociological studies will be conducted in the adjoining forest, which will help in determining the carrying capacity, of forest with a view of assessing impacts of inevitable wild life transfer following the project implementation. Also the measures needed to release the pressure on the carrying capacity of adjoining forest will be suggested.

Wildlife Conservation Measures

The area of the Sloth Bear Sanctuary, (called Dumkhal Sloth Bear Sanctuary), has been enlarged from 151 Sq.km. to 448 Sq.Km. and the extended limits reach upto the shoreline of the reservoir. This will ensure free access to waterfront for the animals. Providing stone wall fencing and other conservation measures such as check dams, habitat improvement measures and firelines have been undertaken in the enlarged Shoolpaneshwar Wildlife Sanctuary to foster the flora and fauna of the area for completion in 5 years.

Besides this sanctuary adjoining the reservoir area, the following three sancturies are located in the command area of the project.

1. Nal Sarovar - A sweet water lake famous for attracting 120 to 150 species of migratory birds from far off lands.
2. Wild Ass Sanctuary in the Rann of Kutch.
3. Black Buck Sanctuary at Velavadar.

These sancturies would also benefit from availability of copious sweet water in the command area. The State Forest Department has been working out the engineering infrastructural facilities needed for these sancturies.

9. Seismicity and Rim Stability of Reservoir

Reservoir Induced Seismicity:

GOG have identified locations for installation of seismological instruments at 9 stations. GOG is implementing the programme for setting up of seismic instruments in Madhya Pradesh and Maharashtra also. Instruments have been installed and commissioned at Kevadia, Karjan, Naswadi and Kawat observatories. While observatories at Alirajpur and Barwani are ready for installation, the same are under construction at Sagbara, Shahda and Kukshi.

Reservoir Rim Stability:

Geological Survey of India (Nagpur Division) has already started the work in the areas of Maharashtra and Madhya Pradesh and proposes to complete it in 3 years. GSI has already completed the work in Gujarat state.

10. Health Aspects:

GOMP

The State Director of Health Services has conducted detailed surveys during 1982-84 and according to the data collected, diseases like malaria, guinea worm, goiter, gastro-enteritis and worm infections have been found in the districts falling under the submergence area. Even after the construction of the dam, the incidence of malaria is to be watched and suitable control measures will have to be adopted by the Health Department. The State Director of Health Services has agreed to monitor at intervals the incidence of water borne diseases and NVDA would keep in touch with the Directorate of Health Services to ensure implementation of preventive measures.

GOM

Action plan prepared by Health Department was returned to GOM for modification the revised health plan is under preparation.

GOG

The work plan has been prepared by the State Health Department in respect of:

- 1) Surveillance and control of water related and communicable diseases.

Total implementation will take about 17 years time as and where irrigation under the canal system is developed. The programme also covers the villages on the periphery of reservoir. Two studies relating to schistosomiasis had been carried out in 1985 by the National Institute of communicable diseases and concluded that there is no threat to the people in the project area on account of this.. Subsequently a team led by Chief of Schistosomiasis Division WHO, Scientist from British Council, London and Environment Advisor, World Bank carried out investigations. The analysis revealed that the project area did not have any risk of Schistosomiasis entering the area. The report (work plan) has been furnished to Min. of E&F & World Bank.

ii) Surveillance and Control of Malaria.

The operation of the reservoir itself inhibits the proliferation of malaria larvae. While the reservoir builds up the storage during the monsoon rains, the larvae, which prefer to stay around the periphery, get drowned and thus are destroyed. On the contrary when the water is with drawn for power generation and irrigation the larvae are stranded and destroyed.

11. Fisheries

GOMP

GOMP studies of important aquatic fauna/fishes, especially the migratory species has been included in the Limnological studies being conducted by the three Universities of the State respectively for the Upper Narmada - (Bargi reservoir) - Rani Durgavati University, Jabalpur, Middle Narmada (Tawa, Barna and Kolar reservoirs) - Barkatullah University, Bhopal and Lower Narmada zone - Vikram University, Ujjain (preimpoundment studies on selected revewrine stretches on 10 centres).

All the three Universities have initiated the studies in their respective areas as per MOU. The quarterly report for the quarter ending March, 1990 is expected shortly.

The matter of finalisation of approach paper by the Central Inland Capture Fisheries Research Insitute (CIFRI) is under correspondence and a suitable date will be fixed in consultation with the Director (CIFRI) for finalising the project paper. While finalising the approach paper, the requirements of Govt. of Maharashtra to include the Maharashtra portion of SSP will be kept in view.

GOM

The Director of Fisheries, Maharashtra has requested the Director, Fisheries, Madhya Pradesh to request Central Inland Capture Fisheries Research Institute to take up studies in Maharashtra area also. Since the approach paper with CICFRI has not yet been finalised the aforesaid institute has not been requested to take up studies in Maharashtra area yet. The matter was however discussed with Dr. K.S. Rao, Principal Investigator, Vikrfam University, Ujjain, Dr. K.S. Rao is willing to establish one observation centre in the Maharashtra zone preferably near Dhulia at no extra cost.

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Central Inland Capture Fisheries Research Institute, Barrackpore, Calcutta (Local Office at Vadodara) has undertaken the studies in respect of aquatic life upstream and down stream of Sardar Sarovar in Narmada River in Gujarat State. Report of the first phase of pre-impoundment survey has been received.

The design plans and estimates for the 10 ha Fish Farm and Fish Hatchery complex have been finalized. The plan is to be implemented in 9 years and will include Hydrobiological studies, establishment of Fish Hatchery and fish farm, training of Fishermen, establishing and assisting primary fishermen's cooperatives, establishing and assisting an Inter-state Fisheries Development Board and a Cell at Directorate for monitoring.

Feasibility of fish lift/ladder to enable the migration of the aquatic life across the dam is being explored.

N.C.A.

The Narmada Control Authority has commissioned a study for possible fisheries development in the entire Narmada Basin excluding Bargi reservoir to the confluence of the Narmada in the Arabian Sea including estuarine areas. The Central Inland Capture Fisheries Research Institute, Barrackpore have been assigned the study. Their Status report is expected by January, 1991 and final report by mid March. 1991.

**STATUS REPORT OF STUDIES AND ACTIVITIES REGARDING THE
ENVIRONMENTAL ASPECTS OF NARMADA SABAR PROJECT (NSP)
DECEMBER - 1990**

a) Phased Catchment Area Treatment

The free draining catchment area of the Narmada between Bargi dam and NSP is 47059 sq. km. Prioritisation survey of the catchment was done by involving the Space Application Centre, Ahmedabad, and the AIS&LUS, New Delhi, the State Agricultural Department and the Agricultural wing of the NVDA.

The AIS&LUS has divided the catchment area downstream of the Bargi dam and upto ISP into 9 sub-catchments. These sub-catchments are further divided into watersheds and sub-water sheds. Survey work in all the nine sub-catchments covering an area of 37.10 lakh ha. has been completed. Preparation of maps and reports are in progress with AIS&LUSO and is expected to be completed very shortly.

Based on the Dewan Committee's recommendation of 1985, pilot studies have been entrusted to Agricultural Finance Corporation in two catchments namely Datuni and Godapachar and the treatment is expected to be completed by 1994.

b) Compensatory afforestation

GOMP has identified 10143 ha of non-forest and 70800 ha of degraded forest land in Dewas, Hoshangabad, Harda and Khandwa forest division for compensatory afforestation. 3992 ha of non-forest land has been transferred to the NVDA.

As regards the progress of afforestation work, it may be stated that NVDA has already formed nine compensatory afforestation divisions with headquarters at Hoshangabad (one), Harda (one), Khandwa (four), Dewas (two) & Bhopal (one) and two Conservator Circles for the execution, control and supervision of the work.

The DFOs shall attend to the compensatory plantations/ compensatory afforestation works together with the Catchment Area Treatment works within their territorial jurisdictions. One Conservator and the chief Conservator have already joined NVDA.

Following plantations in non-forest lands have already been raised by the NVDA during 1987 and 1988-89 under Narmada Sudhikaran programme:

1. Limbaditya (near Maheshwar)	- 50 ha
2. Maked Kheda (Opposite Maheshwar)	- 50 ha
3. Hoshangabad	- 10 ha
4. Rudrasagar (near Ujjain)	- 22 ha

Total	132 ha

Afforestation work has been carried out in July, 1989 on 1439 ha of degraded forest land and 527 ha of non-forest land. In July, 1990, afforestation has been done over an area of 9,317 ha. Thus, till end of July, 1990, 11,283 ha has been afforested.

c) Command Area Development

GOMP had submitted command area development plan. The project on completion will provide an annual irrigation of 1.69 lakh ha of cropped area over a net C.C.A. of 1.23 lakh ha. The implementation of the plan would be taken up in three phases covering construction of main canal, distribution and drainage system. The proposal for irrigation in Phase-I, Phase-II Phase-III is to cover an area of 36100 ha, 46800 ha and 40100 ha respectively. For Phase-I it will start in 1993 and would be completed by 2001-2002. Phase-II would be taken up in 1995-96 for completion by 2004-2005. Phase-III works will be executed by 2001-2002 for completion in 2006-2007. The detailed project report for CAD will be prepared and submitted by 1992-94 and the work will be started by 1993-94.

d) Flora and Fauna

ZSI had completed fauna studies on the basis of secondary data & limited field survey and the report was submitted to Ministry of E&F. The survey of flora and fauna of the area affected by the Indira Sagar Complex of reservoirs (i.e. the submergence areas and the surrounding area of the Indira Sagar, Omkareshwar and Maheshwar reservoirs) has been negotiated with the Indian Institute of Wildlife, Dehra Dun and the MOU has been finalised.

The Institute has started the work in December, 1989. The team of five persons each for flora and fauna and one in respect of human aspects particularly regarding tribal people affected by the project would visit the submergence area shortly for carrying out the survey. Before the visit it is proposed to collect the data from the aerial photographs and remote sensing imageries available to identify several aspects concerning the study.

The study is expected to extend over a three year period and the estimated cost is about Rs. 20 lakhs. In the first two years, field work will be undertaken on the basis of the data already analysed and the third year would be devoted for data analysis and drawing conclusions for preparation of action plans. The MOU stipulates submission of six monthly report on the progress made.

e) Archaeological and Anthropological Studies

Archaeological Survey of India has identified 40 artifacts in Narmada Valley earlier. But only four monuments namely Chaubis Awtar Temple, Jaga Fort, Sidheshwar temple and Chatri of Baji Rao Peshwa will be affected. Steps have already been taken for relocation and strengthening of these monuments by ASI. State Archaeological and Museum Department has completed the survey of 87 villlages of Dewas and Hoshangabad districts and have identified monuments. Programme for shifting and strengthening of these monuments is being prepared. Archaeological Survey of India, Govt. of India was entrusted with the survey of 167 villages of Khandwa and Harsud tehsils in 1987. Report is still awaited.

f) Carrying capacity of surrounding areas

It was informed that the work has been negotiated with the Indian Institute of Wild Life, Dehradun. TOR has been finalised and the Institute has started the field work and will take about three years time to complete the studies. Friend of Nature Society has also been entrusted with the studies on relocation of animals. Action plan is yet to be worked out.

g) Seismicity and Rim Stability

NVDA has sent the report regarding rim stability to NSP of Ministry of E&F in January, 1990 as desired by the Ministry.

Ten seismological observations have to be set up on the basis of studies carried out by CW&PRS for NSP and Maheshwar. NVDA had proposed the instruments as are being adopted on SSP. The firm M/s Sprengnether, USA was contacted through SSP, GOG and the firm has submitted its financial offer for Narmada Sagar Package which was finalised in consultation with IMD, New Delhi. The case has been processed for final approval by GOI Department for their clearance to import the instrument.

h) Health Aspect

The note on health aspects of NSP prepared by NVDA was examined in the Ministry of E&F and the comments were sent for modifying the report. NVDA is preparing an action plan regarding the preventive and curative aspects of health as pointed out by the MOE&F. As regards the water quality aspect the suggestion of MOE&F and M.P. Pollution Control Board are also being included in the plan.

i) Fisheries Development

The aspect relating to study of the availability of important aquatic fauna/fishes, especially the migratory species has been included in the Limnological studies being conducted by the 3 Universities of the State respectively for the Upper Narmada - (Bargi reservoir) - Rani Durgavati University, Jabalpur, Middle Narmada (Tawa, Barna and Kolar reservoirs) -Barkatullah University, Bhopal and Lower Narmada Zone - Vikram University, Ujjain (preimpoundment studies on selected riverine stretches on 10 centres).

All the three Universities have initiated the studies in their respective areas as per MOU. The quarterly report for the quarter ending March, 1990 is expected shortly.

For finalisation of approach paper by the Central Inland Capture Fisheries Research Institute (CICFRI), a suitable date is being fixed.

Annex. X-2SETTING UP OF ENVIRONMENTAL DEVELOPMENT CELL FOR NARMADA BASIN
INDORE (M.P.)1. INTRODUCTION

Narmada Sagar and Sardar Sarovar Projects, the two fore runners of the 30 major, 300 medium and about 3000 small irrigation and hydel power projects proposed in the Narmada Basin, were accorded approval from environmental angle in June, 1987 with the proviso that:

- Environmental Action Plans will be prepared to be implemented pari passu with the engineering works; and
- The scope of the Narmada Control Authority will be suitably enlarged to ensure that NCA is able to oversee and ensure integrated and sustainable development of the basin.

For the implementation of these conditions, the Narmada Control Authority along with the Narmada Valley Development Authority; which is exclusively looking after the development of Narmada Sagar Project in M.P. and Sardar Sarovar Narmada Nigam Ltd., dedicated to the speedy implementation of Sardar Sarovar Project in Gujarat have been trying to prepare requisite environmental and forestry Action Plans. It has, however, become abundantly clear that integration of environmental concerns in the development process calls for specialised inputs which can be provided either by an independent institution/centre or by tapping the specialised expertise of the existing institutions, if necessary, through suitable strengthening and reorientation of their working.

It is in this background that the setting up of a Development Centre, to start with as a Cell in the Narmada Control Authority, through the use of a network of existing institutions with suitable strengthening, has been decided.

2. OBJECTIVES

The centre aims at achieving the following objectives:

- (i) Assess the carrying capacity of the Narmada Basin so that development scenarios with alternate project portfolio can be evolved;
- (ii) Assess the present status of natural resources and prepare a detailed resource inventory;
- (iii) Assess and prepare a report on the present environmental status in the basin;
- (iv) Identification and demarcation of ecologically sensitive and biologically rich regions for total protection in the basin;
- (v) Identification and demarcation of critically degraded areas in the basin for priority treatment;
- (vi) Assessment of the present development mix along with formulation of Environmental Management Plans for prevention or mitigation of adverse impacts from the development projects already in existence and those in the pipeline;
- (vii) (a) Organisational and administrative restructuring considered necessary for planning and implementation of carrying capacity based development portfolio;
- (b) Integration of public participation and "Public Hearings" in the formulation, planning and execution of development projects. This should be accompanied by a programme of mass communication to ensure extensive public participation;
- (viii) Formulation of a detailed training and extension programme for decision makers, planners, managers etc. at all levels; and
- (ix) Finally to come out with an integrated basin development plan and its implementation.

3. INTEGRATED BASIN DEVELOPMENT PLAN

The proposed centre shall eventually come up with an integrated development plan for the Narmada Basin and this shall be based on the carrying capacity and other parameters of the basin. The Development Plan should include:

- (a) Outline of development scenarios with alternative project portfolios for sustainable development of the basin;
- (b) Prescribed land use for various purposes in conformity with maintenance of ecological balance - conservation zones, development zones etc.; and
- (c) Outline and details of the strategy for implementation of the finally accepted development portfolio.

4. ORGANISATIONAL SET-UP

(a) Core Cell With Institutional Network

Creation of a Core Cell in NCA together with specialised institutions to be suitably strengthened to provide the requisite inputs for evolving the integrated Basin Development Plan.

This work would initially be undertaken and coordinated by NEERI, Nagpur.

(b) Functions

I. The Core Cell

The Core Cell would comprise of a small multi-disciplinary group of experts in the Narmada Control Authority. The composition of the core Cell has to be so devised that it can discharge the following functions:

- Clearly identify the tasks to be carried out for sustainable development of the basin within a realistic timeframe;
- Liaise with the institutions recommended to carry out the identified tasks;

- Interact on a regular basis with the NEERI and other expert agencies on the one hand and development agencies on the other to ensure regular feed back and mid-course corrections.
- Report to NCA and the Ministry of Environment & Forests on the progress made.

II. NEERI & NETWORK INSTITUTIONS

NEERI would initially coordinate the work of the various institutions and also prepare the Work Plan and Development Plan.

3. WORK PLAN

NEERI, Nagpur would undertake the coordination of work among the identified institutions so that the basin development plan can be evolved. This would involve a phased approach. It was agreed that NEERI would work out the outline and furnish the data as per the following schedule:-

i) Formulation of conceptual frame-work	- 1 month
ii) Detailed Work Plan outlining the data requirement models and outlays etc.	- 3 months
iii) Identification of institutions	- 3 months
iv) Initiation of Studies	
a) Review and further studies, if any	- 18 months
	+
b) Review	- 6 months
v) Basin development Plan	- 6 months

Total	36 months
	=====

Conceptual frame-work would be submitted by end of December, 1990 - to be considered by the Narmada Control Authority in consultation with the proposed Advisory Board.

6. ADVISORY BOARD TO NCA ON ENVIRONMENTAL DEVELOPMENT CELL

It is proposed to have an Advisory Board of professionals comprising of outstanding experts from various disciplines as per Appendix-'A'

7. CAPITAL COST

As per preliminary estimates prepared, the cost for establishing the Cell for preparation of an Integrated Development Plan of Narmada Basin together with its operating costs for 5 years would be of the order of Rs. 10 crores as detailed belows:

I. Equipment

i) Air Environment	Rs. 15 lakhs
ii) Water Environment	Rs. 20 lakhs
iii) Land Environment	Rs. 15 lakhs
iv) Seismicity	Rs. 10 lakhs
v) Mass Communication Facilities	Rs. 30 lakhs
vi) Computer (a) Hardware	Rs. 40 lakhs
(b) Software	
(c) GIS	Rs. 50 lakhs
vii) Remote Sensing	
(a) Hardware	Rs. 20 lakhs
(b) Software	Rs. 10 lakhs

II. Transport and Vehicle	Rs. 15 lakhs
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III. Assistance to different Institutions	Rs. 325 lakhs
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Total (A)	Rs. 550 lakhs
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RECURRING COST

i. Manpower	Rs. 45 lakhs
ii. Back-up facilities: (Chemicals, Stationery, consumables etc.)	Rs. 10 lakhs
iii. TA/DA/Consultancy/Expert's fees	Rs. 25 lakhs
iv. Contingency	Rs. 10 lakhs

	Rs. 90 lakhs
Recurring cost for 5 years 95 x 5 (B)	Rs. 450 lakhs
Total cost (A+B) =	Rs. 1000 lakhs.

Appendix-'A'Composition of the Advisory Board

1. Dr. S. Vaidyanathan, Ex-Member, Planning Commission - Chairman
2. Dr. Malcom Adiseshiah - Alternate Chairman.
3. Prof. Shekhar Singh, Indian Institute of Public Administration, New Delhi.
4. Prof. Virendra Kumar, Delhi University.
5. Dr. D.R. Bhumbra, Former Vice Chancellor of Agriculture University.
6. Director, Forest Survey of India, Dehradun.
7. Prof. P. Khanna, NEERI, Nagpur.
8. Director, Vector Control Institute, Pondicherry.
9. Dr. Dikshitalu, National Remote Sensing Agency, Hyderabad
10. Dr. Arora, National Bureau of Plant Genetic Resources.
11. Prof. M.M. Sharma, V.J.T.I., Bombay or Dr.S. Vardarajan, Former Director General, CSIR.
12. Dr. A.G. Jhingran, Director, Central Inland Capture Fisheries Research Institute, Barrackpore.
13. Dr.S. Maudgal, Advisor, Ministry of E&F.
14. Member(WP), Central Water Commission, New Delhi.
15. Prof. S. Ramaseshan, IIT, Kanpur.
16. Dr. S.P. Punalekar, Professor, Gujarat University, Surat (Former Director of Centre for Social Sciences, Surat)
17. Executive Member, NCA, Indore.
18. Director, AIS&LUS, New Delhi.
19. Dr. J.L. Sehgal, Director, National Bureau of Soil Survey & Land Use Planning, Nagpur.
20. Dr. Robert B. Grubh, BNHS, Bombay.
21. Member (E&R), NCA, Indore - Member Secretary.

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नर्मदा नियंत्रण प्राधिकरण **NARMADA CONTROL AUTHORITY**

पर्यावरण उपदल
Environment Sub-Group
दसवी बैठक का कार्यवृत्त
Minutes of the Tenth Meeting

31 जनवरी, 1991 को

नई दिल्ली में हुई

Held at New Delhi

31st January, 1991

इन्दौर

फरवरी, 1991

Indore

February, 1991

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**MINUTES OF THE XTH MEETING OF ENVIRONMENT
SUB GROUP HELD ON 31ST JANUARY ,1991 IN
PARYAVARAN BHAWAN , NEW DELHI**

Shri R. Rajamani, Secretary, Ministry of Environment & Forests and Chairman of the Environment Sub-group of NCA welcomed the Members and invitees to the 10th meeting of the Environment Sub-Group. The list of participants is enclosed at Annex-X-Min.1.

Discussion on the agenda items was taken up thereafter.

**ITEM NO.-X-1(57) CONFIRMATION OF THE MINUTES OF THE NINTH
MEETING OF ENVIRONMENT SUB GROUP**

The Minutes of the 9th meeting of Environment Sub-Group of Narmada Control Authority held on 7th September, 1990 were circulated, among the Members. It was agreed that the suggestion made by Shri N.B.Lohani, Vice Chairman, NVDA with regard to the location of Environment Development Centre at Indore would be duly considered when the proposal comes up for discussion.

The minutes were confirmed with the above amendment.

GENERAL DISCUSSIONS

Before going into detailed discussion of the agenda items, Chairman wanted to have a brief presentation of the progress of Environmental action plans so far. He said that this was particularly required to ascertain whether pari-passu implementation of the requisite environmental safeguard measures is being achieved with respect to progress on engineering works. It was explained that for the construction of SSP Dam the physical progress was approx. 15% and financial expenditure so far is about Rs. 1100 crores, out of which Unit-I accounts for Rs.251 crore. In Unit-II i.e. Canal work in a length of 144 Km - the work is going on and the expenditure so far on this was Rs.324.4 crores. Regarding progress of construction work on NSP, it was mentioned by GOMP that Tenders had been invited for short listing the contractors. Total cost of the project is Rs.2,100 crores including canal works, power houses etc. The only physical progress reported was in foundation works. The expenditure so far incurred was Rs.160 crores, including surveys, studies, afforestation etc. It was also pointed out that the SSP is no longer expected to be completed in 1994-95 as stipulated earlier but the target date is now 1997-98.

Shri Shekhar Singh (IIPA) pointed out that the corresponding cost of the works carried out relating to environmental measures should be looked into.

Chairman enquired about the implication of pari-passu clause mentioned in the clearance letter. Dr. Maudgal stated that when this condition was included in the clearance order of the project in 1987, it was expected that the field surveys, studies etc. needed for preparing environmental action plans would be completed and got approved from MOE&F by 1989 which would leave adequate time for implementation of the action plans by 1994-95 i.e. simultaneously with the completion of engineering works. For the purpose of monitoring and implementation of environmental action plan, NCA constituted the Environment Sub- Group under the Chairmanship of Secretary to the Govt. of India, Min. of Environment & Forests. As required, a number of studies, surveys etc. necessary for preparation of action plans have been initialed but are still in progress. Unless this work is expedited and action plans prepared immediately, it will not be possible to complete execution of the safeguard measures pari-passu with engineering works. The State representatives reported that on some of the safeguard measures, such as catchment area treatment, compensatory afforestation etc. works are also in progress ahead of finalisation of the action plans.

Chairman observed that construction works were making good progress while work on a number of environmental safeguard measures was rather stagnant despite a lot of discussion in the past meetings stressing their speedy implementation. This has to be corrected quickly and extension of time sought for the completion of the studies and action plans.

Chairman agreed to the suggestion of Shri Shekhar Singh that a separate item be added in the agenda to report on the follow up of action taken on the decisions of the previous meeting.

Item No.X-2(58) - CONSIDERATION OF POLICY ISSUES.

A. Catchment Area Treatment and Cost Sharing

As decided in the meeting of the Environment Sub-group in 1989, the MOWR was entrusted with the responsibility of preparing a paper dealing with two main issues related to:

- Extent of Catchment area to be treated at project cost; and
- Apportioning the cost of CAT among a number of projects sharing the same catchment in a basin.

Accordingly, as directed by MOWR, CWC prepared such a paper which was discussed in various meetings with the representatives of Min. of Agriculture, Min. of Environment & Forests and Min. of Energy. Since, the Min. of Environment & Forests did not concur with some of the basic assumptions made in the MOWR paper, a modified paper was brought out by them. Both these papers were discussed in the last meeting of the Sub-group but the issues still remain unresolved.

There was general agreement in the Sub-group on the need for Catchment Area Treatment. Chairman pointed out that the requirement is to treat whole of the critically degraded areas in the free draining catchment as a part of the project. Reporting on further action being taken by the Ministry of Water resources, in this regard, Shri K.C. Aggarwal, Joint Commissioner (FP) stated that a meeting is being convened by the Central Water Commission on 19 February, 1991 in which representatives of Ministries of Government of India and States are being invited to discuss these issues. It is expected that guidelines could be drawn up for catchment area treatment based on these discussions and these guidelines could be applicable for all the river valley projects in the country.

Chairman pointed out that the Ministry of Environment & Forests would also like to examine the suggestions emerging from the 19th February, 1991 meeting before these could be accepted as decisions. The Chairman also pointed out that charging the cost of critically degraded free draining catchment, perse, is not the issue as long as alternative arrangements are made for funding to complete this task before impoundment.

Shri D.C. Debnath, Executive Member, NCA stated that it has been suggested by MOWR that the directly draining sub-water sheds of high and very high priority categories on reservoir periphery should be treated at project cost. This stand is, however, not accepted by the Ministry of E&F.

The other three major projects in the Narmada Basin viz Omkareshwar, Maheshwar and Narmada Sagar are all exclusively in Madhya Pradesh and the respective project estimates will bear the

expenses for the catchment area treatment. Chairman, however, stressed the need to proceed with CAT work without waiting for a final decision.

Shri Sekhar Singh (IIPA) pointed out that silt load reduction is not the sole criterion for catchment area treatment and it should be noted that the flow in dry season will get considerably reduced if the catchment area is not treated.

B. Extension of time for environmental & forestry approval

Chairman explained the stipulations in the 1987 order sanctioning the clearance for the projects by the MOE&F vide which the safeguard measures are to be implemented pari-passu with the construction works. It is clear from the discussion that works on certain environmental safeguard measures are lagging behind the construction schedule and no extension of time has been asked for as agreed on 18.9.1990 in the Chief Ministers' meeting on Environmental Action Plan.

Shri A.W.P. David, Secretary (R&E), GOG stated that the environmental safeguard measures in the submergence area alone be correlated to the construction schedule. He stated that only 15% of the work of the Sardar Sarovar Project has been completed in monetary terms, whereas environmental studies have been completed/assigned for Rs. 144 crores out of the total anticipated project cost of Rs. 6406 crores.

Shri N.B.Lohani, Vice-chairman, NVDA stated that for Narmada Sagar Project, more than 11,000 ha have already been afforested, whereas the total expenditure incurred for the entire project is about Rs. 160 crores.

The Chairman observed that the quality of work done so far would also require a close look and evaluation.

Shri Sekhar Singh, (IIPA) expressed the view that it is not sufficient merely that the catchment area treatment progresses pari-passu with the construction schedule but also it must be ensured that the catchment is allowed to stabilise for 3 to 5 years before impoundment.

Chairman mentioned that no application for extension of time has been so far received from NCA as agreed to and directed by the Conference of Chief Ministers' held in September, 1990. Executive Member, NCA stated that even though it is mentioned in the minutes of the Chief Ministers' meeting that NCA will apply for extension of time; while finalising the minutes, the words "if necessary" got inadvertently dropped. He also stated that the implementation of the environmental safeguard measures was progressing even though not completed in the real sense. The whole issue was examined in the NCA Secretariat and the matter was referred to the MOWR with the suggestion that extension of environmental clearance may not be a necessity. It was reported that MOWR has considered the issue and sent a communication to

MOE&F to this effect. It was, however, stated by the representatives of the MOE&F that this interpretation of the Minutes of Chief Minister's meeting is neither factual nor acceptable and that the letter received from the MOWR does not cover this point at all.

Shri S. Sunder, Vice-Chairman and Managing Director, SSNNL stated that on the Gujarat side environmental works are progressing parri-passu with the construction schedule and hence, it was felt by GOG that no such approval for extension appears necessary. Any further strengthening of the implementing agencies, if needed to be done, would very well be attended to by GOG. It was, however, pointed out that a fragmented approach in implementation of environmental action plans is not desirable.

Finally, Chairman expressed the view that he was not at all satisfied with the situation and hence he felt that the matter needs to be brought before the Narmada Control Authority in its next meeting.

Item No.X-3(59) - PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENTAL ACTION PLANS

NARMADA SAGAR PROJECT

Catchment Area Treatment

Shri N.B. Lohani, Vice-chairman, NVDA informed that GOMP is yet to receive the final guidelines as to the extent of the catchment to be treated. However, State machinery is fully geared up to take up the work of 16.35 lakh ha CAT and 10 Sub-divisions of the Directorate of Agriculture besides 9 forest sub-divisions are in position to take up the work and availability of funds is not a problem.

Dr. Maudgal pointed out that at the time of granting the environmental clearance, the project authorities were quite aware that 25% to 30% of the catchment would require treatment as per the Dewan Committee's recommendations. It was accepted at that time that the cost will be charged to project(s). However, when the MOWR was requested to resolve the related interstate issues and prepare a paper on the subject, a different concept was advanced limiting CAT only to the directly draining area on the periphery of the reservoir. As such, while the critically degraded area needing treatment is 16.35 lakh ha in M.P., only 0.11 lakh ha has been treated so far. Phased plans will have to be worked out.

Mr. Aggarwal, Joint Commissioner, MOWR informed that MOWR is evolving guidelines to resolve this issue. Shri A.K. Shangle, Director, CWC stated that Chairman, Central Water Commission is convening a meeting on February 19, 1991 for detailed discussion. He further stated that the directives issued by the Planning Commission specifies to rectify only the direct damage to the catchment.

Shri Sekhar Singh (IIPA) mentioned that catchment area treatment in Narmada Sagar should also be implemented pari-passu with the construction of Sardar Sarovar Dam because NSP is to come up much later than SSP and as such the whole of the catchment becomes free draining until NSP etc are constructed. Dr. S. Maudgal, Adviser, MOE&F concurred with this view.

Chairman expressed concern over the slow pace of work on catchment area treatment by GOMP and desired that construction schedule of both NSP & SSP may be furnished by the NCA so that rescheduling could be worked out and works started immediately to ensure pari-passu implementation.

Compensatory Afforestation

Shri N.B. Lohani informed that one Chief Conservator of Forests and 9 Forest Divisions are engaged in this work and the Forest Development Corporation has completed the afforestation in

11776 ha in NSP areas much ahead of the construction schedule of the NSP.

Chairman, while expressing the need to look into the additionality and quality, appreciated the efforts of GOMP in this respect and stressed the need to further accelerate the pace so as to complete the work of treating 0.82 lakh ha area.

Command Area Development

Shri Lohani informed that studies are being conducted whereas the project works are still to commence. Dr. Maudgal pointed out the problem of water logging faced in Tawa Command Area and desired to know the steps taken by GOMP to prevent or rectify similar situations in this command. Shri K.C. Aggarwal, Joint Commissioner, MOWR stated that various studies have been conducted and the reports on reducing or even preventing water logging in Tawa project are available.

Shri Lohani pointed out that additional studies and infrastructure facilities for marketability of the produce, use of input survey of Command Area Development for land capabilities etc. have been taken up. Plans are yet to be worked out.

Chairman requested GOMP to prepare a master plan for drainage, water logging and salinity control for the command area. Shri Sekhar Singh (IIPA) pointed out that Indian Institute of Science, Bangalore had earlier carried out studies of water logging in NSP command area indicating that almost 30-40% area may become waterlogged and these should also be taken into account. He also stated that the effects in the run-off from fields due to application of pesticides, insecticides and chemical fertilizers in the command area is also a problem to be tackled.

Dr. I.P. Abrol, Dy. Director General, ICAR mentioned that study regarding disposal and recycling of ground water in the command is very important. Action plans to cover these aspects need to be detailed.

Prof. R.K. Katti pointed out that the adoption of a lopsided approach in designing the canals first and then providing the drainage needs to be guarded against.

No review of the work in Rajasthan was possible as the representative had left the meeting.

Flora and Fauna, Wild Life and Carrying Capacity

Mr. Lohani explained the progress of studies and stated that reports will be available by March 1993 and action plans will be ready by March, 1994. Chairman felt the need to monitor this closely as studies were being made by organisations like WLI which had experienced personnel but were new to this work. Addl. Secretary, MOE&F pointed out that there was a Wildlife sanctuary

famous for Sambhar in Neemanpur, in Harsud, at North bank of Narmada, which needs to be improved. The TOR of the study may be expanded, if necessary.

Archaeological studies

GOMP informed that survey work in Dewas and Hoshangabad was completed by Commissioner, Archaeology and Museums of GOMP. He will be undertaking the work in Khandwa District. Survey work is expected to be completed by March, 1992 and action plan will be ready by June, 1993.

Anthropological Studies

Chairman desired that the Rashtriya Manav Sanghralaya may be requested by GOMP to furnish a report on this aspect.

Health Aspects

Proposal for curative part of health aspect submitted by Directorate of Health Services was under finalisation in NVDA and preventive aspect is proposed to be entrusted to Gandhi Medical College, Bhopal. The incidence of diseases in the entire project impact area will also be monitored. These reports when finalised will be submitted for consideration and approval to the Environment Sub-group for implementation of action plans.

Seismicity & Rim Stability

NVDA has already sent the abstract of the report regarding rim stability of NSP to MOE&F in January, 1990 but the complete report requested a number of times has not yet been made available.

SARDAR SAROVAR PROJECT

Catchment Area Treatment

GOMP

Mr. Lohani informed that the total catchment from SSP to NSP is 24.29 lakh ha and that 6 out of 16 additional directorates of Agriculture are ready to take up the work once the policy regarding extent of catchment area to be treated is made clear. The work in the directly draining sub-water sheds will be commenced by March, 1991. NVDA is preparing action plan for directly draining areas i.e. 0.60 lakh ha as per the directives of the MDWR. It is proposed to carry out the work in this area at 10,000 ha per year starting from 1991-92, to be completed in 1996-97.

As per the estimates given earlier by NVDA, total area needing treatment, however, is 6.85 lakh ha for which plans have yet to be worked out.

GOG

Shri A.W.P. David, Secretary (R&E) informed that the area requiring treatment by GOG is 0.4235 lakh ha and GOG is going ahead with the work. Shri B. Sunder, GOG stated that so far 0.4528 lakh ha forest area and 0.00856 lakh ha non-forest area have been treated and it is proposed to complete the work by 1994-95. The work in forest area is being executed by State Forest Deptt. and in the non-forest area by State Agriculture Deptt. As per programme circulated by NCA, Gujarat will complete treatment of both forest and non-forest areas of 27204 ha and 3025 ha respectively by 1994-95.

GOM

Shri U.K. Mukhopadhyay, Secretary (Env), GOM informed that the work is to be done by Forest Deptt. and Agriculture Department. The area to be treated is 20,000 ha and can be completed in 4 years after commencement at the rate of 5000 ha per year.

The Chairman also desired that evaluation of the works already done should be carried out and reported.

Compensatory Afforestation**GOMP**

GOMP informed that submergence will take place in 2732 ha of forest area. Except in Khargone District where the work is being done by Forest Division, the Forest Development Corporation is carrying out the work. Out of 8737 ha proposed for compensatory afforestation, only 848 ha has so far been completed. This is not pari-pasu with dam construction. Afforestation work is being carried out by the FDC as an additional work to its normal functioning in MP. MP's action plan was approved by MOE&F on 28.7.1990 and MP authorities confirmed that as per agreed programme they would be in a position to complete afforestation by 1994-95.

Shri Sekhar Singh of IIPA opined that clear felling is to be dovetailed with the compensatory afforestation and also submergence schedule. Additional Secretary, MOE&F also supported this view.

Chairman pointed out that clear felling from submergence area is to be monitored and felling is to be carried out in phases just prior to submergence. Clear felling operations should be reflected in the cut in regular felling operations.

GOG

GOG agreed that besides afforesting 4650 ha of non-forest area, they are also to afforest double the degraded forest area. GOG informed that 735 ha of land has been identified in the

vicinity of the dam in Kevadia region and 600 ha in Bharoach District and afforestation is being done in Rann of Kutch. Shri David pointed out that representatives of MOE&F after visiting the area were satisfied about the plantation.

Chairman desired that afforestation work has to be done in project impact area which should normally be a continuous area. Alternate land should, therefore, be located for the purpose. GOG pointed out that no revenue land is available in project impact area and that Agriculture land cannot be put under afforestation as vast area of land will be required for resettlement of the Project Affected People. So far about 2150 ha of non-forest area and 4528 ha of degraded forest area have been afforested. As per circulated programme, they will complete afforestation of 4650 ha of non-forest area and 2720 ha of degraded forest area by 1994-95.

GOM

Shri U.K. Mukhopadhyay, Secretary (Env) informed that afforestation in 1329 ha was done this year and further work is in progress. Shri Sekhar Singh desired that GOM may furnish a statement as to why the revenue land earmarked for afforestation could not be given for rehabilitation instead of the Taloda forest land. He also desired a categorical statement from the Govt. of Maharashtra as to whether the 2700 ha of Taloda forest earmarked for resettlement is free of rights by other people and if not where they shall be accommodated.

Shri D.C. Debnath, Executive Member, NCA informed the Sub-group that the World Bank officials as well as he himself visited the Taloda forest and did not come across any encroachment. Besides, villagers on the periphery of Taloda Forest area were asked whether they would accept resettlement from the submergence villages in the Taloda forest and their response was positive as they have relationships through marriages with those villagers. Chairman felt the matter was not free of difficulties.

The programme now circulated for afforestation of 21905 ha by NCA will be adhered to and all afforestation completed by 1996-97.

Chairman informed that the backlog in afforestation for the earlier projects is to be carried out in all the participating States before the requirements are met for Narmada Sagar Project and Sardar Sarovar Project.

Chairman also desired that representatives of the Forest Development Corporation/Forest Department in charge of afforestation may be invited for the Sub-group meetings for presentations.

Command Area Development

Dr. Abrol (ICAR) pointed out that agricultural drainage is largely missing in the country and the stress is only on the rain water disposal. He also opined that wherever rainfall exceeds 1100 mm, problems of water logging and salinity do occur. The command area is likely to suffer from problems of salinity, alkalinity etc. as has been the case in Bhakra Command Area where districts of Fazilka, Ferozpur and Bhatinda etc. are suffering from severe drainage problem. He however, stressed that methods are available to solve them but at a high cost. Prof. Katti stressed that irrespective of the cost, preventive and control measures should be taken before hand and that is why proposal of Environment Development Centre becomes even more relevant. Shri Aggarwal (MOWR) indicated that the drainage problem of the command area is being handled by CADA in each State and finally coordinated by the MOWR.

GOG

Shri S. Sunder, Vice-Chairman & MD, SSNNL explained the different studies being carried out in the command area. He stated that the canal is proposed to be lined to prevent water logging in adjacent fields. Dr. Abrol pointed out that salinity of the area through which the canal is passing is very high and in view of the experience in other projects, has asked how GOG is going to tackle the problem. GOG stressed that Operation Research Group, Vadodara is carrying out the studies and a solution will be found out. A workshop can also be arranged to discuss the issues once a detailed work plan is ready.

Chairman desired that studies may be completed by September, 1991 and GOG may also entrust land use studies to some organisation as these studies have not yet been taken up.

Shri David, Secretary (R&E) briefly explained the studies pertaining to the Micro Hydel system being carried out.

GOR

The representatives of Rajasthan was not available to explain the details of command area development studies/work being carried out in Rajasthan when the subject was taken up. Chairman expressed his concern over lack of information on this aspect of the work and desired that this may be brought to the attention of Govt. of Rajasthan.

Flora, Fauna, Wild Life and Carrying Capacity

GOMP

GOMP informed that the studies started by the Forest Research Institute, Jabalpur in April, 1990 is expected to be completed by March, 1993. Action Plans will be prepared by

March, 1994. Implementation schedule of these plans will be known only then.

GOM

GOM informed that the work is entrusted to Pune University and the Terms of Reference will be approved shortly and the studies will be completed within 2 years.

GOG

GOG informed that the studies are in progress by MS University, Vadodara. An interim report has been already received. The studies will be completed by 1991-92.

Detailed study regarding Wild Life Management is being carried out by a study group of Government of Gujarat in association with Wild Life Institute, Dehradun and MS University, Vadodara.

Chairman opined that the carrying capacity studies presently being attempted have a limited scope which needs to be enlarged in consultation with NEERI, Nagpur where necessary. Chairman also pointed out to all the States to ensure that islands being formed inside the reservoir, if any, are to be treated as forests and should be developed, if possible, as animal or bird sanctuaries.

Fisheries

Apart from the development of commercial fisheries, the need for protection of indigenous aquatic life was stressed so that the migratory species as well as the aquatic species in the estuary part could be protected. The need for a mechanised fish lift for this purpose, if needed, was also stressed.

GOMP

It was explained that pre-impoundment studies have been taken up by the Universities of Ujjain, Jabalpur and Bhopal. Schedules were not given.

GOG

The various studies being carried out were explained. Shri Debnath, Executive Member, NCA informed that NCA requested CICFRI, Barrackpore for a socio-economic study of the whole Narmada basin. A preliminary status report is to be submitted by 31st Jan., 1991 and the final report by March, 1991. The preliminary status report has been received and work is progressing well. This is taken up as per TOR by World Bank.

Shri Sekhar Singh (IIPA) pointed out that the status of fish species, especially the migratory species, in the river is to be

specifically studied alongwith the study of estuarine flora and fauna.

Health aspects

GOMP

NVDA has prepared a report regarding immediate health services and continued health services to be provided for the population. The total anticipated expenditure including the cost of strengthening of health institutes has been worked out as Rs. 748.73 lakhs.

GOG

Work plan has been prepared for surveillance and control of water borne diseases. The total cost estimate is Rs. 3,342.17 lakhs. Shri Sekhar Singh referred to the original report of the committee in 1985 indicating vector control through massive use of pesticides. He stressed that the impact of pesticides on environment must be studied. GOG suggested that a reference could be made to ICMR. Shri Sekhar Singh pointed out that regulating the reservoir level for irrigation purposes does not automatically control the Malaria and that for controlling malaria, reservoir level has to be maintained in relation to the biology of the vector. He further pointed out the need of a status report on effect of pesticides on health.

Chairman desired that GOG should submit a note/report of the concerned directorate of health on these aspects.

Seismicity and Rim Stability Analysis

GOG informed that the study regarding rim stability in Gujarat has been completed and the study in Maharashtra and Madhya Pradesh by GSI is in progress. MOE&F informed that except for the very preliminary report provided to it by GOG some time back, no further reports have been received. Chairman desired that GOG should submit a report on these aspects expeditiously.

**Item No.X-4(60) - TIME-FRAME FOR PREPARATION OF ACTION PLAN AND
IMPLEMENTATION OF ENVIRONMENT SAFEGUARD MEASURES**

This item has been covered under the item Policy Issues - (B) extension of time for environmental and forestry approval. It was, however stressed that MOE&F may be supplied with the following documentation.

- Construction schedule of SSP and NSP, both original and revised with itemwise break up;
- Financial implications of each of the components in the items above;
- Yearwise submergence schedule; and
- Schedule of studies, surveys, action plans needed for meeting environmental and forest clearance stipulations alongwith an implementation schedule of the environmental action plans.

**Item No.X-5(61) - CONSIDERATION OF THE TOR AND MOU OF THE STUDIES
COMMISSIONED BY THE STATE GOVERNMENTS**

No suggestion or comments have been received from any of the members or the States.

Item No.X-6(62) - SETTING UP OF ENVIRONMENT DEVELOPMENT CENTRE

Shri D.C.Debnath, Executive Member, NCA brought to the notice of the sub group that even though, the representative of NEERI, Nagpur agreed to furnish details for establishing the Environment Development Centre, their latest letter shows that they are not interested in the work. Dr.Maudgal, however, stated that this interpretation is not factual as NEERI has been most cooperative. Indeed, after the November meeting, they have had no communication except in the 3rd week of December, 1990 requesting them to submit the report by 31st December, 1990. This is an unjustified demand specially in view of the past performance when NEERI was first requested to give a proposal in 1989 to which there was no response for more than a year. It was, therefore, agreed to request NEERI to give the report within a reasonable time.

Shri Sekhar Singh pointed out that the only consideration accepted during the last meeting of the committee was that the existing Institutes will be given the tasks as per their capabilities and NEERI would coordinate the work. Shri Lohani reiterated that as 90% of the catchment of Narmada projects lies in MP, the best place for locating such a Cell will be at Indore. Shri Sunder, GOG expressed the view that there are some good institutions at Vadodara and they may also be considered for the studies.

Chairman decided to take up himself the issue of location, objectives etc. of the EDC with the Secretary, MOWR and desired that detailed discussion be deferred on this important item.

ANNEXURES

Annex-X-Min.1**LIST OF PARTICIPANTS TO 10TH MEETING OF ENVIRONMENT SUB-GROUP
HELD AT NEW DELHI ON 31ST JANUARY, 1991**

1. Shri R. Rajamani, Secretary to the Govt. of India, Ministry of Environment & Forest, New Delhi - Chairman.
2. Shri D.C. Debnath, Executive Member, NCA, Indore.
3. Shri S. Sunder, Vice-Chairman & Managing Director, SSNNL, Gandhinagar.
4. Shri N.B. Lohani, Vice-chairman, NVDA, Bhopal.
5. Shri A.W.P. David, Secretary (Reh. & Env.), GOG, Gandhinagar.
6. Shri U.K. Mukhopadhyay, Secretary (Env), GOM, Bombay.
7. Shri D.R. Thapliyal, Member (Env.), NVDA, Bhopal.
8. Shri R.G. Kulkarni, Supdt. Engineer, JIPC, Jalgaon, Maharashtra.
9. Prof. R.K. Katti, Director & Consultant, 401/B, Poonam Chambers, Shivsagar Estate, Dr. A. Besant Road, Worli, Bombay-400 018.
10. Shri R.S. Negi, C.F., NVDA, Bhopal.
11. Shri Sekhar Singh, Project Director, IIPA, New Delhi.
12. Dr. I.P. Abrol, Dy. Director General, ICAR, New Delhi.
13. Shri Gopal Krishna, Anthropological Survey of India, New Delhi.
14. Shri B.S. Minhas, Secretary, Forest & Env., Rajasthan.
15. Shri M.K. Ranjit Singh, Rajasthan.
16. Shri K.M. Joseph, Member (Civil), NCA, Indore - Member Secy. of Sub-group
17. Shri S.M. Pai, Secretary, NCA, Indore.
18. Dr. S. Maudgal, Adviser, Min. of Env. & Forest, New Delhi.
19. Shri S.S. Patnaik, DIG (Forest), MOE&F, New Delhi.
20. Smt. Nalini Bhat, Scientist, MOE&F, New Delhi.

21. Shri K. Jagdish, Development Alternatives, 22, Olaf Palme Marg, Vasant Vihar, New Delhi-110057.
22. Shri K.C. Aggarwal, Joint Commission (PP), MOWR, New Delhi.
23. Shri R.V. Rao, Director (EM), CWC, New Delhi.
24. Shri A.K. Shangle, Director (Res.Sedimentation), CWC, New Delhi.
25. Shri R.M. Mehta, Information Officer, MOWR.
26. Dr. Pawan Kumar, Specialist (Env), NCA, Indore.
27. Shri O.P. Saxena, Dy. Director (Env), NCA, Indore.

-ooOoo-

Narmada Valley Development Authority
Narmada Bhawan, Tulsinagar

No. NVDA/FCR/705-B/ 37

Bhopal, dated 9-1-91

To

The Secretary,
Narmada Control Authority,
Vishal Tower, Indira Complex,
Navalakha,
Indore - 452 001.

Sub- Minutes of 9th meeting of Environment Sub-Group
of NCA.

Ref- Your letter No. D-D-34(9)/90 dated 13th October 90.

Sir,

I am desired to draw your attention to your letter cited above with which a copy of the minutes of the Ninth meeting of the Environment Sub-Group held at New Delhi on 7th September 1990, has been forwarded. The minutes on item No. IX-4(55) - "Setting up of an Environmental Development Centre(EDC)" do not contain the observations made by me as the Vice-Chairman of NVDA, MP on the issue, in the meeting. I had expressed that the draft paper on the setting up of EDC in the Narmada basin, prepared by Prof. Ramaseshan, in consultation with Prof. R.K. Katti and Member (Civil) NCA had suggested Indore as the HQs of the Centre. On account of the central location of Indore in Narmada basin and in view of the fact that NCA's HQ is also located at Indore, where a Central Computer Centre is also to come-up, Indore, I felt and expressed, was the most appropriate venue for location of EDC, as rightly recommended by the Committee charged with responsibility of preparing a draft paper. I stated that no change in this recommendation should be permitted to be made.

2/- It is, therefore, requested that the ^{above} observations be incorporated in the minutes, by amending the minutes suitably,

(N.B. Lohani)
Vice- Chairman

Narmada Valley Dev. Authority

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ITEM NO. XI-1(63): CONFIRMATION OF THE MINUTES OF THE TENTH MEETING.

Minutes of the Tenth Meeting of Environment Sub-group of Narmada Control Authority were circulated to all Members and Invitees vide letter No. D-34(11)/91/486 dated 28.2.1991. No comments have so far been received from any Member. The circulated minutes may, therefore, kindly be considered for confirmation.

All this will be carried out. (As per letter of 28.2.91)

ITEM NO. XI-2(64): A) REVIEW OF THE EFFORTS OF ENVIRONMENT SUB-GROUP DURING 1990-1991.

B) REVIEW OF ACTION TAKEN ON THE DECISIONS OF PREVIOUS MEETING.

A) Review of the Efforts of Environment Sub-group During 1990-91.

During the previous year, the Environment Sub-group of NCA held three meetings in May, 1990, September, 1990 and January, 1991. The Environment Sub-group is expected to meet at least once in three months.

NCA is also preparing bi-monthly status reports as decided in the meeting of the Narmada Control Authority. Accordingly, the authority prepared status reports for the bi-monthly periods ending April, June, August and December, 1990. The report of June, 1990 formed part of agenda of the 9th meeting of the sub-group and the rest of the bi-monthly reports were circulated to the State Governments and the Ministries of Environment & Forests & Water Resources.

As desired by the Chairman, NCA, this item has been included for the information of the Members of the Sub-group.

B) Review of Action Taken on the Decisions of Previous meeting.

1. Consideration of Policy Issues [Item No. X-3(57)].

a) Catchment Area Treatment and Cost Sharing:

Guidelines on cost sharing of CAT between a number of Projects in the same basin and the extent of Catchment Area to be treated at project cost prepared both by the MOWR and by the MOE&F were reviewed in the last few meetings. The group was informed that Chairman, Central Water Commission had convened a meeting on 19.1.1991, in which the representatives of the Ministries of Govt. of India and all the states were invited to discuss the issue. The Minutes of the meeting on "Guidelines for an Action Plan for Catchment Area Treatment of Reservoirs" is enclosed at Annex.XI-1.

na reply the meeting of 19.2 was held. The
paper prepared by MOWR
① pln can be signed for further action. as per meeting
② papers be circulated. After both the papers were circulated

Government of Maharashtra opined that the investment incurred on CAT will not be commensurate with the benefits since the BC ratio varies from 0.054 to 0.30 and suggested silt storage in the reservoir for the control of siltation in place of CAT programme. The opinion of the Planning Commission was that Water Resources Projects must share the cost for monitoring the health of river basins. Representative of Ministry of Environment & Forests stated that a separate Authority for Basin Management must be set-up as per the recommendations of the National Water Policy with responsibility of treatment of the critically degraded areas in the entire Catchment irrespective of the sources of funding and they will be sending their comments/observations. Adviser, Planning Commission desired that this issue should be decided by a Committee of Secretaries. It was decided that the documents prepared by MOE&F alongwith the observations of CWC/MOWR, observations of GOM, comments/views of GOMP and the Ministry of Energy should be circulated among the members for further action. Ministry of Water Resources/CWC may indicate present position.

The Chairman, NCA in the last meeting of NCA held on 16.2.1991 directed that treatment of identified areas should start. States can charge the cost of treatment of these identified Catchment areas to unit-I of the Project. This can, however, be reviewed once a final decision is taken about the quantum of CAT to be done together with cost sharing.

b) Extension of Time for Environmental and Forestry Approval:

In the last meeting, the Chairman expressed that this matter needs to be brought before the Narmada Control Authority. Accordingly, the issue was referred to the NCA in its meeting held on 16.2.1991.

Secretary, MOE&F, expressed that the approved Minutes of the Sub-group meetings should form an Annexure to the agenda of NCA meetings for detailed information of the Members of the Authority. He clarified that pari-passu condition laid down by the Ministry was not only for the studies/surveys but also for the implementation of the various related activities. He felt that overall progress

on implementation of the Environmental Safeguard Measures is still not satisfactory and works on many issues require priority attention. He suggested the necessity of reviewing the entire package of required actions and redrawing a time bound programme to meet the conditions laid down by MOE&F. He expressed that the extension of time limits for completion of specific studies which are yet not completed may be sought by MOWR. On the question of implementation of Environmental Safeguard Measures vis-a-vis directive powers, the Chairman, NCA, agreed to include it as an agenda item of NCA Meeting and request the Members of the Authority for a formal decision in this regard.

Further action taken may be reported by MOWR.

2) Present Status of Studies/Surveys and Environmental Action Plans [(Item No. X-3(59))]

a) Narmada Sagar Project.

GOMP was requested to take the following actions:

- i) Prepare a master plan for drainage, water logging and salinity control for the command area.
- ii) To take steps to include in the TOR, studies about Wildlife Sanctuary famous for Sambhar in Neemanpur.
- iii) Obtain short report on Anthropological aspects of NSP/SSP from Rashtriya Manav Sangrahalaya.
- iv) Provide complete report on Seismicity and Rim Stability.

No reply has been received so far.

b) Sardar Sarovar Project.

GOG was requested:

- i) To entrust land use studies to some organisation as these studies have not yet been taken up.

- ii) Scope of Carrying Capacity studies to be enlarged, if necessary, in consultation with NEERI, Nagpur.
- iii) Prepare reports on the use of pesticides for Vector Control and the impact of pesticides on Environment and health.
- iv) Furnish a report on Seismicity and Rim Stability analysis of SSP.

The reply is still awaited.

GDM was requested to provide an evaluation report on works and a categorical statement on:

- i) Whether the 2,700 ha Taloda forest land released for resettlement is free of rights from other people and, if not, where they shall be accommodated; and
- ii) If the land earmarked for afforestation could be given for rehabilitation instead of the Taloda forest land.

State Govt. is yet to send their replies.

Government of Rajasthan was also requested to furnish the details of command area development and related studies to the NCA.

But no reply has come from Government of Rajasthan.

All State Governments to furnish plan for clear felling of trees in the submergence areas to be carried out in phases reflecting the cut in regular felling operations - felling should be preceded the rise of water level but the gap should not be abnormal. Proper planning is necessary here. No plan has yet been received in this respect.

3) Time Frame for Preparation of Action Plan and Implementation of Environment Safeguard Measures [(Item No. X-4(60))]

As desired in the last meeting of the Sub-group, MOE&F has been supplied the following documents under NCA letter No.E-34(11)/91/874 dated 14.4.1991,

- Construction schedule of SSP & NSP both original and revised with itemwise breakup.
- Financial implication of each of the components in the items above.
- Yearwise Submergence schedule for all villages under SSP and phase wise schedule for NSP.
- Skeleton schedule of studies/surveys and action plan for meeting Environmental and Forest clearance stipulations alongwith an implementation schedule for the Environmental Action Plans. This is tentative and is to be finalised in consultation with States. The States will then be required to draw up yearly detailed action plans for implementation.

ITEM NO. XI-3(65): PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENT ACTION PLANS

The latest status report of studies and activities regarding Environmental Aspects of SSP and NSP for the quarter ending March, 1991 has been sent to the States. The progress/present position of the following aspects is given below briefly for review by the Sub-group:

1) Phased Catchment Treatment:

Narmada Sagar Project

Government of Madhya Pradesh:

The total catchment area of NSP downstream of Bargi is 37,10,000 ha. Only directly draining watersheds of "Very High" and "High" priority categories is being taken up for treatment under catchment area treatment plan of NSP. The action plan for treating directly draining "Very High" and "High" category sub-watersheds (1,28,760 ha approx.) is under preparation. The area is expected to be treated in about 7 years. Progress of action plan to be reported by GOMP.

"Agricultural Finance Corporation" was entrusted the preparation of project reports for 2 pilot projects namely Datuni and Ghorapachhar. These areas selected for pilot studies on the basis of Dewan Committee recommendations do not directly drain into the reservoir. The work on Ghorapachhar pilot project has, therefore, been given up. In Datuni Project, (total area 8,949 ha.) 1,136 ha of non-forest and 2,415 ha of forest areas, have been decided to be treated due to advance stage of work. Treatment has been completed over an area of 41 ha of forest land in July, 1990. Two nurseries have also been established in the project area for plantation. In the forthcoming monsoon of July, 1991 it is proposed to treat an area of 1,199 ha (approximately) and the rest of the forest area in the year 1992. Approval of the District Improvement Committee has been sought for treatment of non-forest areas.

GOMP was requested to send a detailed write up on the Pilot studies giving annual financial and physical targets and achievements together with the detailed map of the area.

This may be supplied by the State Government alongwith the details of the treatment measures adopted.

Sardar Sarovar Project

Government of Madhya Pradesh:

1. The total catchment area of SSP below NSP in Madhya Pradesh is 22,48,601 ha. Prioritisation at sub-watershed level is being carried out by AIS&LUSO, New Delhi. AIS&LUSO have completed prioritisation surveys in 6 sub-catchments and the prioritisation in remaining 2 sub-catchments is in progress. An area of 60,000 ha of directly draining sub-watersheds of very high and high priority category is taken for priority treatment. The detailed action plans for the proposed catchment treatment are in progress and are expected in April, 1991.

2. GOMP may indicate the present position about the detailed plan of action, type of treatment proposed, year-wise physical and financial targets in respect of Mann Pilot project in the watershed of the river Mann. The work done upto March, 1991 may also please be indicated.

Government of Gujarat:

The total catchment of the SSP in the State of Gujarat is 36,761 ha. Out of this a total of 29,575 ha falls under "Very High" and "High" category which drains directly into the reservoir and requires treatment. GOG may indicate the present progress of the catchment treatment works and the type of works being executed.

Government of Maharashtra:

The total catchment area of the SSP in Maharashtra is 1,63,611 ha. Out of this a total of 25,398 ha falls under "Very High" and "High" priority, draining directly into the reservoir and is proposed for treatment. GOM has indicated that Agriculture and Forest Departments shall be doing the work of catchment area treatment. The present position regarding preparation of action plan for the CAT works and evaluation of the work already done to be reported.

ii) Compensatory Afforestation

Narmada Sagar Project

Government of Madhya Pradesh:

Government of Madhya Pradesh has identified 10,413 ha of non-forest and 70,802 ha of degraded forest land for taking up compensatory afforestation. NVDA has taken over an area of 4,956 ha of the non-forest land. An area of 11,776 ha (8,704 ha of forest and 3,072 ha of non-forest) has been planted upto 1990-1991. Further progress, if any, and the details of nurseries established may be indicated by GOMP.

Sardar Sarovar Project

Government of Madhya Pradesh:

Government of Madhya Pradesh has identified a total of 6,547 ha of degraded forest and 2,190 ha of non-forest land for afforestation work in lieu of submergence of 2,731 ha forest area in districts of Jhabua, Dhar and Khargone. Till March, 1991, compensatory afforestation has been completed over an area of 848 ha including 132 ha degraded forest and 716 ha non-forest area. GOMP was expected to prepare the detailed plan for 2,390 ha of degraded forest area in Khargone District and the detailed plan for clear felling of trees. GOMP may indicate the present position.

Government of Gujarat:

So far, plantation has been completed in 2,200 ha of non-forest land and 4,528 ha of forest area and a total number of 27,50,000 ha of saplings have been raised in plantations. Further progress may be indicated by GOG.

Government of Maharashtra:

Government of Maharashtra had already submitted a proposal for an area of 19,205 ha of compensatory afforestation to the MOE&F on 14.5.1990. Ministry of E&F is yet to accord approval to the plan. In addition to the above, proposal for compensatory afforestation is also required to

be furnished for 2,700 ha of non-forest land in view of the forest land released for R&R work in Taloda area. GOM has identified 2,000 ha of non-forest land in Nashik and Amaravati Revenue Divisions. Remaining land is yet to be identified. The present position needs to be indicated.

iii) Command Area Development

Narmada Sagar Project

Government of Madhya Pradesh:

Government of Madhya Pradesh was expected to prepare a master plan for drainage, water logging and salinity for the command area. GOMP was also to study the effects of the running water from the fields, besides pesticides, insecticides and chemical fertilizers in the command area. The present position may be indicated.

Sardar Sarovar Project

Soil Surveys and Ground Water Studies as well as Drainage Studies have been completed in the command area upto Mahi River Crossing. Beyond the Mahi Crossing services of 6 consultants have been engaged for studies related to groundwater, drainage, conjunctive use of surface and ground water, silting aspects of main canal, planning and design of micro-level canal network etc. GOG may indicate the current status of the studies.

iv) Survey of Flora & Fauna and Carrying Capacity Studies

Narmada Sagar Project

Government of Madhya Pradesh:

Studies on these aspects were entrusted to Wildlife Institute, Dehradun in December, 1989 and are expected to be completed by March, 1991. Action plan would be ready by March, 1994. Studies will cost Rs.2.73 lakhs. Progress report upto December, 1990 has been received and is given in Annex-XI-2.

Friends of Nature Society, Bhopal was entrusted with the preparation of a plan for Wildlife retrieval and conservation. Preliminary draft report is expected by August, 1991 and the final report will take another 10 months.

Sardar Sarovar Project

Government of Madhya Pradesh:

The studies have been entrusted to the State Forest Research Institute, Jabalpur in April, 1990 and the studies will be completed by March, 1993. The progress report upto December, 1990 submitted by SFRI is appended at Annex-XI-3.

Government of Gujarat:

The studies are being carried out by MS University, Vadodara. The interim report submitted by the University has been circulated to the Members. Upto date progress to be reported.

Government of Maharashtra:

Government of Maharashtra has to finalise TOR with Pune University to undertake these studies. TOR is stated to be under finalisation. The present position may be indicated.

v) Archaeological and Anthropological Survey

Narmada Sagar Project

Government of Madhya Pradesh:

The survey work of 254 villages was given to ASI and State Department of Archaeology & Museum. State Department of Archaeology and Museum has completed the survey in 87 villages and Archaeological Survey of India has completed the survey of 20 villages out of 167 villages. The position in the remaining 147 villages of Khandwa and Harsud is to be indicated. No report has yet been received.

Sardar Sarovar Project

Government of Madhya Pradesh:

Government of Madhya Pradesh, State Department of Archaeology and Museum has completed the survey of 120 out of 193 villages. Action plan would be ready by October, 1991.

Government of Gujarat:

The State Director of Archaeology has completed the survey of all the 19 villages coming under submergence of SSP in Gujarat.

Government of Gujarat has to indicate the mode of relocation of the temples viz. Shoolpaneshwar, Hamfeshwar and Dhumana and the time frame to accomplish the task consistent with the submergence schedule.

vi) Seismicity and Rim Stability of Reservoir

Narmada Sagar Project

Government of Madhya Pradesh:

NVDA was to send a complete report of the GSI to the Ministry of E&F. Present position to be indicated. Regarding procurement of the seismic instruments for the proposed network through M/s Sprengnther, CWC felt that the instruments are not as per latest technology and may not be suitable for NS complex. Further, meeting was proposed on 16.2.1991 to finalise the issue. The outcome of the meeting may be intimated. In the reservoir competency surveys already done by GSI, further studies for some patches of narrow water divide have been suggested. Action taken to be reported.

Sardar Sarovar Project

GOG had submitted only a preliminary report to MOE&F. GOG was expected to submit further reports on these aspects expeditiously. Further, development towards expediting studies by GSI in Madhya Pradesh and Maharashtra may be indicated.

NCA is calling a meeting of State Representatives, Officers of the GSI and CWC on 19.4.1991 to explore the possibilities of expediting the work and results will be reported to the Sub-group.

vii) Health Aspects

Narmada Sagar Project

Government of Madhya Pradesh:

GOMP was expected to modify their report incorporating the comments of the Ministry of Environment & Forests.

GOMP may like to indicate the present position regarding submission of final report to the Ministry of E&F for consideration and approval.

Sardar Sarovar Project

Government of Madhya Pradesh:

NVDA has prepared a report regarding immediate health services and continued health services to be provided for the population. The total expected expenditure including the cost of strengthening health institutions has been worked out as Rs.748.73 lakhs.

Government of Maharashtra:

A report on health aspects has been prepared by the Government of Maharashtra. The total expected expenditure is Rs.2,577 lakhs. MOE&F may indicate the present position.

Government of Gujarat:

Government of Gujarat's work plan for survey and control of water related and communicable diseases with the total estimated cost of Rs. 3,342.7 lakhs has been prepared. In the last meeting the Chairman desired that GOG should consult the concerned Directorate of Health for controlling Malaria with respect to reservoir level variation and in relation to the biology of the Vector. A status report on effect of pesticides on health was also desired.

Present position may be reported.

iv) Fisheries Development of SSP/NSP Reservoir

Government of Madhya Pradesh:

Limnological studies were to be conducted by the three Universities of the State viz. Rani Durgavati University, Jabalpur, Barkatullah University, Bhopal and Vikram University, Ujjain. The quarterly progress report expected from the Universities, has not been furnished by the GOMP. The present position needs to be indicated.

Government of Gujarat:

CICFRI has undertaken studies in respect of aquatic life downstream of SSP in Narmada River in Gujarat State. GOG indicated that the report of first phase preimpoundment survey has been received. In the last meeting, apart from the development of commercial fisheries, the need for protection of indigenous aquatic life was stressed, with particular reference to the migratory species. The need for mechanised lift for this purpose was also stressed. progress in this regard may be intimated.

Narmada Control Authority:

NCA had also commissioned a Socio-economic study for possible fisheries development in the entire Narmada Basin excluding Bargi reservoir upto the confluence of Narmada river in the Arabian Sea including estuarine areas and CICFRI, Barrackpore have been assigned the study. A preliminary report on sociological survey of fishing families of Narmada River has been received and the final report is expected shortly.

ITEM NO. XI-4(66): SETTING UP OF AN ENVIRONMENTAL DEVELOPMENT CELL

It was at the instance of the Chairman, NCA, in early, 1989, that preliminary steps for the establishment of the Cell were taken, as the Cell was envisaged as a vital necessity for Environmental Planning and Monitoring for the Narmada Basin. The Member(Civil) of the NCA discussed the issue with the Director, NEERI on 30.5.1990. The Director, NEERI, submitted a proposal for establishment of the Cell with his letter dated 10.6.1989. However, Environmental Sub-group in its sixth meeting held in August, 1989, discussed the issue and requested Prof. Ramaseshan and Prof. Katti to prepare a joint proposal for establishment of the Cell for consideration of the Sub-group. A detailed proposal for the establishment of the Environmental Development Cell was circulated to all the members of the Sub-group for discussion in the eighth meeting. However, the discussion was deferred. This issue was again taken up during the ninth meeting vide Agenda Item No. IX-4(55), of the Environment Sub-group and it was resolved that the existing institutions will be given the task as per their capabilities and NEERI may coordinate the work. The issue was discussed again during the tenth meeting vide Agenda No. X-6(62). However, no decision could be taken and the issue was deferred again. The Chairman of the Environment sub-group desired to take up the issue with the Secretary, Ministry of Water Resources & Chairman, NCA. However, NEERI was again requested by the NCA on 20.3.1991 to prepare and furnish the proposal containing the inter institutional co-ordination envisaged by them and the role of NEERI in the overall setup, at the earliest, so that it could be placed before the eleventh meeting of the Environmental Sub-group. But NEERI, in their letter dated 25.3.1991 have declined to take up the work without a firm commitment that they would be retained as Consultants. The Chairman of the Environmental Sub-group was informed of the development. World Bank is considering to finance the proposed Environmental Development Cell and had desired on over view proposal from the NCA. NCA prepared the draft proposal and submitted to the World Bank, a copy of which had also been submitted to the chairman of the Sub-group.

Further action to be taken may be discussed and decided.

ANY OTHER ITEM

DATE & VENUE OF NEXT MEETING

ANNEXURES

ANNEX- XI-1

MINUTES OF THE MEETING ON GUIDELINES FOR AN ACTION PLAN
FOR CATCHMENT AREA TREATMENT OF RESERVOIRS HELD ON 19.2.91
AT CENTRAL WATER COMMISSION, NEW DELHI

A meeting to discuss and finalise the Guidelines for an Action Plan for Catchment Area Treatment of reservoirs was held on 19.2.1991 at Sewa Bhawan, Central Water Commission, R.K.Puram, New Delhi under the Chairmanship of Sh. V.B.Patel, Chairman, C.W.C. The list of participants is enclosed at Annexure-I.

1. Chairman welcomed all the participants to the meeting and requested Shri M.S. Reddy, Member (Water Planning), CWC to give a brief background of the guideline.

2. Member (Water Planning) informed that National Commission on Agriculture had recommended some guidelines on sharing of cost. Further, similar guidelines in this regard had also been prepared by a Committee of Secretaries which were circulated by the Planning Commission in October, 1985. Then, he briefly summarised the present guidelines which included prioritisation and identification of areas needing treatment, cost of treatment, sharing of cost and implementing agency etc. These guidelines have been prepared after discussions with the Ministry of Energy, Ministry of Agriculture, Ministry of Environment and Forest, Planning Commission and some of the State Governments over the last one year. Government of Madhya Pradesh and Ministry of Energy (Department of Power) have informed their general agreement with these guidelines. However, Government of Madhya Pradesh have stated that the cost of the Catchment Area Treatment chargeable to the project should be charged to the project as a whole and not to unit I Dam alone and should be apportioned in case of multi-State projects amongst the States concerned in proportion to their share to the total cost of the project.

3. Chairman invited the general comments from the participants. The representatives of State Governments of Tamil Nadu, Uttar Pradesh, Madhya Pradesh, Maharashtra, Orissa and Gujarat indicated that they were in general agreement with the present guidelines. The consensus was that (1) the cost of treatment for the damaged area should be

charged to the project, (ii) the cost of treatment of 'very high' and 'high' categories of direct draining area around the periphery of the reservoir can also be charged to the project subject to its economic viability and (iii) the treatment in free draining areas should be taken up separately as a part of the overall land development programme of the country. The Secretary (Irrigation) Government of Maharashtra informed that they have carried out economic studies in respect of Catchment Area Treatment for reservoirs and they have found that the investment is not commensurate with the benefits, since the B.C. ratio varies from 0.054 to 0.30. As such be suggested that it will be much cheaper to provide silt storage in the reservoir rather than go in for Catchment Area Treatment for reducing siltation in reservoirs. He also submitted a copy of his comments along with a note on siltation of reservoirs for record. Advisor, Planning Commission stated that Water Resources projects must share the cost for maintaining the health of the river basin since they are harnessing the water resources of the basin, Advisor, Ministry of Environment and Forests stated that Basin Management Authorities must be set up as per recommendations of National Water Policy and they should assume the responsibility of treatment of the critically degraded areas in the entire catchment irrespective of the sources of its funding.

4. The Advisor, Ministry of Environment and Forest pointed out that they also prepared guidelines which have not been circulated to the participants. Advisor, Planning Commission and Advisor, Environment & Forest also expressed certain reservations on some of the parts of the guidelines and indicated that they will be sending their comments/observations separately. Advisor, Planning Commission further stated that this being a major policy issue should be decided by a Committee of Secretaries.

5. It was decided that the following documents may be circulated among the members to get their further views, if any, before taking further action on the guidelines.

- i. Guidelines prepared by Ministry of Environment & Forests along with the observations of Central Water Commission/Ministry of Water Resources thereon.
- ii. Observations of Maharashtra Government along with a summary of their note on siltation of reservoirs.
- iii. Comments/views of Government of Madhya Pradesh.
- iv. Comments of Ministry of Energy.

ANNEXURE-ILIST OF PARTICIPANTSCENTRAL WATER COMMISSION

- | | |
|--|--------------------|
| 1. Shri V.B.Patel, Chairman | - Chairman |
| 2. Shri M.S.Reddy, Member (WP) | - Member Secretary |
| 3. Shri J.Ramalingam, Chief Engineer (Special Studies) | - - |
| 4. Shri A.K. Shangle, Director (Reservoir Sedimentation) | - - |
| 5. Shri R.N.P.Singh, Deputy Director (Res. Sed.) | - - |
| 6. Shri Rajesh Kumar, Dy. Director (Res. Sedimentation) | - - |
| 7. Shri S.K.Sil, E.A.D (Res. Sed.) | - - |

MINISTRY OF WATER RESOURCES

- | | |
|---|---------------------|
| 8. Shri K.C.Aggarwal, Jt. Commissioner (PP) | - Representing MOWR |
|---|---------------------|

MINISTRY OF AGRICULTURE

- | | |
|--|------------------------------------|
| 9. Shri Shamsher Singh, Dy. Commissioner | - Representing Min. of Agriculture |
|--|------------------------------------|

MINISTRY OF ENVIRONMENT & FOREST

- | | |
|-----------------------------|--|
| 10. Dr. S.Maudgal, Advisor. | - Representing Min. of Environment and Forest. |
|-----------------------------|--|

PLANNING COMMISSION

- | | |
|---------------------------------|------------------------------------|
| 11. Shri B.N.Navalawale Advisor | - Representing Planning Commission |
| 12. Shri J.N.Nanda, Dy. Advisor | - - |

NARMADA CONTROL AUTHORITY

- | | |
|--|--------------------|
| 13. Shri D.C.Dethanath, Executive Member | - Representing NCA |
| 14. Shri S.M.Pai, Secretary | - - |

SSCAC

- | | |
|-------------------------------|----------------------|
| 15. Shri A.B.Joshi, Secretary | - Representing SSCAC |
|-------------------------------|----------------------|

ALL INDIA SOIL AND LAND USE SURVEY

- | | |
|--|------------------------|
| 16. Shri P.G.Shanware, Specialist Remote Sensing | - Representing AIS&LUS |
|--|------------------------|

GOVERNMENT OF MAHARASHTRA

17. Shri S.I. Deokula,
Secretary (Irrigation) - Representing
Govt. of Maharashtra

GOVERNMENT OF TAMIL NADU

18. Shri S.M.Krishnan,
Chief Engineer (Minor Irriga-
tion, PWD) - Representing Govt. of
Tamil Nadu.
19. Shri P.A.Viswanathan,
Superintending Engineer
Agriculture Engg. Deptt. - -

GOVERNMENT OF ORISSA

20. Shri K.S.Bawa,
Liaison Officer (Irrigation) - Representing Govt. of
Orissa

GOVERNMENT OF MADHYA PRADESH

21. Shri D.K.Verma, C.E
(Monitoring), WRD, Bhopal - Representing Govt. of
MP.
22. Shri R.K.Shukla,
Conservator of Forests,
Bhopal - -
23. Shri D.V.S.R.Sarma,
Member (Engg), NVDA, Bhopal -

GOVERNMENT OF GUJARAT

24. Shri N.Ramaswamy
Secretary, NWR Deptt.
Gujarat. - Representing Govt. of
Gujarat.

GOVERNMENT OF UTTAR PRADESH

25. Shri Ranvir Ahuja,
Special Secretary,
Irrigation (UP) - Representing Govt.
of U.P.

(Representatives from Government of West Bengal, Himachal Pradesh, Kerala, Andhra Pradesh, Karnataka could not participate in the meeting.)

ANNEXURE-XI-2

**STUDY OF IMPACTS OF NARMADA SAGAR PROJECT UPON FLORA AND FAUNA
ALONGWITH ATTENDANT HUMAN ASPECTS**

**PROGRESS REPORT - I
(APRIL 1990 - DECEMBER 1990)**

**Project Investigators : Shri H.S.Panwar, Director, WII
Dr. S.N.Prasad, Scientist, WII
Dr. Asha, Scientist, WII**

**Wildlife Institute of India
P.O. New Forest,
DEHRADUN - 248 006**

INTRODUCTION

The Narmada Sagar Project, one of the major multipurpose projects, near Punasa in Dist. Khandwa of Madhya Pradesh, will be our main focus of attention under this proposed study to investigate the impacts of the project on flora and fauna and the human aspects relevant thereto. The Narmada Sagar Project envisages the construction of a power generating unit with a capacity of 140-256 MW and an irrigation potential of nearly 1.23 lakh ha. The project will submerge 91,348 ha area including 40,332 ha of forest land. It will also displace nearly one lakh people of which over 30000 are tribals.

This study has been undertaken by the Wildlife Institute of India (WII), Dehradun under an MOU signed with the Narmada Valley Development Authority (NVDA) in April 1990. The overall aim of the project is to quantify impacts upon flora and fauna which are likely to be accentuated by the enhanced human pressures on the residual forest area. Suggesting compensatory and mitigatory measures related to wildlife. Four major components have been identified for investigation under this study : (1) A study of vegetation communities and impacts upon them, (2) Estimation of large mammals in terms of abundance, distribution and habitat utilization under the project area and assessment of key wildlife habitat parameters such as cover, food and water in relation to animal distribution and abundance, and thereby to estimate carrying capacities, (3) Ornithological evaluation as component of wildlife assessment and (4). Impact on socio economic conditions of the people in and around the project area with a

view to assessing the induced impacts upon flora and fauna.

The entire study is being undertaken by a team of five WII field scientists, having a background in disciplines of zoology, botany and social sciences. The study is being supervised by WII's faculty members identified as nodal persons for this project, having expertise in EIA, remote sensing, computer applications and other subject areas relevant to this project. The account of progress during April 1990 to Dec. 1990 under the different heads of the study components is as follows :-

1. STUDY OF IMPACT ON VEGETATION AND WILDLIFE HABITAT

(i) Field survey of the study area :

A reconnaissance survey of the proposed submergence areas of Narmada sagar and its surrounding areas has been conducted for floral and faunal species, terrain, wildlife habitat and local inhabitants. On the basis of this survey, proposed submergence area has been categorized into North and South banks for further delineation for specific studies. In order to cover a representative of the study area, grids (1x1 km) have been selected randomly in 20% of the total area for vegetation and wildlife habitat analysis in the proposed submergence and adjacent areas. Some of the randomly selected grids in the reserved and protected forests of Chandgarh, Satwas and Punasa ranges have been studied for the detailed phytosociological and wildlife habitat evaluation.

(ii) Phytosociological study :

For phytosociological study the density, diversity, frequency, dominance, species composition, vegetation

associations and girth class analysis of plant species, parameters like ; species, G.B.H., number of species and height of plants of different species have been recorded at grid level. Forage volume of herb layer has also been recorded within the grids.

(iii) Wildlife habitat evaluation :

Evaluation of wildlife habitat is also integrated in the randomly selected grids of the study area. In order to evaluate the habitat for wildlife, quantitative and qualitative information on parameters such as topography, slope, terrain, soil, water availability, canopy cover, path, erosion, fire, weed cover, herb cover, forestry operations, lopping, dung count of wild and domestic animals, wildlife signs, human pressures, shrub cover etc. have been recorded. These parameters will help evaluate the suitability of habitat for various wild animals and also the level of impacts of human pressures on different habitat types within the proposed Narmada Sagar submergence and adjacent areas.

(iv) Vegetation Regeneration and Phenology :

Regeneration potential and phenological information on important plant species occurring in the study area are being monitored for their significance in seasonally altering the forest and habitat quality.

(v) Ethnobotanical study :

Recording of the ethnobotanical importance of plant species occurring in the study area is in progress. Major source of ethnobotanical information is the dialogue with the local people.

All plant species having ethnobotanical importance have been collected and listed, and are being classified according to their ethnobotanical use, conservation status, abundance, intensity of use and economics.

II. ASSESSMENT OF WILDLIFE STATUS :

(a) Habitat Suitability Index Models :

Initial survey of the study area to estimate present status of large mammals in terms of abundance, distribution and habitat utilization has been made. Key habitat parameters such as cover, food and water requirements of these species are studied as specified in I(iii). The habitat quality for some selected species is being documented through the Habitat Suitability Index (HSI). This value is derived from evaluation of the ability of key habitat components to supply the life requisites of the selected species. The evaluation involves using key habitat components to compare existing habitat conditions and optimum habitat conditions. This habitat evaluation procedure involving model building has been adopted for habitat assessment in impact areas. The proposed HSI model is being developed for selected ungulate species at Bori wildlife sanctuary to represent optimum habitat conditions. This will be utilized in assessing the relative value of different areas at the same point of time in the impact areas and also relate the values of the same area at future points in time. The HSI model has been developed and is in the process of refinement for use as standard in further evaluations. Sites for developing HSI models for species existing in the study area are also being located in the

neighbouring areas to visualize comparisons with disturbance free situations.

(b) Ornithological evaluation :

The ornithological evaluation approach has been taken as one of the component of wildlife assessment. At the core of an evaluation system are the attributes where wildlife conservation interests can be classified. The following attributes are being used to fulfill the objectives : size (extent), diversity and species richness, population size, rarity, habitat fragility and fragmentation.

Reconnaissance survey of the proposed submergence area has been completed both on North and South banks of Narmada river. The number of fragmented and unfragmented forest blocks have been selected as sample study sites. Line transect census technique is being used to determine the population and species diversity of birds at each study site. Habitat parameters such as species composition, density, vertical stratifications and cover estimates are being assessed, using a number of plants along the transect in each study site. Phenology of major tree species is also being monitored to get an idea of changes in food abundance for frugivorous and nectarivorous birds. Data collection for winter season is in progress and data has been collected for four study sites, two on north bank and two on south bank of Narmada river. Data on arrival time and frequency of migratory birds has also been collected.

A total of 170 species of birds representing 47 families have been identified in the proposed submergence area.

III. SOCIO-ECONOMIC STUDIES :

An attempt has been made to assess the natural resource use and socio-economic conditions of the people in the submergence area of the multipurpose project as an aspect of biohabitat evaluation. Natural resources use is being studied in terms of land use, dependence on forests and on Narmada including cultural lifestyles. Data on socio-economic aspects have been collected for all villages falling under the study area from secondary sources for cluster sampling of intensive study villages. Data collection from selected village sites has been in progress. Two villages have been surveyed intensively by structured interview using schedules. The people's dependence on forest for raw materials, fuel, minor forest produce, fodder and socio economic importance of Narmada river are some of the parameters which have been studied during the survey. The resettlement programme offered by the project authority will be evaluated in terms of its suitability to provide requirements to the people as evaluated through the intensive village survey so that a final correlation with biohabitats can be established.

IV. UTILIZATION OF FUNDS RECEIVED SO FAR :

The available funds for this period have been utilized in the recruitment of a scientific team consisting of 2 Scientists at senior level (Research Associates) and 3 Scientists at Junior Research Fellow (JRF) level. Scientific assistants and other support staff has also been recruited for field work. Purchase of two motorcycles and one jeep has been made so far. Other equipment is in the process of acquisition. Certificate of

utilization of the grant will be furnished to NVDA at the end of the financial year.

The research work has, however, to some extent been constrained by delay in providing accommodation for the base camp in Narmada Nagar as per the MOU. The accommodation has been very recently provided by NVDA and the furnishing is still in progress.

One of the Junior Research Fellows (JRF) who had been appointed for the study of socio-economic aspects left the project in October 1990 on having been offered a fellowship in Belgium. Process is underway for the recruitment of another JRF but one such exercise has failed. However, fresh efforts are being made.

V. FUTURE LINE OF WORK :

The data generated so far on different components of the study will be subjected to analysis to provide scientific information outlined earlier in this report. Standardization of techniques used and developed during the course of present investigations will be completed on the basis of results of data analyses.

Field work in Omkareshwar Project area will be initiated after the techniques are standardized and first cycle of data from Narmada Sagar impact area have been gathered.

QUARTERLY REPORT AND REVIEW OF PROGRAMME

PERIOD : 1st SEPTEMBER, 1990 To 31st DECEMBER, 1990

PART I

1 a) Title of the Project : Impact assessment of Madhya Pradesh lands to be submerged under Sardar Sarovar Project and adjoining ecosystem; Flora, fauna and other biotic components.

b) Name of Principal Investigator and Institution : Director, State Forest Research Institute, Polipathar, Jabalpur.

2 a) Objectives :

- i) Nature and extent of impact on the different vegetation types in and around project area.
- ii) Devise special measures for rare and threatened species (floral and faunal).
- iii) Study of various floral components and evaluation of their habitat.
- iv) Identify habitat usage by major bird communities in submergence and impact areas.
- v) Identify existing levels of human use (grazing, lopping, firewood collection etc.).
- vi) Evaluate ethnobotanical values of vegetation for the people of the region.
- viii) ~~Identify suitable areas~~
Survey of nearby forest areas to explore possibility of identifying suitable areas for wildlife displaced.
- ix) To suggest mitigation measures (wild-life displaced).
 - a) Scheduling of forest clearance
 - b) Special protection and habitat development, etc.

- x) Suggest ecodevelopment measures for people living near escape areas so to mitigate peoples pressures upon such areas.
- xi) Identify gene pools likely to be affected.
- xii) Any other relevent study.

Area work : Areas to be submerged due to Sardar Sarovar Project in parts of Dhar, Jhabua districts and Barwani sub-divisions of West Nimar district (Khargone).

Location : Given in Map (enclosed)

PART II

- 1) Planx of work for the period under reference - A preliminary survey to get an overview of the Project area.
 - Literature review to collect secondary data an all components of Sardar Sarovar Project having relevance to present investigation.
 - Study of vegetational spectrum in the submergence and impact areas.
 - Collection of secondary demographic data for socio-economic studies. Questionnaire design and field testing in 10 villages. Collection of information village-wise.
 - Survey of existing ethnobotanical vegetation and their use by rural and tribal population.
 - Assessment of faunal population and habitat utilisation.
 - enumeration of various tree species.
 - other studies in relation to above.

2) Methodology in detail

Ecological : The entire sub-mergence area was divided into 1 sq km grids as given in Fig. 1.

In order to study the diversity and vegetational composition of ground vegetation in the affected region, quadrat method (Mishra, 1968) is being followed; quadrats of 10 x 10m and sub-quadrats of size 2 x 2m and 1 x 1m in each one ^{Sq. Km.} hectare plots were laid to study tree; shrubs and ground flora vegetation. Checklist is being prepared for each site of vegetation as rare and of ethnobotanical, and ethno-medico-botanical importance. Plant specimens are collected, identified and are being preserved for herbarium at S.F.R.I. Tree vegetation survey and enumeration of tree species above 20 cm gbh were ^{also done} ~~totally enumerated~~ (Table 1). A, B, C,

Locality-wise checklist of tree species is being prepared in taxonomic manner. All the data of one ^{Sq. Km.} hectare plot was recorded in the prescribed format. Studies of birds, Snakes and other wild animals (Table 2) was done on the basis of occasional observations during field visits.

Socio-economic Studies : Socio-economic studies were also planned and secondary data collected.

3) Work done (Month wise) :

Sept'90 : Inception report based on preliminary survey was prepared and submitted. This report (~~inception report~~) indicated that the field work has commenced. This was not intended to give any data or conclusion. The data and conclusions are to be submitted through successive quarterly reports.

October'90 : Selected staff of the project were taken for field orientation and training at Alirajpur (Jhabua district). Work plan components were discussed and grid system of work was finally selected. Format and Questionnaire for data collection were also finalised.

November'90: Forests, villages and agricultural areas affected by Sardar Sarovar Project were surveyed in Dhar district for floristic, faunal and socio-economic studies.

The details of the work done ^{are} is given in appended Tables. 3,4,5,6 and 7.

December'90: Barwani sub-division in Khargone district was surveyed. Collection of Secondary and primary data was done.

- Questionnaires for Socio-economic studies on extent of dependence of the rural and tribal population were tested in field.

- Data collected was tabulated.

4. Results obtained including data collected - Collected data have been given in appended Table 1 to 2.

5. Analysis of results - processing of data is continuing

6. Modification required : Not required.

7. Work Plan for next three months.

January'91 : A. Floristic Survey

1. Total Enumeration of tree growth in the submergence area of Alirajpur.

2. ^{Distribution} Enumeration of ground flora in above area.

3. Ethnobotanical studies.

4. Faunal studies.

5. Food cover.

B. Socio-economic studies

1. Villages and house holds to be surveyed for their present requirement of fuel, fodder and non-wood forest products.

February'91 : Above work to continue.

March'91 : -do-

Explanatory Note

In view of on-going agitation against SSP/ISP and non-cooperation by villagers in responding to questionnaire, the survey work might receive set back. In that event, the methodology for assessing dependence of population^{of} man and livestock, on standing forests in respect of grazing, firewood, MFP etc. might necessitate modification. Indirect evidence like secondary data on population of man and livestock, fuelwood consumption pattern, availability of important MFP (based on enumeration in field), availability of grass and other fodder yielding vegetation etc. shall be taken into consideration. Complete enumeration in Dhar Reserve and Protected Forests have been done. Forest Compartments in Alirajpur (Jhabua district) shall be surveyed during the next quarter. Enumeration of growing stock, ground flora, ethno-botanical studies, sighting of birds, wild animals, snakes etc. to be done in the area.

PART III

Physical Progress	Scheduled	Actual
1. Advertisement for staff	5	5
2. Staff in position	5	5
3. Date of ordering equipment	N/A	

-
4. Date of installation equipment N/A -
5. No of field surveyes during the quarter Three
6. Aspects planned for completion. : Study of vegetational and faunal components and impact of Sardar Sarovar on them.
7. Reason for short fall/not achieving the targets envisaged. : Anti-dam agitation, Diesel shortages, non-availability of Jeep etc. were problems faced.
The work is proposed to be speeded up by hiring additional vehicle and employing more researchers for the Job.
8. How this shortfall is proposed to be made up.
9. No. of Research staff in position during the period of report 5
10. Distribution of works among investigators :
- JRFs (i) Dr. S.K. Masih : Ethno-botanical studies.
- (ii) Dr (Miss) S. Sambatsar : Collection and interpretation of flora.
- (iii) Mr. ^{Santosh} Patidar : Collection and interpretation of flora.
- (iv) Mr. Sanjay Shrivastava
- (v) Mr. Anil Shrivastava : Socio-Economic studies.
- (vi) Shri G.L. Shrivastava with F.R./Dy. R. and other staff. : Enumeration of growing stock
- (vii) Dr. P.C. Kotwal
Dr. A.K. Kandya
Dr. R.K. Pandey : Sighting of wild animals, Birds and Snakes, Ground Flora, food cover and overall guidance.

- b) Dr. Pratibha Bhatnagar
(Social Economist) : Guidance given to Research
Fellows doing Socio-economic
studies.
- (viii) Shri V.K. Shrivastava : Field organiser to select camp
(Short-term assistance) site, provide other working
(1.9.90 to 28.2.91) facilities in the field, Term upto
28.2.91.
- (ix) Dr. S.P. Bajpai : Dr. Bajpai for grassland ecosys-
& tem and Dr. Oomachan for ethno-
botanical guidance.
Dr. M. Oomachan These are only part time super-
(short-term consultation) visors.
- (x) Prof. G.P. Mishra : Continued to provide technical
guidance.

The services of Shri V.K. Shrivastava, shall be dispensed with after February 1991. Similarly Dr. S.P. Bajpai and Dr. M. Oomachan shall be consulted as and when required. After 31st March 1991, further cut in supervisory staff and strengthening of Research Fellows is proposed to be done.

11. Map Digitisation : So far the complete enumeration of growing stock has been done and therefore use of photo-imagaries may not be used. However, once the work of Alirajpur and Badwani area gets going, use of photo-imagaries may be thought of.


Financial Progress

Rs.

1) Junior Research Fellows	30,350
2) TA/DA	7,808
3) Driver	2,745
4) Contingent expenses	55,030
5) Fuel (POL)	8,221
6) Stationery & Postage	2,644

Total Rs. 1,06,798

Accfs. Suptd.


Director,
S.F.R.I. Jabalpur, (M.P.)

I N D E X

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NARMADA CONTROL AUTHORITY

Environment Sub Group

11th meeting

1st May 1991

Minutes

MINUTES OF THE 11TH MEETING OF ENVIRONMENT
SUB-GROUP HELD ON 1ST MAY, 1991 IN
PARYAVARAN BHAWAN, NEW DELHI.

Shri R. Rajamani, Secretary, Ministry of Environment & Forests and Chairman of the Environment Sub-Group of NCA welcomed the Members and Invitees to the 11th Meeting of the Environment Sub-group. The list of participants is enclosed at Annex.XI-Min.1.

Discussion on the agenda items was taken up thereafter.

ITEM NO. XI-1(63): CONFIRMATION OF THE MINUTES OF THE TENTH MEETING

The minutes of the 10th meeting of the Environment Sub-group held on 31st January, 1991 were circulated among the Members. It was agreed that the amendments contained in letter No.NVDA/FOR/91/705-B/465 dated 16.4.1991 of Shri N.B. Lohani, Vice Chairman, NVDA, circulated during the meeting, (copy enclosed at Annex-XI. Min-2) with regard to the Catchment Area Treatment etc. may be incorporated excepting the paragraph on Archaeological Studies. The minutes were confirmed with the above amendments.

Item No. XI-2(64): A) REVIEW OF THE EFFORTS OF ENVIRONMENT SUB-GROUP DURING 1990-1991

B) REVIEW OF ACTION TAKEN ON THE DECISIONS OF PREVIOUS MEETING

A) Review of the Efforts of Environment Sub-group during 1990-91.

The Chairman desired that discussion on each item covered during the 3 meetings may not be necessary as discussion on subsequent agenda items will cover these aspects:

B) Review of Action Taken on the Decisions of Previous Meeting.

1. Consideration of Policy Issues [Item No.X-3(57)]

a) Catchment Area Treatment and Cost Sharing:

Shri Shangle, Director, CWC explained that a meeting was held on 19.2.91 on this subject and that CWC was awaiting the comments of MOE&F and Planning Commission who have also been reminded. Dr. Maudgal, however, clarified that the participants invited to the meeting on 19th Feb., were not made available copy of the Paper on the subject prepared by the Ministry of Environment and, as such, they were not in a position to react to the proposal by taking both view points into account. Secretary (Irrigation), Maharashtra had also opined that data collected for Maharashtra from a number of projects needs first to be studied for due consideration of the extent of catchment area treatment and cost sharing etc. It was agreed, therefore, that a meeting would be convened after these documents were circulated among the participants of the Central and State Governments so that a final decision could be arrived at or, if the need arose, the matter referred to a Committee of Secretaries as suggested by Adviser (I&CAD), Planning Commission in that meeting.

Chairman stressed the need for quick finalisation of this issue and, therefore, suggested that the views of the Ministry of Environment & Forests communicated earlier on its Paper should be taken as final. He also stated that the final decision must be taken before the next meeting of NCA so that this long over due decision does not remain outstanding.

b) Extension of Time for Environmental & Forestry Approval:

Chairman informed the participants that he has received a letter from the Joint Secretary, MOWR, just that day indicating an extended time-frame for carrying out the proposed studies needed for preparing Environmental Action Plans. The Chairman made it clear that the pari-passu implementation of the Environmental Action Plans is not merely for carrying out the studies but even more so for their implementation as well. The communication received, therefore, will be separately examined to see whether it really covers the directive of NCA Review Committee to seek extension of environmental approval granted earlier stipulating pari-passu clause. Executive Member, NCA sought to explain the delay in the studies by saying that these studies had been contemplated for the first time in the case of Narmada Sagar and Sardar Sarovar Projects and that some action on items like CAT, CAF etc. is already being taken up and, in any case, there is sufficient time for pari-passu implementation. The Chairman, however, pointed out to the poor progress made in carrying out even the studies.

2) Present Status of Studies/Surveys and Environmental Action Plans [(Item No.X-3(59))]

This item was clubbed for discussion with Item No.X-3(65): Present Status of Studies/Surveys and Environmental Action Plans.

To ensure implementation of environmental measures pari-passu with engineering works, it was decided in May, 1990 that details will be worked out covering -

- Revised and final time-frame for completion of environmental studies and preparation of plans;
- Final time targets for formulation and implementation of environmental action plans; and
- Revised construction schedule.

[REDACTED]
[REDACTED]
[REDACTED]. A tentative Bar Chart for NSP was made available during the meeting. However, most of the members and participants in the meeting did not have copies of these two documents and the progress reported by State representatives was discussed and compared on the basis of Chart furnished by NCA to the Chairman.

Reporting on the action taken on the decisions of the last meeting, Vice Chairman, NVDA stated that:

- there was no sanctuary by the name 'Neemanpur' in the area. Shri Ranjit Singh, Addl. Secretary, MOE&F clarified that the sanctuary is in 'Kheoni' and that further studies may be carried out for this sanctuary.
- A report on anthropological aspects from Rashtriya Manav Sangrahalaya was furnished in the meeting by GOMP to NCA. This will be forwarded to the MOE&F.
- The full report on Seismicity, Rim Stability and Reservoir Competency has already been furnished to MOE&F by GOMP vide letter No.287/11/9/198 dated 26.4.1991 with copy to NCA.

b) Sardar Sarovar Project

Govt. of Gujarat

- i & ii) Regarding land use studies and carrying capacity studies in command area, Vice Chairman, SSNNL stated that it was mentioned for the first time during the last meeting that GOG would carry out such studies. GOG is consulting the Narmada Planning Group to carry

out such studies. MOE&F agreed to send its concept of carrying capacity and land use studies for finalisation of the TOR for the studies.

- ii) GOG informed that the report on impact of pesticides and insecticides on health is under discussion with the concerned department of GOG and it will be submitted shortly.
- iii) GOG informed that the report on seismicity of SSP is already available and regarding the rim stability, the work has been carried out by GSI for the area in Gujarat and in an area of 130 sq.km. out of 300 sq.km. in M.P. and the reports on both the studies are expected by July, 1991. For the balance area in M.P., the work will be taken up during the next working season by GSI.

Government of Maharashtra

GOM was requested to take immediate action in the matter.

Government of Rajasthan

GOR representative submitted a report on Study of Ecological and Environmental Aspects and Remedial Measures on Narmada Main Canal command in Rajasthan portion, during the meeting.

Plan for Clear felling of Trees in the Submergence Area

None of the State Governments have furnished plan for clear felling of trees in the submergence area. However, GOMP in their report furnished during the meeting mentioned that felling plan was prepared by SFRI, Jabalpur in March, 1991 for GOMP but on scrutiny it was found that the wildlife aspect was not covered in the plan. SFRI, Jabalpur has now been asked to revise the felling plan indicating the receiving area for safe migration of the existing wildlife. As the final report on wild life retrieval and conservation plan is expected from Friends of Nature Society by [REDACTED] te. This plan will, therefore, be examined by the wildlife committee constituted by GOMP forest department. As such

this plan can be put up to Environment Sub-group only after February, 1992. Addl. Secretary, MOE&F emphasised that the clear felling in reservoir area should be dovetailed to afforestation and corresponding programme of regular felling.

3) **Time frame for Preparation of Action Plan and implementation of Environmental Safeguard Measures [Item No.X-4(60)]**

NCA has furnished the documents desired by the MOE&F vide letter No.E-34(11)/91/874 dated 14.4.1991. However, the financial implications of the individual environmental components could not be submitted for want of information from the respective State Governments. Chairman was not very happy and he desired more details. The Bar Charts prepared in a hurry require reshaping and detailing.

ITEM NO.XI-3(65): PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENTAL ACTION PLAN

i) Phased Catchment Area Treatment

Narmada Sagar Project

It was noted that the schedule for construction operation as well as Environmental Action Plans for Narmada Sagar Project has not been circulated. One copy of a Bar Chart was, however, made available during the meeting. It was noted that total catchment area requiring treatment has been reduced from 11.02 lakh ha. to only 1.65 lakh ha. on the assumption that only the directly draining critically degraded catchment areas on the reservoir periphery would require treatment. Indeed, on the same assumption, the pilot project for catchment area treatment taken up in Ghodapachhar watershed has also been abandoned.

While reviewing the work of catchment area treatment, [REDACTED]

[REDACTED]

[REDACTED] Considering that over a 5 year period since approval of the project in 1987, only 41 ha area has been taken up for treatment, the Chairman stressed the need for mobilising resources and infrastructure so that the task of catchment area treatment can be completed in time. This would require catchment area treatment at the rate of 21,000 ha every year in the Narmada Sagar catchment alone which may have to be increased ten times to cover the entire free draining catchment. Vice Chairman, NVDA, while agreeing to compress the Action Plan for completion by 1995-96, requested to extend the time limit by one year i.e. 1996-97. Considering the mis-match between the work executed so far and the magnitude of the task to be completed, the [REDACTED]

[REDACTED]

The Chairman also directed that afforestation work in Narmada Project should not be at the cost of the afforestation work elsewhere in the State i.e. by excessive diversion of resources and manpower from other areas. Shri Lohani, Vice Chairman, NVDA stated that additional Directorate of Agriculture with 16 Divisions is already in position with NVDA with a capability to take up the catchment area treatment works @ 25,000 ha per annum. To meet targets beyond this level may hamper afforestation efforts in other parts if manpower is diverted from there. Dr. Maudgal, however, added here that the combined target of catchment area treatment by GOMP both for Narmada Sagar and Sardar Sarovar Projects would be much more than 25,000 ha per year and, therefore, the need for further mobilisation of resources is essential if the work is to be completed within the stipulated time. The Chairman reiterated his earlier stand and desired that the GOMP should compress its action plan so as to complete the works by 1995-96 even if help needs to be taken from other participating States like Gujarat and Maharashtra.

Sardar Sarovar Project

Government of Madhya Pradesh:

Shri Shekhar Singh, Director, IIPA expressed that during the last meeting, the following 3 basic points were raised by him with regard to the catchment area treatment:

- 1) Assimilation time of 3-4 years is required for stabilisation of the catchment.
- 2) Till NSP comes up, the entire catchment of the Narmada below Bargi will form the catchment area for SSP and the same will have to be treated.
- 3) The catchment area is to be treated not only from the point of view of arresting silt but also for getting increased dry weather flow.

Chairman remarked that by compressing the Action Plan to 1995-96, becomes all the more necessary to meet the points raised by Shri Shekhar Singh. However, considering that no Catchment Area Treatment has been reported over the last five years, the

quantum jumps proposed to treat 6,000 ha during the current year and 19,000 ha every year subsequently would call for massive mobilisation of resources. Vice Chairman, NVDA assured that they will be able to compress the time schedule and complete the job within the stipulated time.

Government of Gujarat:

Vice Chairman, SSNNL informed that the area targetted under the Action Plan of the GOG for catchment treatment cannot be increased further in view of acute shortage of staff, but they will be able to complete the catchment area treatment works as stipulated in their Action Plan.

Government of Maharashtra:

No Representative attended the meeting. No catchment area treatment works have been done so far.

Chairman directed that the catchment area treatment and afforestation plans with detailed drawings for the SSP may be furnished to MOE&F by GOM and GOG within 15 days as required from NSF.

ii) Compensatory Afforestation

Narmada Sagar Project

Government of Madhya Pradesh:

Out of the [REDACTED] area to be afforested, [REDACTED] [REDACTED] ar. GOMP informed that afforestation work will be taken up during the coming monsoon season on a large scale for which 75 nurseries have been established. Addl. Secretary, MOE&F desired that felling in submergence area should be synchronized with the catchment area treatment above FRL and that workers in the submergence area should be supplied with fuel. He further requested that the proposed afforestation programme should be protected from human and cattle interference. Chairman mentioned that he himself has seen the area taken up for

afforestation and found that the trenches have been made for necessary protection from cattle. Chairman appreciated the efforts of GOMP with respect to nurseries near dam site inspected by him. However, he further stressed that in order to achieve proper natural regeneration, dependable field level management should be ensured.

Sardar Sarovar Project

Government of Madhya Pradesh:

GOMP informed that an area of 1980 ha is targetted for afforestation during 1991 monsoon for which area preparation is under progress. 12 nurseries have been established, 2 in Khargone, 6 in Dhar and 4 in Jhabua districts. MPRVVN and NVDA have already started the advance area preparation in 1200 ha and 780 ha respectively for plantation during monsoon of 1991.

Out of 8,700 ha area to be covered, the work has been so far, however, completed in about 900 ha only.

Government of Gujarat:

GOG representative informed that afforestation is to be taken up over an area of 31,800 ha out of which 6,700 ha area has been covered so far. Afforestation is ~~to be~~ taken up in 4650 ha non-forest area in Kutch region and 24,560 ha of degraded forest, with density below 0.4 falling in the catchment. In addition, O'G GOG has also taken afforestation works in the vicinity of dam also. Shri Mehta, Chief Conservator of Forests, GOG further informed that salinity in the Kutch area is very high. 12 species have been taken up for trial out of which 3-4 species have been found successful. GOG is going ahead with their afforestation programme. Chairman expressed some reservations about the prosopis species. However, GOG informed that in view of its adaptability to local conditions, there should not be any apprehension in adapting this species. Addl. Secretary, MOE&F stated that the Prosopis species is particularly used for charcoal preparation by local people.

Government of Maharashtra:

No representative was present in the meeting to report that out of the target of 21,900 ha area to be covered, nothing has been done so far. However, Executive Member, NCA informed that GOM had submitted programme for afforestation in 19,205 ha area about a year back to MOE&F but approval is still awaited. Shri Patnaik, DIG Forests, MOE&F informed that acceptance from PCCF Maharashtra regarding suitability of land for compensatory afforestation is awaited. He also mentioned that some more clarifications are to be given by GOM before granting approval. Executive Member, NCA requested that the points requiring clarification may be furnished to NCA so that the matter can be expedited.

Addl. Secretary, MOE&F desired to know the information on mechanism of monitoring of progress on afforestation. Member (Env.), NVDA stated that one DFO is exclusively attending to the monitoring work in M.P. Chairman desired that apart from the internal monitoring, external monitoring is also required and the mechanism to be created may be decided in the next meeting of the NCA.

Chairman, however, expressed [REDACTED]
[REDACTED]
ing pari-passu with construction works. This has, Therefore, to be discussed in the NCA meeting.

iii) Command Area Development**Narmada Sagar Project**

Government of Madhya Pradesh:

Studies on surface and sub-surface drainage in command areas of Narmada Sagar and Omkareshwar projects were conducted by Consulting Engineering Services, New Delhi in 1984 and the ground water modelling studies done by Indian Institute of Science, Bangalore in 1985. A Master Plan for control of waterlogging and salinity control is to be prepared. Copies of [REDACTED] should be furnished to NCA and MOE&F immediately. ✓

Action has been initiated to shortlist consultants for drawing up a Master Plan to cover 1,23,000 ha command area.

Regarding studies on effect of run-off from fields after application of pesticides, insecticides and chemical fertilizers in command area, GOMP is not aware of such studies in the State or elsewhere in the country, but the matter has been taken up by NVDA with J.N. Agriculture University, Jabalpur and State Pollution Control Board on this aspect.

Prof. Ramaseshan requested that copies of the reports may be forwarded to him so that he may also be able to contribute.

Prof. Shekhar Singh of IIPA desired the information from GOMP with respect to ground water studies which were carried out for NSP without considering the impact of SSP and whether fresh studies on ground water modelling have been started to account for back-water effect of SSP also. Vice Chairman, NVDA stated that Consultants are being finalised to undertake these studies. Time frame was not indicated.

Sardar Sarovar Project

Government of Gujarat:

GOG informed that command area studies beyond Mahi Crossing are still in progress and the report is expected to be ready by end of this month year.

Chairman enquired whether there has been any progress in studies on status of the carrying capacity taking into account industrial growth and other developments in the command area.

Vice Chairman, SSNNL explained that the matter has been taken up with Narmada Planning Group as well as Planning Department of the Government. NEERI has also been addressed in the matter. He also requested that some guidance may be given by MOE&F regarding the details of studies to be carried out in this respect. Chairman directed that Terms of Reference for the studies may be drawn up based on the studies carried out for Ukai and Kadana projects and the same may be forwarded to MOE&F for consideration.

iv) Survey of Flora & Fauna and Carrying Capacity Studies

Government of Madhya Pradesh:

-Regarding Studies entrusted to Friends of Nature Society,
BH [REDACTED]
-servation, the report is expected by August, 1991 and the final
report will take another 3 months. However, the progress report
as on April, 1991 was furnished by GOMP during the meeting.

Government of Madhya Pradesh:

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Government of Gujarat:

GOG informed that M.S. University, Vadodara to whom studies were entrusted has submitted second interim report recently and final report is expected by the year end. GOG further informed that a separate team on wildlife studies, under the Forest Department with cooperation of M.S. University, is doing the work. In reply to a suggestion of Chairman for involving Wild Life Institute, Dehradun as an external agency, GOG informed that the Institute has declined to take up the study.

In reply to a question of Addl. Secretary, MOE&F for developing Wild Ass Sanctuary, GOG informed that it has a plan for development of a sanctuary in Nal Sarovar for wild Ass. In reply to another question of the Addl. Secretary, MOE&F over the Shoolpaneshwar Sanctuary, GOG informed that M.S. University, Vadodara along with one Conservator of Forest is carrying out the studies and that these agencies are consulting BSI, ZSI in addition to WII as per the need of the work.

Government of Maharashtra:

No representative was available. However, the Chairman expressed concern over non-finalisation of even the TOR by GOM with Pune University. He desired to take up the issue with the Chief Secretary, GOM. ✓

v) Archaeological & Anthropological Survey

Narmada Sagar Project

Government of Madhya Pradesh:

GOMP informed that the work on the survey is now entrusted to State Archaeological Department for the completion of the work in the remaining 147 villages. The work will be completed by

Sardar Sarovar Project

Government of Madhya Pradesh:

GOMP informed that the survey work in the remaining 73 villages is affected by the agitation in the submergence area. Yet GOMP is trying to maintain the schedule.

Government of Gujarat:

In reply to a question of Chairman, GOG informed that sites for relocation of the temples have been selected finally in consultation with trustees and that the Archaeological Department invariably certifies the monuments to be protected and the reports on the same was submitted 5 years ago by the GOG. However, Executive Member, NCA and the Adviser, MOE&F desired to have a fresh copy of the report under reference from GOG. ✓

vi) Seismicity and Rim Stability of Reservoir

Narmada Sagar Project

Government of Madhya Pradesh:

GOMP informed that the matter was discussed with Member (D&R), CWC, and Director, IMD by Member (Engg.), NVDA on 18.3.1991 at New Delhi. [REDACTED]

[REDACTED] Based on the above draft, [REDACTED] by NVDA and [REDACTED] As regards further studies on some patches of narrow water divide regarding Rim Stability, GOMP is pursuing the matter with GSI. MOE&F acknowledged the receipt of report delivered that day on seismicity aspect from GOMP.

Sardar Sarovar Project

Government of Gujarat:

MOE&F desired a report on seismicity prepared by GSI, Jaipur from GOG. }

Regarding Rim Stability, GOG informed that studies in 130 sq.km. area was completed by GSI, Nagpur, the report of which will be available by July, 1991. The issue was discussed during the meeting convened by the NCA on 19.4.1991 wherein it was decided to take up the matter with GSI for early completion of the remaining studies commencing in the next working season.

vii) Health Aspects

Narmada Sagar Project

Government of Madhya Pradesh:

[REDACTED] Narmada Sagar Project and [REDACTED] to NCA. A copy is to be made available to MOE&F also.

Sardar Sarovar Project

Government of Maharashtra:

No representative was present.

Government of Gujarat:

In reply to a question on a report on effect of pesticides and insecticides on health and control of mosquitoes vis-a-vis reservoir level, GOG informed that they have taken up the matter with the concerned department and will report before the next meeting.

viii) Fisheries Development of SSP/NSF Reservoir

Government of Madhya Pradesh:

GOMP informed that the project is being implemented by [REDACTED] University, [REDACTED] and Vikram University, Ujjain for [REDACTED] ec- [REDACTED] available with NCA.

Narmada Control Authority:

Executive Member, Narmada Control Authority informed the Sub-group about the progress of studies conducted by CICFRI, Barrackpore for the entire Narmada basin. He further informed that the draft of the Final Report of the studies has been submitted by CICFRI to NCA during the meeting and a copy of the same will also be submitted to MOE&F. After finalisation, the report will be placed before the sub-group. Adviser, MOE&F enquired from Dr. S.P. Singh, Scientist, CICFRI about the presence of migratory fish in river. Dr. Singh informed that a fish called Hilsa-Ilsa and a giant fresh water prawn are present in the river which need conservation and the migration is only for about 80 km. from the mouth of the river. Separate action is to be taken for development of fisheries in the reservoir. No work need be done at the dam as migration upto the dam is not expected. However, he stressed the need for artificial propagation of these species. In reply to another question from Chairman, Shri Chakravorty also reiterated the need for culture fisheries over capture fisheries in the Narmada basin.

ITEM NO. XI-4(66): SETTING UP OF AN ENVIRONMENTAL DEVELOPMENT
CELL

Chairman suggested that he will pursue the matter with Secretary, MOWR separately in response to the letter received that day.

ANNEX.XI Min. 1**LIST OF PARTICIPANTS OF 11TH MEETING OF ENVIRONMENT SUB GROUP OF NARMADA CONTROL AUTHORITY HELD ON 1.5.1991 AT NEW DELHI**

1. Shri R. Rajamani, Secretary, Ministry of E & F - Chairman
2. Shri D.C. Debnath, Executive Member, NCA, Indore.
3. Dr. M.K. Ranjitsinh, Addl. Secretary, MOE&F, New Delhi.
4. Shri N.B. Lohani, Vice Chairman, NVDA, Bhopal.
5. Shri S. Sundar, Vice Chairman & M.D., SSNNL, Gandhinagar
6. Shri A.W.P. David, Secretary (Reh.), GOG.
7. Shri D.V.S.R. Sarma, Member (Engg.), NVDA, Bhopal.
8. Shri D.R. Thapliyal, Member (E&F), NVDA, Bhopal.
9. Dr. S. Maudgal, Advisor, MOE&F, New Delhi.
10. Dr. R.K. Katti, Retd. Professor, IIT & Director, UNEECS
11. Prof. S. Ramaseshan, IIT, Kanpur.
12. Shri A.B. Joshi, Secretary, SSCAC, Vadodara
13. Shri K.M. Joseph, Member (Civil), NCA, Indore.
14. Shri C.V. Sarma, Member (Power), NCA.
15. Shri B. Pyda Raju, Chief Engineer (Env.Mgt.Orgn.), CWC.
16. Shri Shekhar Singh, IIPA, New Delhi.
17. Shri S.M. Pai, Secretary, NCA, Indore.
18. Shri H.G. Acharya, Director, Minor Irrig.Schemes, GOR.
19. Shri A.K. Shangle, Director (Watershed Management), CWC.
20. Shri M.B. Mehta, CCF, Vadodara
21. Shri A.V. Gururaja Rau, Specialist (Env.), SSNNL.
22. Shri R.S. Negi, Conservator of Forest, NVDA, Bhopal.
23. Dr. S.N. Singh, Sr.Scientist, CIFIR, Vadodara

Contd. ... 21/.

24. Shri T.K. Chakrabarti, Sr.Scientist, CIFIR, Barrackpore.
 25. Shri K.C. Aggarwal, Jt.Commissioner, MOWR.
 26. Shri Y.P. Kakar, Scientist-SF, MOE&F, New Delhi.
 27. Ms. Nalini Bhat, Scientist-SF, MOE&F, New Delhi.
 28. Shri S.S. Patnaik, DIG (Forest), MOE&F, New Delhi.
 29. Shri D.P. Singh, Executive Director, MPRVVN, Bhopal.
 30. Dr. B.R. Sharma, ADG (IWM), ICAR, New Delhi.
 31. Shri I.P. Patel, Addl.Director (Agn.), NVDA, Bhopal.
 32. Shri S.P. Rawat, Exec.Engineer (Irrig.), PCA Divn., GOR.
 33. Shri M. Ilangovan, Dy.Director (EM), CWC.
 34. Shri R.M. Mehta, Information Officer, MOWR.
 35. Dr. Pawan Kumar, Specialist (Env.), NCA, Indore.
 36. Dr. Afroz Ahmad, Impact Assessment Officer, NCA, Indore.
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NARMADA VALLEY DEVELOPMENT AUTHORITY
NARMADA BHAWAN: TULSINAGAR: BHOPAL:(M.P.) PIN-462 003.

No.NVDA/FOR/91/705-B/465

Bhopal, Dated-16/4/1991

To

The Secretary,
Narmada Control Authority,
Vishal Towers,
Indira Complex,
Navalakha,
Indore- 452 001

Sub : Comments on the minutes of Xth Environmental Sub-Group meeting of N.C.A. held at New Delhi on 31st January, 1991.

Ref : Your letter No. D-35(11)91/486 dated 28.02.1991.

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Sir,

Please refer to your letter cited above with which you have circulated the minutes of 10th Environmental Sub-Group of NCA. There are some factual inaccuracies in some of the sub-paragraphs, as explained in the enclosed comments. It is requested that the minutes be amended in the light of these observations.


[N.B. LOHANI]

VICE CHAIRMAN
NVDA, NARMADA BHAWAN,
BHOPAL-(M.P.)

NARMADA VALLEY DEVELOPMENT AUTHORITY, M.P. BHOPAL.COMMENTS ON THE MINUTES OF THE 10th MEETING OF
ENVIRONMENT SUB-GROUP.

NCA has circulated minutes of 10th meeting of Environment Sub-Group held at New Delhi on 31st Jan., 1991. The following ammendments may please be incorporated in the minutes.

Item No. X-3(59) - PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENTAL ACTION PLANS.

NARMADA SAGAR PROJECTCATCHMENT AREA TREATMENT

In para 1 of the item, the comments of Vice Chairman, NVDA have not been reproduced correctly. What the Vice Chairman, NVDA informed^{was} that state machinery is fully geared up for taking up the catchment area treatment in a phased manner in the critically degraded sub-watersheds situated on the periphery of the NSP reservoir and directly draining into it measuring about 60,000 ha. For this purpose, 6 sub-divisions of Agriculture wing of NVDA (not Directorate of Agriculture) have been posted in field. Besides this, Forest Divisions (not sub-divisions) numbering 9, charged with the responsibility of compensatory afforestation in the area, will also take-up the catchment area treatment in the forest portions of the Critically degraded sub-watersheds mentioned above. It was stated that funds would be a serious constraint in attempting catchment area treatment in degraded sub-watershed, other than those directly draining into the reservoir. The area of all degraded sub-watershed including those, not draining directly into the reservoir, was very very extensive- and estimated to be 16.35 lakh ha. It was not mentioned that 0.11 lakh ha. of catchment area has already been treated. (What was stated was that compensatory afforestation has been done over an area of 0.11 lakh ha.)

Contd...2/..

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COMPENSATORY AFFORESTATION

There is some mix up of facts in the para recorded under the sub-heading 'Compensatory Afforestation'. What was stated by the Vice Chairman, NVDA was that one Chief Conservator of Forests, 2 Conservator of Forests and 9 Forest divisions are engaged in this work and they have carried out 11,776 ha. of afforestation in NSP area. Forest Development Corporation has not been given any afforestation work in NSP. The total afforestation proposed to be carried out in NSP is 80,945 ha not 82,000 as mentioned in the minutes.

COMMAND AREA DEVELOPMENT

In the second sub-para (which relates to certain additional studies) the words "have been taken up" should be substituted by the words "will be taken up".

FLORA & FAUNA, WILDLIFE & CARRYING CAPACITY

Under this item a mention has been made of one Neemanpur Sanctuary in Harsud at north bank of Narmada river. There is no such sanctuary, on the north bank of Narmada river in Madhya Pradesh.

ARCHAEOLOGICAL STUDY

Under this item the date of completion of Action Plan is mentioned as June 1993. This should be June 1994 as was mentioned by the Vice Chairman, NVDA in the meeting.

ANTHROPOLOGICAL STUDY

Under this item the Vice Chairman, NVDA had mentioned that Dr. K.S. Singh, Director General Anthropological Survey of India was consulted by NVDA on this issue. He had expressed the view that no

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separate survey/study was needed. Vice Chairman, NVDA said that the Ministry of Environment & Forests, Govt. of India had also been informed accordingly. There was no mention of obtaining any report from Rashtriya Manav Sangrahalaya.

SARDAR SAROVAR PROJECT

CATCHMENT AREA TREATMENT.

The Vice Chairman, NVDA pointed out that 10 out of 16 subdivisions of Agriculture Wing of NVDA (not Additional Director ate) are ready to take up the work once the policy regarding the extent of area to be treated is finalised.

केवल सरकारी प्रयोग के लिए
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नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

पर्यावरण उपदल

Environment Sub-Group

बारहवीं बैठक की कार्यसूची

Agenda for Twelfth Meeting

स्थान : पर्यावरण भवन, नई दिल्ली

Venue : Paryavaran Bhavan, New Delhi

दिनांक : 10 सितम्बर 1991, 10.00 बजे

Date : 10th September 1991, 10.00 A.M.

इन्दौर

अगस्त, 1991

INDORE

August, 1991

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Item No.XII-1(67): CONFIRMATION OF THE MINUTES OF THE ELEVENTH MEETING.

Minutes of the Eleventh meeting of Environment Sub-group of Narmada Control Authority were circulated to all Members and Invitees vide letter No.D-4(8)/91/ND dated 17.5.1991. Comments received from Gujarat are placed at Annex.XII-1 for consideration of the Sub-group.

The minutes may be confirmed.

Item No.XII-2(68): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETING.

1. Consideration of Policy Issues [Item No.XI-2(64) B-1]

a) Catchment Area Treatment and Cost Sharing:

Guidelines on cost sharing of CAT between a number of Projects in the same basin and the extent of Catchment Area to be treated at project cost prepared both by the MOWR and by the MOE&F were reviewed in the last few meetings. The Sub-group was informed that Chairman, Central Water Commission had convened a meeting on 19.2.1991, in which the representatives of the Ministries of the Govt. of India and all the States were invited to discuss the issue. The minutes of the meeting on "Guidelines for an Action Plan for Catchment Area Treatment of Reservoirs" were circulated to the members during the 11th meeting.

During the last meeting of the Environmental Sub-Group, Chairman stressed the need for immediate finalisation of this issue and stated that this should be done before the next meeting of the NCA so that this long overdue decision does not remain outstanding.

The Chairman, NCA in the last meeting of NCA held on 12.7.1991 had stressed that the treatment of identified areas should start immediately, charging the costs thereof to the Project as already decided by the Authority. This can, however, be reviewed once a final decision is taken by the CWC on the quantum of CAT to be charged to reservoir projects.

Planning Commission vide their D.O. No.16(138)/91/I&CAD dated 27th May,1991, communicated its views on the minutes of the meeting on catchment area treatment of reservoir projects held on 19.2.1991 in the Central Water Commission, which is placed at Annex.XII-2. Salient points brought out in this communication are given below.

- (a) The catchment areas with 'Very High' and 'High' erodibility need treatment.

- (b) In addition, those other areas which due to their proximity to the reservoir or for other reasons threaten the safety and/or the anticipated life or economic benefits of the project must also be treated. Fortunately, technologies like the isotope trace method are available to assist in identifying such areas.
- (c) The cost of treatment of only some part of catchment area, which is directly attributable to the project may need to be provided in the project cost. Such treatment costs are those which must immediately be incurred as a result of execution of the project and would not have otherwise been incurred by the Departments of Environment & Forests/Agriculture as part of their normal Plan activities.
- (d) It will be necessary to take an integrated view of the total requirement for catchment area treatment taking into account the part already covered by various schemes of forestry, watershed management, rural development, soil conservation, employment, etc. in that area and the balance work to be done now.

In this connection the comments of the Ministry of Env. & Forests are given in Annex-XII-7.

Thereafter CWC issued fresh guidelines for treatment of lands likely to be affected due to construction of river valley projects. This covers treatment of land affected due to project related activities such as borrow areas, quarries for construction material, construction of project roads, residential colonies etc. to be treated at project cost. In view of this, the matter has been referred to the Ministry of Water Resources on 5th August, 1991 for final guidelines in the matter. Views of the MOWR are awaited.

b) Extension of Time for Environmental and Forestry Approval:

During the last meeting of the Environmental Sub-Group, Chairman informed that the letter requesting extension of time for completion of certain studies has been received by him and that he would examine it separately to see whether it really covers the directives of NCA review committee to seek extension. Thereafter a reply by Secretary, MOEF was sent to Secretary, MOWR, GOI, indicating his reluctance to concur to the proposal of the MOWR. Further action by MOWR is awaited.

2. Time frame for preparation of Action Plan and Implementation of Environment Safeguard Measures [Item No.XI-2(64) B-3]

The NCA has furnished the documents desired by the MOE&F vide letter No.E-34(11)/91/874 dated 14.4.1991. However the financial implications of the individual Environmental components could not be submitted for want of information from the respective State Governments.

In response to Chairman's direction, the States were approached for indicating the expenditure incurred in the Engineering work vis-a-vis the expenditure for Environmental Safeguard Measures. Complete picture has not yet been received from the States. The picture as available is as under:

U n i t	I t e m	Estimated cost of project	Expenditure incurred upto June, 1991
			<u>Rupees Crores</u>
I	Dam & Appurtenant Works	1019.45	396.81
II	Canal System	4406.64	717.82
III	Electrical Works	979.95	188.80
	Miscellaneous Works		88.97
		6406.04	1392.40

Cost of Environmental Works:

a) Included in the Project Costs.

- (i) CAT for areas directly)
affected by Project)
- (ii) Compensatory affores-) Rs.14.55 crores
tation in lieu of forest)
submerged)

b) Not included in the project Costs.

(i) CAT for areas between NSP and SSP	Rs.187.00 crores
(ii) Restoration of Wildlife, flora and fauna	Rs. 0.60 crores
(iii) Survey & Inventory preparation of flora and fauna	Rs. 1.00 crores
(iv) CAD works	Rs.685.00 crores

Estimated costs of all the Environmental Safeguard Measures and the expenditure incurred thereon separately for each item have not been furnished by the States so far. GOG have, however, reported an expenditure of Rs.3.49 crores under Environment and Ecology but break up of the expenditure between different items is not furnished.

During the last meeting of the Environment Sub-Group, Chairman desired reshaping and detailing of the Bar Charts supplied by NCA. The detailed Bar Charts are now placed at Annex. XII-3.

Item No.XII-3(69): PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENT ACTION PLANS

The latest status report (ending 6/91) of studies and activities regarding Environmental Aspects of SSP and NSP for the quarter ending June, 1991 is attached. (Annex.XII-4). The progress/present position of the different measures are given below briefly for review by the Sub-Group.

i) Phased Catchment Treatment

Narmada Sagar Project

During the eleventh meeting of the Environment Sub-Group Chairman, while reviewing the progress of work on Catchment Area Treatment, desired that GOMP should compress its Action Plan for completion of the works by 1995-96. He had also directed that details of status of Plan, encroachment, ownership status etc. with plans and maps of the areas proposed to be treated every year for Narmada Sagar should be submitted by Madhya Pradesh within 15 days.

The GOMP has submitted detailed Action Plan for Catchment Area Treatment of NSP in June,1991. According to this, the treatment is proposed to be completed by 1996-97 covering a total non forest area of 47,000 ha. and a forest area of 6,424 ha. at a total cost of Rs.22.23 crores. The requirements of staff, funds, equipments etc. are detailed in the Action Plan. According to this plan, it is proposed to treat a total area of 7,199 ha during the current year at an estimated cost of Rs.3.18 crores.

GOMP was also requested to send a detailed write-up alongwith status giving annual financial and physical targets and achievements together with the detailed map of the Pilot project of Datuni area. The details are awaited.

Sardar Sarovar Project

Government of Madhya Pradesh

The detailed Action Plan has been submitted by the GOMP to the MOE&F and according to this, it is proposed to treat

72,000 ha. of degraded forest and 18,000 ha of non-forest areas. An area of 6,000 ha will be covered in the current year (1991-92) and 19,000 ha every year subsequently till 1995-96. Another 8,000 ha will be treated during 1996-97, thus completing the entire programme. At the price level of 1990 GOMP has projected a total expenditure of Rs.43.93 crores.

Government of Gujarat

The detailed action plan alongwith the drawings as desired by the Chairman was supplied to the MOE&F. Govt. of Gujarat vide letter No.SSNNL/ENV/271/91 dated 27.6.91 has revised the plan for completion by 1994-95 it is reported that due to the reclassification of the entire forest area, the non forest area in the Catchment will get reduced to 3025 ha. Revision of the Action Plan for non-forest area is proposed. GOG may like to indicate the latest position.

Government of Maharashtra

The Catchment area treatment plan for cultivable areas received from GOM has been forwarded to the MOE&F. However the drawings of the area were not enclosed. Plans for forest areas and non-cultivable areas have not been received. GOM may indicate the position.

ii) Compensatory Afforestation

Narmada Sagar Project

Government of Madhya Pradesh

Government of Madhya Pradesh has identified 10,413 ha of non-forest and 70,802 ha of degraded forest land for taking up compensatory afforestation. NVDA has taken over an area of 4,956 ha of the non-forest land. An area of 11,776 ha (8,704 ha of forest and 3,072 ha of non-forest) has been planted upto 1990-1991. 75 Nurseries have been established. Afforestation at the rate of 13,900 ha per year is targetted. Thus afforestation in 80,945 ha will be completed by 1995-96. Further progress, if any, may be indicated by GOMP.

Sardar Sarovar Project

Government of Madhya Pradesh

Government of Madhya Pradesh has identified a total of 6,547 ha of degraded forest and 2,190 ha of non-forest land for afforestation work in lieu of submergence of 2,731 ha forest area in districts of Jhabua, Dhar and Khargone. Till June, 1991, compensatory afforestation has been completed over an area of 848 ha including 132 ha degraded forest and 716 ha non-forest area. 12 Nurseries have been established. An area of 1980 ha per year is targetted. GOMP was expected to prepare the detailed plan for clear felling of trees. GOMP may indicate the present position.

Government of Gujarat

So far, plantation has been completed in 2,200 ha of non-forest land and 4,528 ha of degraded forest area and a total number of 27,50,000 saplings have been raised in plantations. Further, GOG has prepared a plan for afforestation of 9,300 ha of degraded-forest land outside catchment. Accordingly 1800 ha area per year for first two years and 1900 ha per year subsequently is targetted. Further progress may be indicated by GOG.

Govt. of Maharashtra

Government of Maharashtra had already submitted a proposal for compensatory afforestation in an area of 19,205 ha to the MOE&F on 14.5.1990. Ministry of Environment and Forests has sought some clarifications from Govt. of Maharashtra which are awaited. GOM has identified 2,900 ha of non-forest land in Nashik and Amaravati Revenue Divisions and orders for handing over this land to forest department were issued on 22.4.91. This is for Compensatory Afforestation in lieu of 2,700 ha of forest land diverted for resettlement. The present position needs to be indicated.

iii) Command Area Development

Narmada Sagar Project

Government of Madhya Pradesh

Reports prepared by Consulting Engineering Services in 1984 and by Indian Institute of Science, Bangalore were

already furnished to MOE&F. However, Government of Madhya Pradesh was expected to prepare a master plan for drainage, water logging and salinity for the command area. It was reported that GOMP had already shortlisted consultants for drawing up a master plan to cover 1,23,000 ha of command area to study the effects of run-off from the fields, besides pesticides, insecticides and chemical fertilizers in the command area. GOMP has also taken up the matter with J.N. Agriculture University, Jabalpur and State Pollution Control Board. The present position may be indicated.

Sardar Sarovar Project

Soil Surveys and Ground Water Studies as well as Drainage Studies have been completed in the command area upto Mahi Crossing. Services of 6 consultants have been engaged for studies related to ground water, drainage, conjunctive use of surface and ground water, silting aspects of main canal, planning and design of micro-level canal network etc. NEERI is addressed by GOG for improving the TOR of carrying capacity. The concept of carrying capacity is already sent by MOE&F. Now the TOR is to be finalised by GOG. GOG may indicate the current status of the studies.

iv) Survey of Flora and Fauna and Carrying Capacity Studies

Narmada Sagar Project

Government of Madhya Pradesh

Studies on these aspects were entrusted to Wildlife Institute, Dehradun in December, 1989 and are expected to be completed by March, 1993. Action plan would be ready by March, 1994. Studies will cost Rs.20.73 lakhs. Progress report was circulated to Members during the last meeting. GOMP may indicate the progress during the last quarter.

Friends of Nature Society, Bhopal was entrusted with the preparation of a plan for Wildlife retrieval and conservation. Preliminary draft report is expected by August, 1991 and the final report will take another 3 months. GOMP may indicate the position about the draft report.

Sardar Sarovar Project

Government of Madhya Pradesh

The studies have been entrusted to the State Forest Research Institute, Jabalpur in April, 1990 and the studies will be completed by March, 1993. The progress report for the quarter ending June, 1991 submitted by SFRI is appended at Annex.XII-5.

Government of Gujarat

The studies are being carried out by MS University, Vadodara. The interim reports I & II submitted by the University have been forwarded to the MOE&F. Upto date progress to be reported.

Government of Maharashtra

Government of Maharashtra has to finalise TOR with Pune University to undertake these studies. TOR which is long over due is still stated to be under finalisation. The present position may be indicated.

v) Archaeological and Anthropological Survey

Narmada Sagar Project

Government of Madhya Pradesh

The survey work of 254 villages was given to ASI and State Department of Archaeology and Museum. They have completed the survey of 87 villages and Archaeological Survey of India has completed the survey of 20 villages out of 167 villages. The position in the remaining 147 villages of Khandwa and Harsud is to be indicated. GOMP to furnish information about the monuments listed during the survey already completed and current position of the survey work.

Sardar Sarovar Project

Government of Madhya Pradesh

State Department of Archaeology and Museum has completed the survey of 120 out of 193 villages. Action plan would be ready by October, 1991. GOMP is to provide a list of monu-

ments identified during the survey and the elevation of each monument vis-a-vis the year of their submergence.

Government of Gujarat

The State Director of Archaeology has completed the survey of all the 19 villages coming under submergence of SSP in Gujarat. A meeting was held by SSNNL on 11.6.91 to finalise the mode of relocating the Shoolpaneshwar temple. Minutes of the meeting are placed at Annex.XII-6.

Government of Gujarat has to indicate the mode of relocation of the other two temples viz. Hafeshwar and Dhumana and the time frame to accomplish the task consistent with the submergence schedule besides furnishing a copy of the latest action plan for shifting the three temples.

vi) Siesmicity and Rim Stability of Reservoir

Narmada Sagar Project

Government of Madhya Pradesh

During the meeting held on 18.3.1991 between Member (D&R), CWC, Director, IMD and Member (Engg.), NVDA the list of instruments to be procured and broad specification were agreed to and tender papers relating to this were expected to be finalised by June, 1991. GOMP to indicate the progress. In the reservoir competency surveys already done by GSI, further studies for some patches of narrow water divide have been suggested. Action taken to be reported.

Sardar Sarovar Project

GOG had submitted only a preliminary report to MOE&F. GOG was expected to submit further reports on these aspects expeditiously. Further, final report on rim stability was expected by July, 1991. GOG is to make the report available.

Action taken by GOMP and GOM to complete Reservoir competency studies in their portion of the Sardar Sarovar to be indicated.

vii) Health Aspects

Narmada Sagar Project

Government of Madhya Pradesh

Revised health plan for NSP and SSP is already submitted by the GOMP and action plan is prepared. GOMP may indicate the health services provided to the workers in the field currently.

Sardar Sarovar Project

Government of Madhya Pradesh

NVDA has prepared a report regarding immediate health services and continued health services to be provided for the population. The total expected expenditure including the cost of strengthening health institutions has been worked out as Rs.748.73 lakhs.

Government of Maharashtra

A report on health aspects prepared by the Government of Maharashtra has been submitted to the MOE&F. The total expected expenditure is Rs.2,577 lakhs. MOE&F may indicate the present position.

Government of Gujarat

Government of Gujarat's work plan for survey and control of water related and communicable diseases with the total estimated cost of Rs.3,342.7 lakhs has been prepared. In the last meeting the Chairman desired that GOG should consult the concerned Directorate of Health for controlling Malaria with respect to reservoir level variation and in relation to the biology of the Vector. A status report on effect of pesticides on health was also desired. GOG during the eleventh meeting promised to provide the detailed report. The report may be submitted and present position may be reported.

viii) Fisheries Development of SSP/NSP Reservoir

Government of Madhya Pradesh

Limnological studies were to be conducted by the three Universities of the State viz. Rani Durgavati University,

Jabalpur, Barkatullah University, Bhopal and Vikram University, Ujjain. The quarterly progress report furnished by the University to NVDA may be furnished to the Sub-Group by NVDA.

Government of Gujarat

CICFRI has undertaken studies in respect of aquatic life downstream of SSP in Narmada River in Gujarat State. GOG indicated that the report of first phase preimpoundment survey has been received. In the last meeting, apart from the development of commercial fisheries, the need for protection of indigenous aquatic life was stressed, with particular reference to the migratory species. The need for mechanised lift for this purpose was also stressed. Progress in this regard may be intimated.

Narmada Control Authority

NCA had also commissioned a Socio-economic study for possible fisheries development in the entire Narmada Basin excluding Bargi reservoir upto the confluence of Narmada river in the Arabian Sea including estuarine areas and CICFRI, Barrackpore were assigned the study. Final report submitted by the Institute has been furnished to MOE&F.

Item No.XII-4(70): SETTING UP OF AN ENVIRONMENTAL DEVELOPMENT CELL

During the eleventh meeting of Environment Sub-group, Chairman suggested that he will pursue the matter with Secretary, MDWR separately in response to the letter received by him on the issue. A meeting, however, was called by the Chairman, Advisory Committee of MDWR to discuss the issues. Minutes of the meeting are enclosed as Annex.XII-7.

The World Bank has scheduled the appraisal of the Narmada Basin Development Project in September, 1991. One of the likely components of the project to be considered for financing by the Bank is Environment Development Cell of the Narmada Control Authority. The Bank's Appraisal Mission is expected in India on 2.9.1991 and the appraisal is programmed for completion by 27.9.1991. The proposal for Environment Development Cell to be incorporated in the project has, therefore, to be finalised for presentation to the Bank Mission.

The same may therefore be discussed for finalisation.

ANY OTHER ITEM

DATE & VENUE OF THE NEXT MEETING

ANNEXES



Sardar Sarovar Narmada Nigam Ltd.

Block No. 12, 1st Floor, New Sachivalaya Complex,
Gandhinagar-382010, Gujarat. Phone : 23530-23537

TELEX : 1203 209-SSNN-IN
FAX-02712-23056 (GNA)

No. SSNNL/ENV/MEET/ 338 /91

Gandhinagar. Dt:7/6/1991

To

The Secretary
Narmada Control Authority
Vishal Tower, India Complex, Navlakha
INDORE-452 001 (M.P)

Sub:- Minutes of the 11th Meeting of
Environment Sub-group -

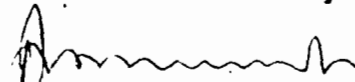
Sir,

I am directed to refer to the minutes of the 11th meeting of Environment Sub-Group held in Delhi on 1-5-91 and with reference to (ii) of item No.(XI).3(65), I have to inform you that the minute on page 12 is not reported correctly and in the first 5 lines under Government of Gujarat has to be reworded as under.

GOG representative informed that afforestation is to be taken up over an area of 31,800 Ha. out of which 6700 Ha. area has been covered so far. Out of this, afforestation is taken up in 4650 Ha. in non-forest area in Kachchh district and 24560 Ha. degraded forest area in the catchment area having forest cover density less than 0.6 will be improved with additional plantation.

It is requested that necessary action may please be taken.

Yours faithfully


(A.V.GURURAJA RAU) 7/6/91
Specialist Environment
SSNNL, Gandhinagar.



Sardar Sarovar Narmada Nigam Ltd.

Block No. 12, 1st Floor, New Sachivalaya Complex,
Gandhinagar-382010, Gujarat. Phone : 23530-23537

TELEX : 1203 209-SSNN-IN
FAX-02712-23056 (GNR)

No. SSNNL/ENV/MEET/336/91
Gandhinagar. Dt: 7/6/1991

To

The Secretary
Narmada Control Authority
Mishal Tower, Indira Complex, Navalakha
INDORE-452 001 (M.P)

Sub:- Minutes of the 11th Meeting of
Environment Sub-group -

Sir,

I am directed to refer to the minutes of the 11th meeting of the Environment Sub-group held on 1-5-1991 and to inform you that minute recorded in 2nd para of page 15 in respect of item No. XI-3(65), does not reflect the opinions expressed during the discussion.

It is requested that this part of the minute may be reworded as under.

In reply to a question of Addl. Secretary Ministry of Environment & Forest ^{about} ~~for~~ developing ^{the} Wild Ass Sanctuary, Vice Chairman & Mg. Director, SSNNL informed that a plan for ^{the} improvements of the Wild Ass Sanctuary in the Rann of Kachchh is being worked out. He also informed that beside the Wild Ass Sanctuary, plans will also be drawn ~~and~~ for improvement of Bird sanctuary at Nal Sarovar and also Black Duck Sanctuary at Velavadar. In reply to another question of Addl. Secretary of M. E. & F. over the Shoolpanesh Sanctuary, Vice Chairman & M.D, SSNNL, informed that M.S. University, ~~Madodara~~ ^{Madodara}, alongwith an officer of the rank of Conservator of Forests, is carrying out the studies and agencies are consulting experts in other organisations as per the needs of the study.

I am directed to request you to take further appropriate action.

Yours faithfully

(Signature)
(A.V.G. RAU) 7/6/91
Specialist Environment



Sardar Sarovar Narmada Nigam Ltd.

Block No. 12, 1st Floor, New Sachivalaya Complex,
Gandhinagar-382010, Gujarat. Phone : 23530-23537

TELEX : 1203 209-SSNN-IN
FAX-02712-23056 (GNR)

No.SSNNL/ENV/MEET/ 337 /91
Gandhinagar.Dt:7/6/1991

To

The Secretary
Narmada Control Authority
Vishal Tower, Indira Complex,Navalakha
INDORE-452 001 (M.P)

Sub:- Minutes of the 11th Meeting of
Environment Sub-group -

Sir,

I am directed to refer to the minutes of the 11th meeting of the Environment Sub-group and with reference to the minute on page 13 in respect of item No.XI-3(65), and to inform you that the last 8 lines on page 13 does not reflect the views expressed by Vice Chairman & Mg. Director, SSNNL.

This part of the minute may kindly be reworded as suggested below.

Vice Chairman, SSNNL explained that the matter has been taken up with the Narmada Planning Group of the State Government and that the NEERI Nagpur has also been addressed in this matter. He also requested that Ministry of Environment may provide some guide-lines about the scope of the study to be carried out in this respect. He also mentioned that the Irrigation Department of the Government of Gujarat has some experience in carrying out command area development programme in Mahi, Kadana and Ukai - Kakarapar Projects and therefore the command area development of Sardar Sarovar Project is not expected to ~~be~~^{pose} any difficulty ~~work~~.

I am also directed to specifically bring it to your notice that Vice Chairman, SSNNL did not mention during the discussions that the terms of reference for the studies carried out for Ukai and Kadana projects would be made available by GOG.

Appropriate action may kindly be
taken.

(A.V.GURUJAJA RAU) / 10/10/70
Specialist Environment
SSNNL, Gandhinagar.



Sardar Sarovar Narmada Nigam Ltd.

Block No. 12, 1st Floor, New Sachivalaya Complex,
Gandhinagar-382010, Gujarat. Phone : 23530-23537

TELEX : 1203209-SSNN-IN
FAX-02712-23056 (GNR)

No.SSNNL/ENV/ 341/1 /91
Gandhinagar. Dt: 7/6/1991

To

The Secretary
Narmada Control Authority
Vishal Tower, Indira Complex, Navalakha
INDORE-452 001, (M.P)

Sir,

I am directed to refer to the minutes of the 11th meeting of the Environment Sub-group, held in New Delhi on 1-5-91, and with reference to the minutes on page 13, recorded in para 1 under Sardar Sarovar Project, to inform you that the view expressed by Vice Chairman & Managing Director (A & E F) is not properly recorded.

V.C.& M.D., SSNNL mentioned about the several command area studies that are on hand beyond Mahi river crossing and said that a couple of interim reports have been received and that all the studies are expected to be completed by the end of this year, in accordance with the schedule that has been intimated to the NCA earlier.

I am therefore directed to request that first para under the heading Sardar Sarovar Project - Government of Gujarat on page 13 of the minutes, may be reworded as under

The Representative of GOG informed that command area studies beyond the Mahi river crossing have been taken up and are still in progress. The nature of the studies has been intimated to the NCA earlier. The reports in respect

of a few studies are expected to be ready
by the end of the year.

Yours faithfully

(A.V.GURURAJA RAU)
Specialist Environment

B.N. NAVALAWALA
Adviser (I&CAD)

Tel. No. 3716463

योजना आयोग

योजना भवन

नई दिल्ली-110001

PLANNING COMMISSION

YOJANA BHAVAN

NEW DELHI-110001

D.O.No.16(138)/91-I&CAD

the 27th May, 1991

Dear Shri Patel,

Sub.: Minutes of the meeting on "Guidelines for Action Plan for Catchment Area Treatment of Reservoirs" held on 19.2.91 at Central Water Commission, New Delhi

Kindly refer to C.W.C.'s letter No.6(42)/91/Res.Sed./316-48, dated 12th March, 1991, on the above subject. The views of the Planning Commission are as under :

1. Subsequent to the decision taken in the Committee of Secretaries the Planning Commission issued the circular letter No.16(12)/85-I&CAD, dated 28.10.85 to all States and Central administrations indicating the procedure to be adopted for preparation of project reports for irrigation and multi-purpose projects. By taking into account the catchment area treatment in a holistic manner this letter had, inter-alia, clarified the cost of apportioning of CAT works for Water Resources projects and also the agency at the State Government level to take up such works.

2. Further there had been several discussions/debates going on in the recent past especially on these two aspects of catchment area treatment works vis-a-vis the water resources projects. The present stand of the Planning Commission on these two aspects are as given below :

(i) Apportioning of CAT works for water resources projects.

(a) The catchment area with "Very High" and "High" erodibility need treatment.

(b) In addition, those other areas which due to their proximity to the reservoir, or for other reasons also threaten the safety and/or the anticipated life or economic benefits of the project must be treated. Fortunately, technologies like the land use/cover method are available to assist in identifying such areas.

(c) The cost of treatment of only some part of catchment area which is directly attributable to the project may need to be provided in the project cost. Such treatment includes those which must immediately be incurred as a result of execution of the project and would not have otherwise been incurred by the

Departments of Environment & Forest/Agriculture as part of their normal Plan activities.

(d) It will be necessary to take an integrated view of the total requirement for catchment area treatment, taking into account the part already covered by various schemes of forestry, watershed management, rural development, soil conservation, employment, etc. in that area and the balance work to be done now.

(ii) Agency best qualified to undertake CAT works

The project authorities are not generally best qualified to undertake these works. An appropriate agency need, therefore, to be identified. In some cases of bigger projects, it may be advisable to set up or designate a separate agency or central authority for the catchment area treatment works which require multi-disciplinary skills and approach. The Ministry of Environment & Forest should sponsor or designate such suitable agency/institution for this purpose wherein a large project, the project authorities are willing to fund, but are unable directly to execute CAT works. However, a separate agency should not be a reason for delay of CAT works.

Further, the voluntary agencies/NGOs, with proven track record, may be associated as interface between State Forest Departments and the local village communities for revival, restoration and development of degraded forests in the catchment area. The modalities including giving usufructory rights for such association will be worked out on the basis of guidelines in this regard laid down vide the Ministry of Environment & Forest's letter No.6-21/89-F.P., dated 1.6.1990 to all State Forest Secretaries.

3. This has the approval of the Deputy Chairman, Planning Commission.

With best regards,

Yours sincerely,

(F.N. NAVALAWALA)

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(B.N. NAVALAWALA)

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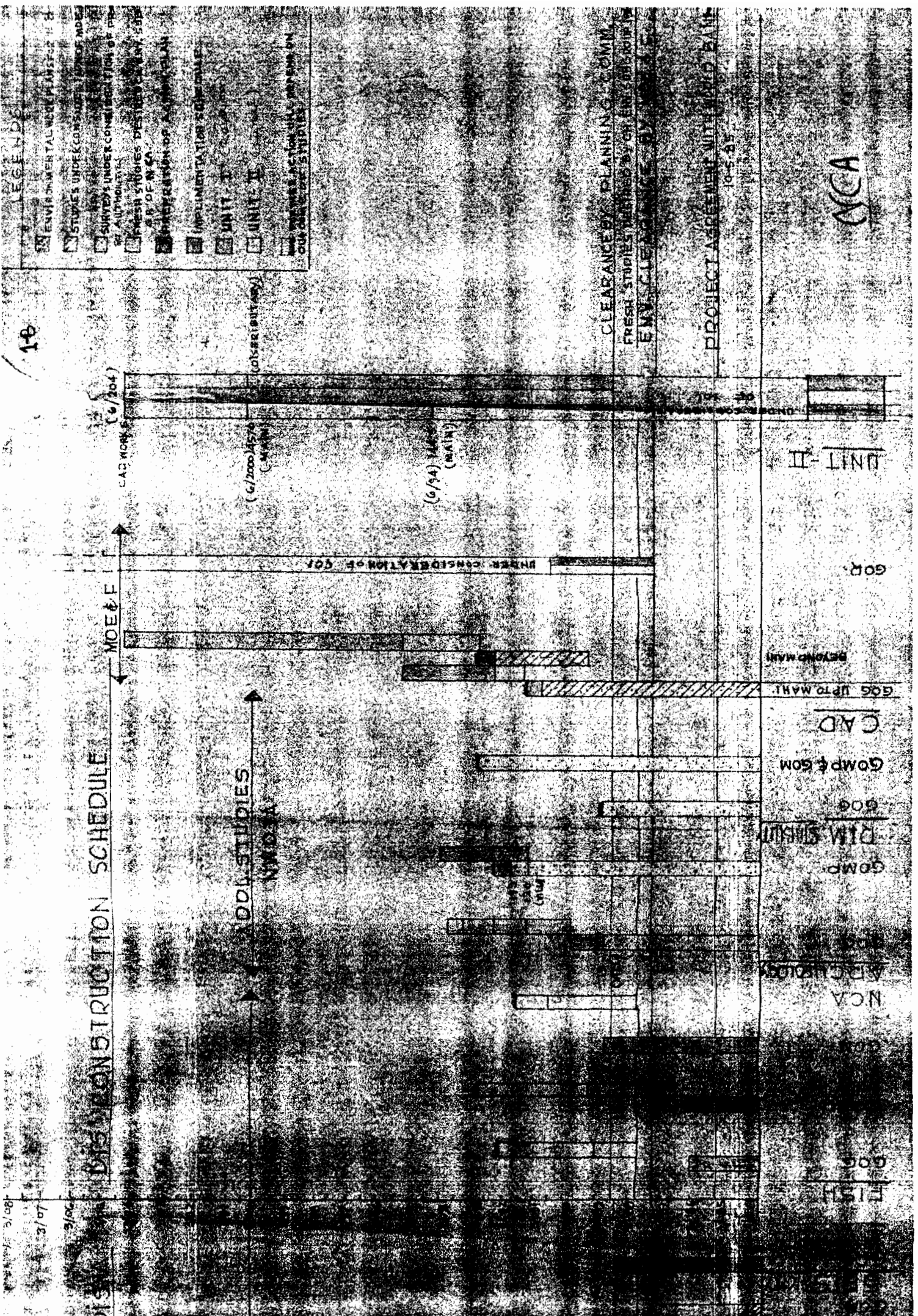
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ANNEX-XII -(4)

STATUS REPORT OF STUDIES AND ACTIVITIES
REGARDING THE ENVIRONMENTAL ASPECTS OF
BARDAR SAROVAR PROJECT (BSP)
JUNE, 1991

At the time of environmental clearance of SSP in June, 87, the Ministry of Environment & Forests stipulated certain conditions for implementation of Environmental Safeguard Measures along with the construction of engineering works under the project. Before implementation of these measures, studies were to be carried out by the participating States of Gujarat, Maharashtra and Madhya Pradesh on the various environmental aspects and action plans were to be prepared and submitted to the Ministry of E&F. Similarly, at the time of signing of the agreement with the World Bank by the participating States and the Government of India, the Bank also stipulated submission of a workplan for the environmental effects covering fish and fisheries, forest and wildlife and public health aspects.

The present status of studies/preparation of action plans and implementation, in respect of Environmental Safeguard Measures is indicated in the succeeding paragraphs in respect of the following environmental concerns:

- 01) Phased Catchment Area Treatment.
- 02) Compensatory Afforestation.
- 03) Command Area Development.
- 04) Flora, Fauna, Wildlife & Carrying Capacity.
- 05) Seismicity.
- 06) Health Aspects.
- 07) Archaeological & Anthropological Studies.
- 08) Fisheries.
- 09) Rim Stability Analysis.

01) PHASED CATCHMENT AREA TREATMENT

The total catchment area of SSP below NSP including Omkareshwar and Maheshwar Projects is 2468973 ha. The survey for prioritisation of watersheds was undertaken by All India Soil and Land Use Survey Organisation, New Delhi, for the entire Narmada catchment covering States of Gujarat, Maharashtra and Madhya Pradesh. Final report on prioritisation of watersheds was received in April, 91.

The extent of catchment area to be treated as part of reservoir projects is yet to be finalised at Government of India level. However, pending a final decision, following the guidelines of the Ministry of Water Resources, lands identified as of 'high' and 'very high' erodibility categories situated in the Sub-watersheds directly draining into the reservoirs are being taken up for treatment by the State Governments.

Government of Madhya Pradesh (90,000 ha)

An action plan for catchment area treatment in Madhya Pradesh has been forwarded to the Ministry of Environment and Forest. The total catchment area of SSP below NSP in Madhya Pradesh is 2248601 ha. According to the guidelines issued by MOWR, the 'very high' and 'high' priority areas in sub-watersheds, directly draining into the reservoir are proposed to be treated at project cost. In SSP catchment in M.P., 29 sub-watersheds have been identified for treatment. They cover an area of about 80,000 ha, 20% of which is estimated to be forest land. However, the GOMP has provided a cushion of 10,000 ha for possible increase in area at the time of final decision and has prepared an action plan to treat 90000 ha. Treatment has been planned separately for forest and non forest areas. It is proposed to treat 6000 ha of non-forest area during 1991-92 & 15000 ha each year during 1992-93 to 1995-96 and balance during the year 96-97 at an estimated cost of Rs.3,500.00 per ha. Provision of Rs. 17.85 crores has been made for the work in the 8th Five Year Plan and the balance will be provided in the 9th Plan.

For the forest areas, however, it is proposed to treat 4,000 ha each year from 1992-93 to 1995-96 and the balance area of 2,000 ha during 1996-97 at an estimated cost of Rs.9,000.00 per ha. Besides an expenditure of Rs.213 lacs is envisaged for advance preparation during the year.

Programme of Catchment Area Treatment in M.P (S.S.P)

	91-92	92-93	93-94	94-95	95-96	96-97	Total estimated cost at price level of 1990 (Rs.crores)
Non-forest area/ha (72,000 ha)	6000	15000	15000	15000	15000	6000	25.20
Forest area/ha (18,000 ha)							
Advance prepa- ration		4000	4000	4000	4000	2000	18.33
Total	6000	19000	19000	19000	19000	8000	43.53

Thus at the price level of 1990 a total of Rs.25.20 crores is required for treating 72000 ha of non-forest area and Rs.18.33 crores for treatment of 18,000 ha of forest area. The action plan compressing to 1995-96 for completion is yet awaited.

Government of Maharashtra (25,400 ha)

The total catchment area of the SSP in Maharashtra is 163611 ha. Out of this, 25400 ha fall under 'very high' and 'high' priority category areas draining directly into the reservoir and is proposed to be treated. The detailed treatment plans for the non-forest and forest areas are being prepared by the Agriculture and Forest Departments respectively of the GOM who will also execute the works. An action plan to treat the cultivable areas of the villages falling within the watersheds identified for treatment has been forwarded to Ministry of Environment and Forest. According to the plan furnished, various soil conservation measures like terracing, contour bunding, stone bunding, Nalla bunding, gully plugging, horticulture, vegetative barriers etc., are planned at an estimated cost of Rs.119.75 lacs.

In cultivable areas, so far the GOM has done contour bunding in 165 ha, horticulture in 2.20 ha and nalla bunding at 16 locations.

Government of Gujarat (32,687 ha)

The total catchment area of the SSP in Gujarat is 36,761 ha. Of this, a total of 29,575 ha fall under 'very high' and 'high' priority categories which drain directly into the reservoir as per the data made available by AIS&LUSO and require treatment.

The GOG had already submitted a work plan for Catchment Area Treatment following the recommendations of the Diwan Committee in 1986. However, this programme was later revised to include entire area of catchment. In the revised plan the Catchment Area treatment measures have been planned separately for forest and non-forest areas covering 27204 ha and 5483 ha respectively. The State Government has to review the areas to be treated taking into consideration the survey data furnished by the AIS&LUSO.

Catchment Treatment in forest areas is being executed by the State Forest Department and in the non-forest areas by the State Agriculture Department. The progress of work is as below:-

a) Forest Area (27,204 ha)

Stock mapping survey has been completed and the treatment works are in progress for completion by 1994. The total area treated till June,91 stood at 4578 ha. The annual treatment programme is given below:

<u>Area in ha programmed for treatment in</u>					
1990-91	1991-92	1992-93	1993-94	1994-95	Total
4528	6000	6000	6000	4676	27204

b) Non-Forest Area (5,483 ha)

Due to reclassification of forest areas, the actual non-forest area in the catchment is stated to be 3025 ha only. Matching changes in the action plan are contemplated.

The methodology of implementation essentially follows the guidelines issued by AIS&LUSO. The plan is phased for completion in five years. Till the end of July, 1990, 856 ha have been treated.

02) Compensatory AfforestationGovernment of Madhya Pradesh

Action plan prepared by the GOMP in January, 89 has been approved by the Ministry of E&F on 23rd July, 1990. A total of 6547 ha of degraded forest and 2190 ha of non-forest land located in districts of Jhabua, Dhar and Khargone is identified for afforestation works in lieu of submergence of 2732 ha forest area. The work of compensatory afforestation in the districts of Dhar and Jhabua has been assigned to Madhya Pradesh Van Vikas Nigam (MPVVN). MOU has been finalised and they have started nursery work. The compensatory afforestation work in non-forest and degraded forest land identified in Khargone district has been entrusted to the Divisional Forest Officer, Kaveri Forest Division, who is preparing the detailed action plan for re-forestation of 2390 ha of degraded forest area.

Status of Work

Till March, 1990, compensatory afforestation has been completed over 848 ha covering 132 ha of degraded forest and 716 ha of non-forest areas. NVDA proposes to complete compensatory afforestation work of SSP in next four years as per the following schedule.

	FOREST	NON-FOREST	TOTAL
Already planted till December, 1990	132	716	848 ha
Area targetted to be planted			
1991-1992	1580	400	1980 ha
1992-1993	1580	400	1980 ha
1993-1994	1580	400	1980 ha
1994-1995	1675	274	1949 ha
	----	----	----
	6547	2190	8737 ha
	=====	=====	=====

During 1991 monsoon, an area of 1980 ha is targetted. Twelve nurseries have been set up, two in Khargone, six in Dhar and four in Jhabua districts. NPRVN & NVDA have already taken up the area preparation in 1200 ha and 780 ha respectively for plantation during monsoon of 1991.

Government of Maharashtra

The forest area diverted due to submergence is 6488 ha. The total area to be put under compensatory afforestation is 19205 ha being 6205 ha non-forest area and 13000 ha of degraded forest. A detailed compensatory afforestation scheme has already been prepared and submitted by the Government of Maharashtra to the Ministry of Environment & Forests on 14.05.90 for approval. Min. of Environment and Forests has sought certain clarifications from Govt. of Maharashtra which are still awaited.

In addition, compensatory afforestation is also required to be undertaken in 2,700 ha of non-forest land in lieu of the forest land in Taloda area released for resettlement works. For this, non-forest land to the extent of 2,900 ha has already been identified. The GOM has issued orders on 22.04.91 to transfer these lands to the forest dept. Ministry of Environment & Forests, has asked for the details of land identified and other clarifications. The present position is awaited from the Government of Maharashtra.

Government of Gujarat

A total of 4523 ha of forest area has been diverted for SSP in Gujarat. A work plan prepared and submitted to the Government of India is under implementation for carrying out afforestation in 4650 ha of non-forest land in nine villages of Kutch district at an estimated cost of Rs.4.65 crores. Besides, to meet the condition laid down by Ministry of Environment and Forests a project for afforestation of 9300 ha of degraded forest land outside the basin, in the districts of Surat, Bharuch, Vadodara, Panchmahals and Sabarkantha, has been prepared at an estimated cost of Rs.875.20 lacs. It may be stated that the entire forest area of 27204 ha within the basin in Gujarat is proposed to be treated and one of the measures under execution is intensive afforestation of all areas having forest density below 0.6. About 4528 ha has already been covered under this programme.

As per the programme prepared by the Government of Gujarat, 1225 ha of plantation in non-forest area will be done during Monsoon of 1991 and an equal area by the monsoon of 1992, thus completing the work. For afforesting 9300 ha of degraded land outside the basin, an area of 1800 ha per year for the first three years and 1900 ha per year subsequently is proposed. Progress and programme are given below :-

	1991-92	1992-93	1993-94	1994-95	Work done till June, 1991	
Non Forest Area (4650 ha)	1225	1225			2200	
Degraded forest (outside- the catch- ment) (9300 ha)	0 Year Advance prepa- ration.	Ist Year 1800	IIInd Year 1800	IIIrd Year 1800	IVth Year 1900	Vth Year 1900

Additional Activities

(a) Dam Vicinity Plantation

Afforestation programme in the dam vicinity has been planned in 235 ha. Out of this, rain-fed plantation has been done over 110 ha and irrigated plantation in 92.5 ha. Remaining areas will be planted during 1991-92 and 1992-93.

(b) Forest Plantation

SSNNL has also decided to take up a model forest plantation programme in Gandhinagar District, in an area of 500 ha of ravine lands on the left bank of the Sabarmati in village Ratanpur (300 ha) and Pirojpur (200 ha).

(c) Additional Plantation in Non-forest Areas

In addition to compensatory afforestation planned over an area of 4650 ha, SSNNL, in October, 1989, decided to carry out afforestation in an additional area of 1088 ha of non-forest land in Kutch district. Lands have already been released. A detailed plan is being worked out and plantation will be completed by 1994-95.

03) COMMAND AREA DEVELOPMENT (INCLUDING DRAINAGE STUDIES)

Government of Madhya Pradesh

No command area in Madhya Pradesh.

Government of Maharashtra

No command area in Maharashtra.

Government of Gujarat

Soil surveys and ground water studies as well as drainage studies have been completed by consultants in the Command Area upto Mahi River Crossing and Master Plan for surface and sub-surface drainage has been prepared. Services of six Consultants have been engaged for carrying out studies beyond Mahi Crossing. These include studies related to ground water, drainage, conjunctive use of surface and ground water, silting aspects of main canal, planning and design of micro-level canal net work etc.

- (i) An agreement for execution of studies on ground water resources beyond Mahi in SSP command was entered on 14.8.89 and it will take 3 years to complete the work.
- (ii) Agreement on mathematical modelling for areas of command were entered into with three consultants by the end of 1989. Inception reports from all the three is available. However final report will be available by the end of 1991.
- (iii) Agreement on drainage study (pre-feasibility level) beyond Mahi was entered into during August, 1989. Study was to take 18 months time.

Government of Rajasthan

The Government of Rajasthan, has submitted a report on Environmental & Ecological aspects and remedial measures for Narmada Canal Project which is under consideration of the Central Water Commission, Government of India. Copy of the report is submitted to Ministry of Environment and Forests.

04) FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

Government of Madhya Pradesh

Study has been entrusted to the State Forest Research Institute, Jabalpur, in collaboration with H.S.G University, Sagar and Rani Durgavati University, Jabalpur. The study commenced in April, 1990 and is expected to be completed in three years by March, 1993. Action plan will be ready by March, 1994 and implementation will be done by March, 1996. The Institute has submitted interim report for the quarters ending March & June, 1991.

Government of Gujarat

01) Basic Studies

The study for the SSP submergence area in Gujarat has been entrusted to M.S. University, Vadodara, and is planned to be completed in two years from 1989-90. An inception report and interim reports I & II have been furnished by the University study team and have also been discussed in workshops convened by the Government of Gujarat for the purpose.

02) Wildlife Conservation Measures

The area of the Shoolpaneshwar Sanctuary (formerly called Dumkhal Sloth Bear Sanctuary), has been enlarged from 151 sq.kms. to 448 sq.kms. and the extended limits reach upto the shorelines of the reservoir. This will ensure free access to waterfront for the animals. Providing stone wall fencing and other conservation measures, such as, check dams, habitat improvement measures and firelines have been undertaken in the enlarged Shoolpaneshwar Wildlife Sanctuary to foster the flora and fauna of the area for completion in five years.

Besides this sanctuary adjoining the reservoir area, the following three sanctuaries are located in the command area of the project.

- a) Nal Sarovar - A sweet water lake famous for attracting 120 to 150 species of migratory birds from far off lands.
- b) Wild Ass Sanctuary in the Rann of Kutch.
- c) Black Buck Sanctuary at Velavadar.

These sanctuaries would also benefit from availability of copious sweet water in the command area. The State Forest Department has been working out the Engineering Infrastructural Facilities needed for these sanctuaries.

03) Wildlife Management Study for Sardar Sarovar Submergence Area

The above study has been assigned to a group with a Principal Investigator (of the rank of Conservator of Forest) and subordinate staff. The report would be available by end of 1991. The group has been directed to ensure periodical interaction with the Wildlife Institute of Dehradun. A workshop on approaches to integrated wild-life management in Gujarat was organised in October, 1990. Report is made available.

04) Additional Environment Improvement Programme.

Sardar Sarovar Narmada Nigam Ltd, has decided to undertake the following additional environmental improvement programme in the catchment area and its vicinity.

Estimated Cost (Rs in lacs)

- i) Creation of a habitat for the great Indian Bustard (highly endangered bird of the country).

- | | |
|---------------------------------|-------|
| a) First stage covering 201 ha. | 12.00 |
|---------------------------------|-------|

b) Second stage covering 400 ha to be taken up later on.	14.75
ii) Improvement of support watering facility at six locations.	14.75
iii) Providing inspection and transport facilities.	3.40

TOTAL:	44.90
	=====

Government of Maharashtra

Pune University, under the supervision of Environmental Department is to carry out the work. Estimate given by the University was scrutinised and accepted by the Forest, Irrigation and Environment Departments and is pending with Planning/ Finance Department of the Government of Maharashtra. Terms of Reference are yet to be finalised. The Government of Maharashtra have been requested for finalisation of TOR expeditiously.

05) SEISMICITY

Government of Bujarat

The design of the dam allows for a horizontal seismic coefficient of 0.125 g., and it covers additional risk due to reservoir induced seismicity. An eminent Indian Consultant Dr. Jai Krishna, who was the Vice Chancellor of the Roorkee University had been engaged as the Consultant to the Project. The design of the dam had also been referred to the Central Water & Power Research Station, Pune, and Earthquake Engineering School at Roorkee, for dynamic analysis. Advice had also obtained from the World Bank Consultants viz - Dr. Glough and Dr. Bolt, of Burkley University. The design of the dam has also been approved by the Dam Safety Panel comprising eminent engineers.

Establishing Seismological Observatories:

Installation and Commissioning of seismological instruments have been completed in four observatories at Kevadia, Naswadi, Karjan and Kawant. The remaining five observatories viz. Alirajpur, Barwani, Sagbara, Kukshi and Shahada are being commissioned.

No separate study regarding Seismicity Aspect is required in Madhya Pradesh and Maharashtra.

06) HEALTH ASPECTS

Government of Madhya Pradesh

The State Director of Health Services, has conducted detailed survey during 1982-83 and according to the data collected, diseases like Malaria, Guinea Worm, Goiter, Gastro-enteritis and

Worm infections have been found in the districts falling under the submergence area. Even after the construction of the dam, the incidence of malaria is to be monitored and suitable control measures will be adopted by the health department. The State Director of Health Services, has agreed to monitor at intervals the incidence of water borne diseases and NVDA would keep in touch with the Director of Health Services, to ensure implementation of preventive measures. Report regarding immediate service to be provided and continued health services to the population has been prepared. Provision for hospitals, dispensaries, mobile units and evaluation cell & monitoring cell has been made. The total anticipated expenditure including the cost of strengthening of health institutions has been worked out as Rs.748.73 lacs.

Government of Maharashtra

Report has been prepared on the following aspects:

- a) Strengthening anti malaria programme in the border area.
- b) Provision of mobile dispensaries.
- c) Providing sub centres.
- d) Construction of primary health services.

The total expenditure anticipated is Rs.2,577.00 lacs.

Government of Gujarat

The work plan has been prepared by the State Health Department in respect of the following:-

- 1) Surveillance and control of water related and communicable diseases.

Total implementation will take about 17 years time as and where irrigation under the canal system is developed. The programme also covers the villages on the periphery of reservoir. Two studies relating to schistosomiasis had been carried out in 1985 by the National Institute of Communicable diseases and concluded that there is no threat to the people in the project area on account of this. Subsequently, a team led by the Chief of Schistosomiasis Division WHO, Scientist from British Council, London, and Environment Advisor, World Bank carried out investigations.

The analysis revealed that the project area did not have any risk of Schistosomiasis entering the area. The report (work plan) has been furnished to the Ministry of Environment & Forests, and World Bank.

ii) Surveillance and control of Malaria.

The operation of the reservoir itself inhibits the proliferation of malaria larvae. While, the reservoir builds up the storage during the monsoon rains, the larvae, which prefer to stay around the periphery, get drowned and thus are destroyed. On the contrary, when the water is withdrawn for power generation and irrigation the larvae are stranded and destroyed. The plans would be implemented in a phased manner keeping in view the progressive development of irrigation in the vast command area of the project. A twenty five bed hospital is already set up and operating in the main colony of the project.

07) ARCHAEOLOGICAL AND ANTHROPOLOGICAL STUDIES

ARCHAEOLOGICAL STUDIES

Government of Madhya Pradesh

For identification of monuments of archaeological importance survey of the villages falling in the submergence area of SSP in Madhya Pradesh are being carried out by the State Department of Archaeology and Museum. Out of 193 villages, survey is completed for 120 villages and for the remaining 73 villages it is expected to be completed by March, 1992. Monuments identified are Dharampuri Rock Sculpture and excavation site at Navada Toly, at Dhar and Khargone. Excavation was to start by second week of March, 1991. In Phase-I survey will be carried out for identification of the monuments. In phase-II, complex shifting, partial shifting, re-arrangements, re-erection, replica preparation of monuments etc., will be taken up. Phase-II will be completed by January 1993. During Phase-III establishment of monuments and antiques in museum, besides, establishing museum at Indore, strengthening of museums at Dewas, Mandhata, etc. will be taken up. Detailed action plans are still awaited from the Government of Madhya Pradesh.

Government of Gujarat

Inventory survey of 19 villages, coming under submergence is being carried out by the Director of Archaeology. The following temples are proposed to be shifted:

- 01) Shoolpaneshwar Mahadev Temple at Surpan, District Bharuch.
- 02) Hafeshwar Mahadev Temple at Chhota Udaipur, and
- 03) Dhumna Temple at village Dhumna.

Shifting these monuments is proposed in three phases. Identified monuments are not listed as protected monuments. The Shoolpaneshwar Temple is on the border of Maharashtra and Gujarat

and Gujarat has agreed to do all works in this respect. Sites have been finalised to relocate Shoolpaneshwar and Hafeshwar temples in consultation with trustees of the temples. Shoolpaneshwar temple will be shifted, reconstructed and consecrated near Gora, about 15 kms., down-stream on the same bank. The construction work is expected to commence after the monsoon. Whereas, Hafeshwar temple will be shifted and reconstructed at a higher elevation near the present location. NCA has suggested a tentative programme of shifting of these monuments before submergence. Reply from state Govt. is awaited.

Government of Maharashtra

No work is proposed.

ANTHROPOLOGICAL STUDIES

Government of Madhya Pradesh

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.

Government of Maharashtra

No study is proposed.

Government of Gujarat

No study is proposed.

08) FISHERIES

Government of Madhya Pradesh

Studies of important fish/fauna specially the Mahaaseer has been included in the studies being conducted by the three Universities of the State, for the upper Narmada, Rani Durgavati University, Jabalpur, Middle Narmada, Barkatullah University, Bhopal and lower Narmada, Vikram University, Ujjain. All the three Universities have initiated the studies in their respective areas as per MOU. Progress report for the period ending September 1990 has been received.

Government of Maharashtra

Department of Fisheries, Government of Maharashtra, has submitted a draft outline for the fresh water fisheries development in Maharashtra area. A fisheries development plan is under consideration of the Government of Maharashtra.

Government of Gujarat

Central Inland Capture Fisheries Research Institute, Barrackpore, Calcutta, (Local office at Vadodara) has undertaken the studies in respect of aquatic life upstream and downstream of Sardar Sarovar in Narmada River in Gujarat State. Report of the first phase of pre-impoundment survey has been received.

The design plans and estimates for a 10 ha., fish farm and fish hatchery complex have been finalised. The plan is to be implemented in 9 years and will include Hydrobiological studies, establishment of Fish Hatchery and fish farm, training of Fishermen, establishing and assisting primary fishermen's cooperatives, establishing and assisting an Inter-state Fisheries Development Board and a Cell at Directorate for monitoring.

Feasibility of fish lift/ladder to enable the migration of aquatic life across the dam is being explored.

NARMADA CONTROL AUTHORITY

Proposals to establish an Inter-state Apex Body (Co-operative or Board) with participation by the States and NCA are under consideration.

The Narmada Control Authority, had commissioned a socio-economic study for possible fisheries development in the entire Narmada basin excluding Bargi reservoir to the confluence of the Narmada in the Arabian Sea including estuarine areas. The Central Inland Capture Fisheries Research Institute, Barrackpore, was assigned the study. Their final report has been received.

(09) RIM STABILITY ANALYSIS

Government of Madhya Pradesh

Geological Survey of India, Nagpur Division, was assigned the work by SSNNL Gujarat and the work was going on. Now the work has been shifted from Nagpur Division to Bhopal Division and the modalities for continuation and completion are being worked out.

Government of Maharashtra

Geological Survey of India, Nagpur Unit, is to carry out the work.

Government of Gujarat

Rim Stability analysis has been completed by the Geological Survey of India, Jaipur Branch, in the Gujarat portion of the reservoir. No more work in this respect is required.

STATUS REPORT OF STUDIES & ACTIVITIES
REGARDING THE ENVIRONMENTAL ASPECTS OF
NARMADA SAGAR PROJECT
JUNE, 1991

01) PHASED CATCHMENT AREA TREATMENT:

The free draining area of Narmada Sagar Project down-stream of Bargi Dam is about 38,952 sq.kms. As per the guidelines of MOWR, directly draining watersheds of 'very high' and 'high' priority categories only are to be treated. This is, however, subject to a final decision on the subject yet to be arrived at. Works on prioritisation of the watershed was entrusted earlier to GSIT&S, Indore. However, the work is now entrusted to "All India Soil & Land Use Survey Organisation, New Delhi, and they are carrying out the prioritisation for the entire catchment of NSP.

AIS&LUS has divided the catchment area down-stream of the Bargi Dam into nine sub-catchments. These sub-catchments are further divided into watersheds and sub-watersheds. Preparation of maps and reports relating to five sub-catchments has been completed. These covers the entire area around the periphery of the Narmada Sagar Reservoir. Out of 638 Sub-watersheds, only 25 watersheds directly drain into the reservoir and in these, an area of 58,510 ha of land of 'high' and 'very high' priority category is to be treated. About 20% of this area i.e. 11,510 ha is estimated to be forest land and the rest 4700 ha non forest land.

The treatment of the non-forest area of 47,000 ha is proposed to be completed in a period of six years from 1991-92 to 1996-97 at a cost of Rs.16.45 crores. The programme is to treat 6000 ha in 1991-92, 9,000 ha per year from 1992-93 to 1995-96 and 5,000 ha in 1996-97. A provision of Rs.11.65 crores exists for this work in the VIII Plan and further provisions will be made in the IX Plan. Six Soil Conservation Subdivision under the Control of two Soil Conservation Divisions located at Harda and Khandwa respectively have been assigned the work.

As already indicated 11,510 ha of forest land requires treatment. In addition, 2,415 ha in the Pilot Project area is also to be treated. It was observed by GOMP that out of this area, 7,460 ha has already been identified for compensatory afforestation. Hence catchment area treatment is proposed only over an area of 6,645 ha. It is proposed to treat this area in a period of 5 years starting from 1991-92 to 1995-96 at a total cost of Rs.5.78 crores. The annual programme of treatment is given below:

Year	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	Total
Area to be treated (in ha)	1199	2175	1050	1000	1000	--	6424

NVDA has already established 9 Forest Divisions in Narmada Sagar catchment for compensatory afforestation and catchment area treatment works in forest areas who will carry out these works related to the forest area.

02) 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 permitted to be diverted for power house. Thus a total of 41420 ha of forest land has been permitted to be utilised for the construction of ISP. Out of the total area diverted, an area of 10996 ha is delineated as treeless forest land in the working plan of the respective forest divisions. The Government of Madhya Pradesh, has identified 10143 ha of non-forest and 70802 ha of degraded forest land in Dewas, Hoshangabad, Harda and Khandwa forest divisions for taking up compensatory afforestation. NVDA has taken over an area of 4956 ha of non-forest land in districts of Sihore, Khargone, Khandwa, Dewas and Hoshangabad. The present status and future annual targets are given below:

75 nurseries established, Afforestation already done in 11776 ha. (8704 ha of forest, 3072 ha non-forest). Afforestation @ 13900 ha per year targetted. Thus afforestation in 80945 ha will be completed by 1995-96.

03) 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 of cropped area over a net C.C.A. of 1.23 lakh ha. The implementation of the plan would be taken up in three phases covering construction of main canal, distribution and drainage system. The proposal for irrigation in Phase-I, Phase-II and Phase-III is to cover areas of 36,000 ha, 46,800 ha and 40,000 ha respectively. Phase-I will start in 10/94 and would be completed by 6/97. Phase-II would be taken up in 10/2000 for completion by 6/2003. Phase-III works will commence in 10/2004 for completion in 6/2007.

04) FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

Studies on these aspects were entrusted to Wildlife Institute of India, Dehradun in December, 1989 and are expected to be completed by March 1993. Action plan will be ready by March, 1994. Study will cost Rs.20.73 lacs. Implementation of the action plan will be completed by March, 1996. Progress report upto December, 1990 has been submitted by Wildlife Institute of India.

Friends of Nature's Society, Bhopal, is entrusted with preparation of Wildlife Retrieval and Conservation Plan on consultancy basis. The consultants have started the work and made extensive visits to the study area from the end of November, 1988. A position report was submitted in July, 1989 and a preliminary draft report is expected by August, 1991. The final draft will take another three months and may be available by November/December, 1991.

05) SEISMICITY AND RIM STABILITY

NVDA has sent the report regarding rim stability of NSP to the Ministry of Environment & Forest, in January, 1990. The reservoir competency survey has also been done by GSI and report is submitted. In the report, GSI has suggested further studies for some patches of narrow water divide. These studies are to be taken up in consultation with GSI. The Director, GSI has been approached for the same.

Establishment of Seismic observatories in the Narmada Sagar Complex area is under correspondence with IMD, DGTD and CWC. Meeting of IMD, CWC, DGTD and NVDA Officers for finalising the issue was held on 18.3.91. A list of instruments and broad specifications agreed. Draft Tender papers are being finalised.

06) HEALTH ASPECTS

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 is preparing the plan costing Rs.748.73 lacs for the preventive and curative aspects of health as pointed out by the Ministry of E&F. As regards the water quality aspects, the suggestions of the Ministry of E&F and M.P. Pollution Control Board are being included in the plan. Regarding preventive aspects, a MOU is being signed with the Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal, whereas, for studies on health aspect in project impact areas of SSP and NSP work is proposed through Epidemiological Surveillance Cell. This Cell will monitor incidence of diseases in the entire project impact areas.

Pre-impoundment and post-impoundment Limnological studies being carried out by three Universities will take care of water quality aspect.

07) FISHERIES DEVELOPMENT

The aspect relating to study of the availability of important aquatic fauna/fish, especially the migratory species has been included in the Limnological studies being conducted by the 3 Universities of the State; the Upper Narmada, (Bargi Reservoir) Rani Durgavati University, Jabalpur, Middle Narmada (Tawa, Barna and Kolar Reservoirs) Barkatullah University, Bhopal, Lower Narmada, Vikram University, Ujjain. All the three Universities have initiated the studies in their respective areas as per MOU.

The Central Inland Capture Fisheries Research Institute (CICFRI) Barrackpore, Calcutta has already completed a Status Survey and report is available. Further Socio-economic Study report is ready.

08) ARCHAEOLOGICAL AND ANTHROPOLOGICAL SURVEY

A survey of the 254 villages is required for identification of the archaeological monuments falling within the submergence area. State Department of Archaeology and Museum was entrusted with the survey of 87 villages which has been completed. The survey has identified 150 artifacts and 30 monuments besides Siddeshwar temple, Nimawar, Dewas and Joga Fort, Hoshangabad, which are likely to be affected.

As only lower bastion in north of the Joga Fort is likely to be affected by scour action of water and the Siddeshwar temple is well above the FRL of 860 ft., these two structures are not considered as affected by the project. However, other structures/monuments will be considered for shifting or protection after their archaeological significance is established through joint inspection of the competent authorities.

Archaeological Survey of India, was entrusted with the survey of 167 villages. So far they completed the survey of only 20 villages and identified 40 artifacts. Commissioner, Archaeology and Museum, M.P. is proposed to be given this task of survey work. Survey work will be completed by March 1992 and action plan would be ready by June, 1994. Action will be taken to preserve material of archaeological importance in consultation with experts.

ANTHROPOLOGICAL:

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 Sangrahalaya has constituted a working group for the retrieval of bio-cultural material in Narmada Basin, whereas survey of tribal art and handicraft is entrusted to M.P. Adivasi Kala Parishad. These works are in progress.

THIRD
QUARTERLY REPORT AND REVIEW OF PROGRAMME
(1ST APRIL, 1991 - 30TH JUNE, 1991)

IMPACT ASSESSMENT OF MADHYA PRADESH
LAND TO BE SUBMERGED UNDER SARDAR SAROVAR
PROJECT AND ADJOINING ECOSYSTEM: FLORA, FAUNA
AND OTHER BIOTIC COMPONENTS

DR RAM PRASAD
IFS

DIRECTOR
STATE FOREST RESEARCH INSTITUTE
JABALPUR (M.P.)

JUNE, 1991

T H I R D
QUARTERLY REPORT AND REVIEW OF PROGRAMME

PERIOD : 1st April, 1991 to 30th June, 1991

PART I

- 1.a) Title of the Project : Impact assessment of Madhya Pradesh lands to be submerged under Sardar Sarovar Project and adjoining ecosystem; flora, fauna and other biotic components.
- b) Name of Principal Investigator and Institution :
Director, State Forest Research Institute, Polipathar, Jabalpur.
2. Objectives:
 - i) Nature and extent of impact on the different vegetation types in and around project area.
 - ii) Devise special measures for rare and threatened species (floral and faunal).
 - iii) Study of various floral components and evaluation of their habitat.
 - iv) Identity habitat usage by major bird communities in submergence and impact areas.
 - v) Identity existing levels of human use (grazing, logging, firewood collection etc.).
 - vi) Evaluate ethnobotanical aspects of various vegetation for the people of the region.
 - vii) Survey of nearby forest areas to explore possibility of identifying suitable areas for displaced Wildlife.
 - viii) To suggest mitigative measures (wildlife displaced)
 - (a) Scheduling of forest clearance
 - (b) Special protection and habitat development etc.
3. Area of Work : Areas to be submerged due to the Sardar Sarovar Project in parts of Dhar, Jhabua and Khargone districts of Madhya Pradesh.
4. Location : Alirajpur Tehsil, Jhabua District, Barwani Tehsil, Khargone District and Kukshi Tehsil, Dhar District.
- 4.1 Work During This Quarter:

During the period of this quarter the Barwani tahsil of Khargone District, Alirajpur tahsil of Jhabua District and Kukshi tahsil of Dhar District were visited for the data collection of present vegetational compositions, live stock,

population and composition and effect of submergence on agricultural land, forest areas offer socio-economic benefits according to the people.

It is observed that 41 villages, 25 villages and 36 villages are submerging in the above mentioned tahsils of Barwani (Khargone) Alirajpur (Jhabua) and Kukshi (Dhar) respectively. Submergence of agricultural land, house property etc. in these tahsils are given in (Table - I).

PART II

Plan of work for the period under reference :

Monthly survey of the submergence areas of Dhar, Jhabua and Khargone districts of Madhya Pradesh to get an overview of this project.

- a) Survey of various localities including forest areas, villages, etc. of above districts for the collection and analysis of flora and fauna.
- b) Collection of field observations with reference to faunal population and their occurrence.
- c) Study of ecological status of plant species found in the survey areas (Density, Frequency, Cover, Abundance etc.)
- d) Incorporation of ethnobotanical information and multifarious uses of the plant species present in the survey areas.
- e) Enumeration of various tree species present in the submergence areas and various forest compartments.
- f) Literature review to collect various publications relating to submergence areas of Dhar, Jhabua and Khargone districts; Data of all other components of S.S.P. having relevance to present investigation were also collected.

Methodology in Detail :

Methodology for the collection of the data pertaining to the ecological status, floristic composition, ethnobotanically important plant species, livestock, trees enumeration as well as socio-economic status have been same as described in the previous reports. In short the methodology for various studies is as follows:

• Ecological: In order to study the density, frequency and abundance of ground vegetation in the submergence areas, quadrats of 10 x 10m and sub-quadrats of size 2 x 2m and 1 x 1m in each one sq km plots were laid to study trees, shrubs and ground vegetation. Further processing of data was done to assess the relative ecological status of plants.

Floristic: A checklist of all plant specimens is being prepared which were collected during the period of this quarter: (Table - 2).

Ethnobotanical: All the plant species, plant parts, plant products were collected and informations on the collected plants was made with special reference to medicinal plants, food plants, fodder plants, fuel and timber and for various socio-religious purposes: (Table - 3).

Faunal: Various animals, birds, snakes etc. were observed during the survey of river banks, various forest compartments, revenue villages etc. of the study site. Their records have been prepared: (Table - 4).

Enumeration of Tree Growth: A list of forest growth was enumerated on cent percent basis. The data on plant density has been given in (Table - 5).

Socio-economic studies: This quarter coincided with the season for tendu leaf collection and therefore studies were directed to collect information on average collection of earning of a person and a family per day. The collection season lasts for 30 days each year. This statistics will provide valuable informations on total livelihood person year generated due to collection of M.F.P. (Tendu leaves). Informations on collection of other gums found in this area has also been collected. (Table 6.2)

3. Month-wise Work done :

April '91: Second quarterly report of S.S.P. was prepared and submitted. A field trip was made for the collection of data.

May '91 : Various forest compartments and villages were visited and informations regarding the flora, fauna, socio-economic conditions in some areas of Dhar, Jhabua and Kargone districts were collected.

First Interim Report (90-91) from 1.9.90 to 31.3.91 of S.S.P were prepared and submitted on 10th May '91 to N.V.D.A.

June '91 : Another villages of the Dhar and Khargone districts were visited for collection of informations regarding socio-economic and faunal status and ethnobotanical studies. The data collected has been processed and tabulated.

4. Results Obtained:

The data, on total enumerations of forest growth in the affected area have been incorporated and given in Table 1 to 7

5. Analysis of Results:

Processing of data is being continued. General synthesis of results appear in next section 8 :

6. Modification required :

Not felt so far.

7. Work Plan for Next Quarter :

July '91 to september '91 :

- (i) Survey of various villages and localities of Dhar, Jhabua and Khargone district.
- (ii) Collection of various plant species present in Dhar, Jhabua and Khargone districts.
- (iii) Collection and recording of various faunal species in these districts.
- (iv) Ethnobotanical studies with special reference to collection of information of multifarious plant species, medicinal plants, edible plants, fodder plants and fuel and timber species.
- (v) Enumeration of tree species in different girth classes and height coming under S.S.P. areas.
- (vi) Analysis of ecological status of flora more important being attributes such as plant density, frequency, abundance and cover of ground vegetations.
- (vii) Survey and collection of informations in various villages, regarding dependance of man and his bovine population on various forest products.
- (viii) Preparation of fourth quarterly report of the S.S.P.

8. Synthesis of Results obtained :

- 8.1 As reported earlier the forests in Alirajpur tehsil of Jhabua districts which are coming under submergence due to S.S.P. are highly degraded. The studies of tree growth is of coppice origin as the forests in the past have been subjected to a lot of maltreatment. Figures of Enumeration carried out in 9 compartments clearly bringout this fact that the trees are of fuel type and mostly in girth class below 30 cm Above pole stage (31-45 cm girth and breast height and above) are very few in each hectare.

- 8.2 Composition wise also no such species has been enumerated which can be described as threatened, rare or endangered. Since the area is highly degraded, on account of excessive cutting, trampling, grazing and burning, ground flora of any ethnobotanical importance is missing. However, these areas would be surveyed once again during rains to enumerate the species composition.
- 8.3 The forest areas of Alirajpur tahsil of Jhabua district (Mathwad Range with head quarter at Barkhatgarh and Sondhwa Range) were also surveyed for presence of wild animals. Since the areas are highly degraded, the areas are not able to provide protective cover to the wild animals. Moreover, due to frequent visits of officials and voluntary workers associated with the project a lot of disturbance to wild animals appear to be imminent. This has already pushed the wild animals deep in the forests. Very few animals, birds have been spotted in the area.
- 8.4 Although the forests are not very rich in tree based minor forest produce, tendu shrubs present on revenue wastelands, in degraded forests, along road sides and on marginal cultivated lands provide employment in a season when there is no employment to the rural poor. On an average each person earns about Rs. 17.50 per day for about 30 days from the collection of tendu leaves. Gum and some more trees of MFP are also being studied for their role in providing employment to the local people.
- 8.5 Work Plan for clearance of forests of Jhabua, Dhar and Khargone districts coming under submergence of S.S.P. have been submitted to R.V.D.A., Bhopal vide this office letter no. 2228A Dated 8.7.91. The details showing the sequence of fellingings have been marked on the map of 1:50,000 scale.

9.0 CONSTRAINTS

The survey work continued to suffer on account of stiff resistance by anti-SSP/Karnada Project. The agitationists have well spread net work throughout the affected areas. Even the most inaccessible village Sopate in Jhabua district were found with two activists. Ku. Nandni Sheras, Rajendra and Bhagirath Prasad a young graduate woman from Delhi and a young man from Maharashtra who were found preaching villagers not to divulge any information. Infact villagers were so much infuriated with the party that after scientists walked into the forests, the Jeep driver was threatened by them. Several such incidents took place during survey. However, with great risk the parties continued working in the area under the garb of forest officials checking "tendu patla" collection.

PART III

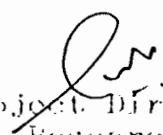
Physical Progress	Scheduled	Actual
1. Advertisement for Staff	Already done in previous quarter	
2. Staff in position	5	5
3. Date of ordering equipment	N.A.	
4. Date of installation of equipment	N.A.	
5. No. of field surveys during the quarter	3	-
6. Aspects planned for completion	Study of vegetational and faunal components.	
7. Reasons for short fall/not achieving the targets envisaged	Anti-dam agitation, non co-operation of villagers, problems faced; work slow.	
8. How this shortfall is proposed to be made up	Waiting for better working environment after agitation slow down.	
9. No. of research staff in position during the period of report	-	5
10. Distribution of works among	Investigators & Field Investigators:	
a. Prof. V.P. Mishra	To provide Technical guidance.	
b. Dr. S.K. Maith	Ethnobotanical studies and Floristic	
c. Ms. S. Sambatsar	Floristic, collection and interpretation of flora.	
d. Mr. Santosh Patidar	Ecological	
e. Mr. Sanjay Shrivastava)	Socio-economic studies.	
f. Mr. Anil Shrivastava)		
g. Shri G.L. Shrivastava with F.R./Dz.R. & Other staff	Enumeration of growing stock.	
h. Dr. A.K. Kandyu)	Obtained overall guidance relating to sighting of wild animals, ground flora and other biological components.	
i. Dr. R.K. Pandey)		
j. Dr. Pratibha Bhatnagar	Provide guidance for socio economic studies.	

FINANCIAL PROGRESS

Expenditure incurred upto 30.6.91.

S.NO.	Item	Amount (Rs.)
1.	Honoraria - Salaries	90,783=00
2.	Wages for hiring labours to assist	17,532=00
3.	Contingent Field expenses	34,400=00
4.	TA/DA	17,376=00
5.	Organising seminars	1,140=00
6.	Maintenance, fuel & oil	23,697=00
7.	Stationery/Postage/Printing	5,292=00
8.	Contingent expenses	45,471=00
9.	Rent expenses for field office/station	18,264=00
10.	Contractual services photocopy/drawing	2,320=00
Grand Total :		2,56,275=00

Certified that an amount of Rs. 2,56,275=00 (Two lakh Fifty Six Thousand Two hundred Seventy Five) Only has been incurred on Scheme during 1990-91 and 1991-92 i.e. from the starting of Scheme from 1.9.90 to 30.6.91 against Rs. 5,00,000.00 (Rs. Five Lakh) only.


Project Director
State Forest Research Institute,
Jabalpur, M.P.

LIST OF TABLES

- Table 1 : No. of villages of Barwani, Alirajpur and Kukshi Tehsils coming under submergence.
- Table 2 : List of Plant species observed and collected.
- Table 3 : List of Multifarious plant species observed during survey of likely submergence areas of Jhabua district.
- Table 4 : Wild animals observed during this quarter.
- Table 5 : Total Enumeration of Tree growth in various forest compartments of Jhabua district.
- Table 6 : Employment generated in 1990 and 1991 in Four collection units in Dhar district.
- Table 7 : Tendu leaves in Dhar district (1965-90)

Table 1 : No. of villages coming under submergence of Barwani, Alirajpur and Kukshi Tahsils

S.No.	Submergence of S.S.P.	No. of villages		
		Tahsil Barwani (Khargone)	Tahsil Alirajpur (Jhabua)	Tahsil Kukshi (Dhar)
1.	Govt. Land only	4	3	-
2.	Less 10 % Agri. land (House holding uneffected)	3	6	6
3.	10 % Agri. land and little House holding	2	-	2
4.	10 % Agri. land and complete House holding	4	1	3
5.	More than 10 % Agri. land only	9	-	6
6.	More than 10 % Agri. land and little House holding	8	4	7
7.	More than 10 % Agri. land with House holding	11	12	12
Total -		41	26	36

TABLE 2 : LIST OF PLANTS RECORDED DURING THIS QUARTER

Records	SPECIES	
1	Acacia catechu Willd.	Fabaceae
2	Acacia ferruginea D.C.	Fabaceae
3	Acacia leucophloea Willd.	Fabaceae
4	Acacia nilotica Willd.	Fabaceae
5	Acacia pennata Willd.	Fabaceae
6	Adina cordifolia Hook.	Malvaceae
7	Aegle marmelos Correa	Rutaceae
8	Ailanthus excelsa Roxb.	Simarubaceae
9	Alangium salviifolium (L.)	Alangiaceae
10	Albizzia lebbek Benth.	Fabaceae
11	Albizzia odoratissima Benth.	Fabaceae
12	Annona squamosa Linn.	Annonaceae
13	Anogeissus latifolia Wall.	Combretaceae
14	Apluda varia Hack.	Euphorbiaceae
15	Azadirachta indica A. Juss.	Melastomaceae
16	Bauhinia racemosa Lamk.	Bauhinaceae
17	Borassus flabellifer L.	Palmeae
18	Boswellia serrata Roxb.	Burseraceae
19	Bridelia retusa Spreng.	Euphorbiaceae
20	Buchanania lanzan Spreng.	Anacardiaceae
21	Butea monosperma (Lamk) Taub.	Fabaceae
22	Calotropis gigantea R. Br.	Asclepiadaceae
23	Careya arborea Roxb.	Myricaceae
24	Casearia graveolens Dalz.	Sapotaceae
25	Cassia auriculata Linn.	Fabaceae
26	Cassia fistula Linn.	Fabaceae
27	Cassia tora Linn.	Fabaceae
28	Celstrus paniculata Willd.	Celastraceae
29	Chloroxylon swietenia D&C	Meliaceae
30	Cochlospermum religiosum Linn.	Bixaceae
31	Coix gigantea Kon.	Poaceae
32	Cordia dichetoma Forest.	Boraginaceae
33	Cryptolepis buchmanii B&S	Fabaceae
34	Cuscuta reflexa Roxb.	Convolvuliaceae
35	Cymbopogon martini Wats.	Poaceae
36	Cynodon dactylon Pers.	Poaceae
37	Dalbergia latifolia Roxb.	Fabaceae
38	Dalbergia paniculata Roxb.	Fabaceae
39	Deanodium pulchillum Benth.	Fabaceae
40	Delichandrone falcata Seem.	Bignoniaceae
41	Dendrocalamus strictus Nees.	Poaceae
42	Diospyros melanoxylon Roxb.	Ebenaceae
43	Ehretia laevis Roxb.	Ehretiaceae
44	Elaeodendron glaucum Pers.	Celastraceae
45	Emblica officinalis Gaerth.	Euphorbiaceae
46	Eragrostis tenella Link.	Poaceae
47	Eriocaulon hookeriana W&A.	Sterculiaceae
48	Erythrina suberosa Roxb.	Fabaceae
49	Euphorbia nerifolia Linn.	Euphorbiaceae
50	Ficus bengalensis Linn.	Urticaceae
51	Ficus glomerata Roxb.	Urticaceae
52	Ficus infectoria Roxb.	Moraceae
53	Ficus religiosa Linn.	Moraceae
54	Flacourtia remontchi, L. Herit.	Bixaceae
55	Gardenia turgida Roxb.	Guttiferaceae
56	Garcia pinnata Roxb.	Myrsinaceae
57	Gmelina arborea Roxb.	Verbenaceae
58	Grewia tiliaefolia Vahl.	Tiliaceae

59	<i>Gynnosporia meatana</i> Linn.	Celastraceae
60	<i>Hardwickia binata</i> Roxb.	Fabaceae
61	<i>Helicteres isora</i> Linn.	Sterculiaceae
62	<i>Heteropogon contortus</i> Beauv.	Poaceae
63	<i>Holarrhena antidysenterica</i> Wall.	Apocynaceae
64	<i>Holoptelea integrifolia</i>	Ulmaceae
65	<i>Ichnocarpus frutescens</i> Br.	Apocynaceae
66	<i>Imperata cylindrica</i> P. Beauv.	Poaceae
67	<i>Indigofera pulchella</i> Roxb.	Fabaceae
68	<i>Ischaenum pilosum</i> Hack	Poaceae
69	<i>Kydia calycina</i> Roxb.	Malvaceae
70	<i>Lagerstroemia parviflora</i> Roxb.	Lythraceae
71	<i>Lanea grandis</i> Engler	Anacardiaceae
72	<i>Loranthus longiflorous</i> Desr.	Loranthaceae
73	<i>Madhuca latifolia</i> Roxb.	Sapotaceae
74	<i>Mangifera indica</i> Linn.	Anacardiaceae
75	<i>Merinda tineteris</i> Roxb.	Rubiaceae
76	<i>Milletia auriculata</i> Baker	Fabaceae
77	<i>Mimusops hexandra</i> Dubard	Sapotaceae
78	<i>Mitragyne parvifolia</i> Korth	Rubiaceae
79	<i>Mucuna pruriens</i> D.C.	Fabaceae
80	<i>Opuntia dillenii</i> Hair	Cactaceae
81	<i>Ougeinia galbergioides</i> Beth.	Fabaceae
82	<i>Phoenix sylvestris</i> Roxb.	Palmae
83	<i>Pongamia pinnata</i> Kierre	Fabaceae
84	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae
85	<i>Randia dumetorum</i> Lamk.	Rubiaceae
86	<i>Raecopetalum tomentosum</i> H.F. & Thomas	Anonaceae
87	<i>Salmalia malaribrica</i> Schoott and Endl.	Malvaceae
88	<i>Schleichera oleosa</i> (Lour.) Cken.	Sapindaceae
89	<i>Schima sulcatum</i> A. Camus	Fabaceae
90	<i>Schrebera swietenioides</i> Roxb.	Oleaceae
91	<i>Sesuvium portulacastrum</i> L.	Meliaceae
92	<i>Sterculia urens</i> Roxb.	Sterculiaceae
93	<i>Stereospermum suaveolens</i> DC	Bignoniaceae
94	<i>Syzygium cumini</i> (Linn.) Skeels	Myrtaceae
95	<i>Tamarindus indica</i> Linn.	Leguminosae
96	<i>Tectona grandis</i> Linn.	Verbenaceae
97	<i>Terminalia arjuna</i> Pedd.	Combretaceae
98	<i>Terminalia bellerica</i> Roxb.	Combretaceae
99	<i>Terminalia tomentosa</i> Roxb.	Combretaceae
100	<i>Themeda quadrivalvis</i>	Poaceae
101	<i>Tribulus terrestris</i> Linn.	Zygophyllaceae
102	<i>Vernonia cinerea</i> L.	Asteraceae
103	<i>Vitis rotundifolia</i>	Vitaceae
104	<i>Woodfordia fruticosa</i> Kurz	Lythraceae
105	<i>Wrightia tinctoria</i> Roxb.	Apocynaceae
106	<i>Xanthoxylum</i> Willd.	Rubiaceae
107	<i>Xanthoxylum</i> Willd.	Rubiaceae

Table 3 : List of Multifarious plant species.

-
1. Acacia catechu Willd.
 2. Acacia ferruginea D.C.
 3. Acacia leucophloea Willd.
 4. Acacia nilotica Willd .
 5. Acacia pennata Willd.
 6. Adina cordifolia Hook.
 7. Aegle marmelos Correa
 8. Ailanthus excelsa Roxb.
 9. Alangium salviifolium (L.)
 10. Albizia lebbek Benth
 11. Albizia odoratissima Benth.
 12. Almona schumosa Linn.
 13. Alseodissus latifolia Wall.
 14. Alula varia Neck
 15. Andirahta indica A.Juss
 16. Antirrhinum racemosum Lamk
 17. Corassus flebeliifer L.
 18. Boswellia serrata Roxb.
 19. Crucifolia retusa Spreng
 20. Buchanania lanzan Spreng
 21. Butea monnifera (Lamk) Teub.
 22. Calotropis gigantea A. Bro.
 23. Caraya amara Roxb.
 24. Cassia angustifolia Lamk.
 25. Cassia auriculata Linn.
 26. Cassia fistula Linn.
 27. Cassia tora Linn.
 28. Calatrus paniculata Willd
 29. Chloroxylon swietenia D. C.
 30. Coccolobium relucens Linn.
 31. Coix gigantea Lin
 32. Cordia dichotoma Forst
 33. Cryptolepis buchanania L. & S
 34. Cuscuta reflexa Roxb.
 35. Cymbopogon martinii Nees.

36. Cynodon dactylon Pers.
37. Dalbergia latifolia Roxb.
38. Dalbergia paniculata Roxb.
39. Decnodium pulchellum Benth.
40. Delichandrone falcata Seem.
41. Dendrocalamus strictus Nees.
42. Diospyros melanoxylon Roxb.
43. Ehretia laevis Roxb.
44. Elaeodendron glaucum Pers.
45. Emblica officinalis Gaertn.
46. Eragrostis tenella Link.
47. Eriocaulon hookerianum W & A.
48. Erythrina suberosa Roxb.
49. Euphorbia perfoliata Linn.
50. Ficus bengalensis Linn.
51. Ficus glomerata Roxb.
52. Ficus infectoria Roxb.
53. Ficus religiosa Linn.
54. Flacourtia remontana L. Merit
55. Cardenia turrida Roxb.
56. Garuga pinnata Roxb.
57. Gmelina arborea Roxb.
58. Grewia tiliadifolia Vahl.
59. Gynnostoma matana Lam.
60. Hardwickia binata Roxb.
61. Helicteres isora Roxb.
62. Heteropogon contortus Nees.
63. Holarrhena antidysenterica Wall.
64. Holoptelea integrifolia Br.
65. Ichnocarpus frutescens P. Beauv.
66. Imperata cylindrica Roxb.
67. Indigofera pulchella Mack.
68. Ischaemum piliolum Roxb.
69. Indica calycina Roxb.
70. Lantana camara L. var. pruriens Engler
71. Lantana camara L.
72. Loranthus longiflorus Deserv.

73. Madhuca latifolia Roxb.
74. Mandifera indica Linn.
75. Morinda tinctoria Roxb.
76. Milletia auriculata Benth.
77. Mimusops hexandra Dubard
78. Mitragyna parvifolia Benth.
79. Mucuna pruriens D.C.
80. Opuntia dillenii Benth.
81. Ouscinia dalbergioides Benth.
82. Phoenix sylvestris Roxb.
83. Pongamia pinnata Kierre
84. Pterocarpus marsupium Roxb.
85. Pandia spinosa Poir. Lamk.
86. Paccopetalum tomentosum J.P. & Thomas
87. Salvia malaribrica Schoott. and Endt.
88. Schleichera oleosa (Lour) Chen. Willd.
89. Scrima sulcatum Champ.
90. Schrebera swietenoides Roxb.
91. Soyala febricula A. Juss.
92. Sterculia urens Roxb.
93. Sterculium suaveolens DC
94. Syzgium conini (Linn.) Skreels
95. Tamarindus indica Linn.
96. Tectona grandis Linn.
97. Terminalia arjuna Wedd.
98. Terminalia belerica Roxb.
99. Terminalia tomentosa W & A
100. Terminalia quadrivalvis
101. Tribulus terrestris Linn.
102. Verticillium coccinella Tul.
103. Vitis rotundifolia
104. Xanthoxylum indicum Linn.
105. Xanthoxylum indicum Roxb.
106. Xanthoxylum indicum Willd.
107. Xanthoxylum indicum Willd.

Table 4 :- Wild Animals observed during this quarter.

Local Name	Scientific Name
Catla	Catla catla
Rohu	Labeo rohita
Bam	Macracanthus amarus
Singhala	Mystus singhala
Gingil	Calotes persicolar
Magar	Crocodilus palustris
Dhaman	Dendrophis pictus
Kachua	Gegemyda m. moga
Chhipkali	Gekko gekko
Bamni	Mubya sp.
Nag	Naja naja
Jangli Hyna	Acridotheres fuscus
Jalmarghi	Amaurornis phoenicurus
Vileo	Bubo zeylonensis
Kabutar	Columba liria
Jangli Kowwa	Corvus macrorhynchos
Bater	Coturnix coturnix
Katphoda	Dendrocopos mahrattensis
Kool	Eudynamys scolopacea
Titar	Francolinus poplicorlanus
Jangli Murghii	Gallus gallus
Saras	Carus antigone
Cheel	Milvus migrans
Mayur	Pavo cristatus
Baya	Ploceus philippinus
Balhal	Pyrenonotus cafer
Harial	Treron phoenicoptera
Chuha	Randicata bengalensis
Jangli Billi	Randicata bengalensis
Gilheri	Funambulus palmarum
Kyula	Herpestes edwardsi
Khargosh	Lepus ruficaudatus
Bandar	Macaca radiata
Changadar	Taphozous melanopogon
Lomri	Vulpes bengalensis

Table 5:- Enumeration of tree growth in various Compartments of Jhabua

S.N.	Compartment No.	Timber Fuel	No of Trees in different girth classes (Cm)								Total
			Upto 20	21/30	21/45	46/50	51/90	91/120	121/150	Over 150	
1.	99	T/F	1586	120	30	64	65	61	13	13	1952
2.	100	T/F	1582	264	31	94	103	63	18	1	2157
3.	101	T/F	2283	345	92	78	78	32	9	2	2919
4.	102	T/F	3704	373	169	161	233	154	68	18	4880
5.	120	T/F	2673	125	1	15	33	68	130	-	3045
6.	358	T/F	1755	230	10	18	45	21	6	5	2090
7.	359	T/F	1112	210	8	14	33	12	5	1	1395
8.	360	T/F	1315	122	8	20	39	11	7	-	1522
9.	361	T/F	922	77	15	9	4	5	1	-	1033
Total			16932	1866	364	473	633	472	252	40	21037

Table 6 : Employment generated in 1990 and 1991 in Four collection units in Dhar District.

No. Collection	Total Collection Tendu leaves		Total Employment Generation	
	1990	1991	1990	1991
	(In Std bags)		(In person days)	
1. Kulwat	335500	21200	4793	3031
2. Dabhandi	85800	84260	1240	1204
3. Dalaskheda	148700	53440	2142	763
4. Balpur	326460	275700	6364	3939
			14539	8937

Table 7 :- Tendu leaves collection in Dhar District. (1965-90)

Year	Tendu leaves collection (in standard Bags)
1965	9552.598
1966	6600.925
1967	9826.525
1968	11395.153
1969	7218.360
1970	4279.100
1971	7280.111
1972	10730.270
1973	8702.940
1974	10255.650
1975	9722.605
1976	5095.786
1977	7445.451
1978	12279.586
1979	11387.311
1980	14094.725
1981	17921.689
1982	19909.834
1983	19773.300
1984	21493.399
1985	21441.975
1986	11742.291
1987	12572.601
1988	14679.350
1989	17754.539
1990	14964.976

Minutes of meeting for Shoolpaneshwar Temple at Narmada Guest House, Vadodara on 11th June 1991 at 16.00 hours in the chairmanship of Vice Chairman & Mq. Director (A & E F) Sardar Sarovar Narmada Nigam

A meeting was held under the chairmanship of Vice Chairman and Managing Director (A & E F) at 4-0 P.M. on 11-6-91 at Baroda to discuss the action to be taken to expedite the construction of a new Shoolpaneshwar temple. Besides the officers of the Nigam, the representatives of the temple trust also attended the meeting.

The names of the participants are given in the annex i.

After detailed discussions the following decisions taken.

- (1) The Nigam will issue a formal letter to the temple trust confirming the availability of ^{land} ~~site~~ for the relocation of temple at Gora colony as selected by the Trust.
- (2) The Nigam will make arrangements for providing water connection to the new site for temporary use and also for construction purpose. Simultaneously, the Nigam will make arrangement for permanent source of water to the temple from Narmada and the related buildings.
- (3) The Nigam will provide as early as possible a suitable fencing to the new site finally selected by the trustee.
- (4) A representative of the trustees and O.S.D:Environment:SSNNL would jointly make efforts to locate an experienced temple Architect, preferably of Sompura family who may be engaged by the trustees for this work.
- (5) The temple Architect, a representative of the trustee, O.S.D:Environment: and other concerned officers of the Nigam would jointly visit the existing temple and prepare inventory of the structures to be shifted.
- (6) Thereafter the team would visit the new site ear-marked for

reconstruction of the temple, to enable the Architect to study the ground situation which would assist him in the preparation of layout and other drawings.

(7) The Architect will prepare the lay out plan at the new site indicating the location of each of the structures that will be either shifted or rebuilt at the new site. He will also provide the foundation plan of the Garbh Griha of the main temple. This work will be completed by the end of July 90-91.

(8) The temple Architect will prepare detailed drawings for the super-structure of the main temple and for the related temples and supervise each stage of the construction activity.

(9) On the basis of the general lay out and the foundation plans for the Garbha Griha of the main temple, the Superintending Engineer Narmada Project Construction (Rehabilitation) Circle will prepare detailed estimates in consultation of the Architect and obtain the approval of the competent authority. The estimates will be in two parts -

- :1: Estimates for foundation of Garbha Griha and shifting and reconstruction of part of old temple which it is possible to shift. And also facilities for the Pujari and few devotees.
- :2: Estimates for new structures for the temple complex including steps/path for devotees to reach Narmada waters.

On the basis of the estimates the temple trust would call for tenders for shifting and the reconstruction of the temple and related structures and proceed to fix up a competent agency for these works.

(10) The construction work on the foundation of the Garbh Griha of

main temple at the new site may commence by the end of October 1991 and completed by the end of November 1991.

(11) Funds required for the reconstruction purpose will be provided by the Nigam and the temple trustees will make demands for funds as and when each stage of a work is completed and so certified by the Executive Engineer in charge.

W. K. M.
4/7/91
Conservator of Forests
Environment Cell,
SSNVL

Annex - 1

Names of the participants in the meeting for Shoolpaneshwar Temple at Narmada Guest House, Vadodara on 11.6.91 @ 16.00 hours in the Chairmanship of Vice Chairman & Mg. Director, (A & E F) SSNNL.

Sr.No.	Name
1	Shri Jawahar Tolia O.S.D (Env.)
2	" P.T.Karmarkar G.M. (R. & D)
3	" A.V.Gururaja Rau Specialist Environment, SSNNL
4	" P.N.Jain Superintending Engineer, NPCC(Reh.)
5	Dr. S.N.Pandye Representing Director of Archaeology, Ahmedabad
6	Shri B.M.Patel Ex.Engineer, N.P.Con. & Reh.Un.No.3 Vadodara
7	" A.P.Mistry Ex.Engineer, N.P.Constn.(Reh) Dn.No.1 K Colony.
8	" K.M.Raval Mamlatdar, Tilakwada
9.	" Uttambhai Ramanlal Gandhi, Solicitor Ahmedabad
10.	" Rajvaidya Hirubhai K.Patel Nadiad
11	" B.N.Anant Ramial
12.	Dr. Kirit C. Pandya
13	Shri Vithalbhai K. Patel

MINISTRY OF ENVIRONMENT & FORESTS

ANNEX XII - 7

Catchment Area Treatment for the Narmada Projects
Cost Sharing

1. Draft guidelines prepared by the Ministry of Water Resources have been examined. Considering that:

- the fundamental principles of the processes of Hydrology and sedimentation are equally applicable to small, medium and large watersheds as corroborated by studies in India and other countries;
- sedimentation carried into a reservoir is dependent upon the Silt Yield Index and the Delivery Ratio;
- the flow dynamics determine the hydraulic distance considered in priority delineation survey of vulnerable areas

it was noted that the assumption made in the draft guidelines are contrary to the natural principles and processes of hydrology, sediment production and its dispersal etc, a revised set of Guidelines has been prepared. Guidelines are, therefore, still to be finalised.

2. The revised guidelines stipulate that:
- Subwatershed will be considered as a planning unit;
 - Critically eroded & vulnerable areas will be identified & demarcated as per the All India Soil & Land Use Survey Organisation methodology.

12]

Very High & High priority areas will be treated at project cost in the Free draining catchment and not the direct draining catchment on the reservoir periphery.

3. The free draining catchment for Sardar Sarovar Project (SSP) falls in the States of MP, Maharashtra and Gujarat.

MADHYA PRADESH

- Free draining catchment of SSP below Narmada Sagar Project: 22700 sq.km.
- Catchment under Very High category: 1990 sq.km. (8%)
- Catchment under High category: 4860 sq.km. (20.1%)

Total area needing treatment in MP: 6059 sq.km.
Cost of treatment @ Rs.7000/ha for Very High category areas.....Rs.400.15 crores.

This cost will presently be charged to the Sardar Sarovar Project but part of the cost shall be later debited to Onkareshwar and Meheshwar projects.

MAHARASHTRA

Degraded areas needing treatment are under identification. Approximately 400 sq.km. costing Rs.200 crores may need treatment.

GUJARAT

Free draining catchment area: 423 sq.km.
Area identified for treatment: 371.9 sq.km.
Cost of treatment @ Rs.7000/ha: Rs.26 crores

[3]

4. The catchment area treatment in the Narmada project will be funded through:

- i. Treatment of Very High & High category vulnerable areas in the free draining catchment to be funded by the concerned project.
- ii. Sardar Sarovar will be charged catchment treatment to the extent of Rs.534 crores. Part of the cost would subsequently be debited to Onkareshwar & Maheshwar projects.
- iii. Catchment treatment of Medium & other two categories of vulnerable areas shall be done by the State Departments of Agriculture, Forest and Soil Conservation.

5. The catchment area treatment shall be completed ahead of or simultaneously with the commencement of impoundment.

केवल सरकारी प्रयोग के लिए
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नर्मदा नियंत्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

पर्यावरण उपदल
Environment Sub-Group

बारहवीं बैठक का कार्यवृत्त
Minutes of the Twelfth Meeting

10 सितम्बर 1991 को
नई दिल्ली में हुई।

Held at New Delhi
10th September, 1991

नई दिल्ली
नवम्बर, 1991

New Delhi
November, 1991

MINUTES OF THE 12TH MEETING
OF
ENVIRONMENT SUB-GROUP OF NARMADA CONTROL AUTHORITY
HELD ON 10TH SEPTEMBER, 1991 AT NEW DELHI.

I N D E X

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	Date & Venue of the Next Meeting	19

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MINUTES OF THE 12TH MEETING OF ENVIRONMENT SUB-GROUP
HELD ON 10TH SEPTEMBER, 1991
IN PARYAVARAN BHAWAN, NEW DELHI.

Shri R. Rajamani, Secretary, Ministry of Environment & Forests and Chairman of the Environment Sub-group of NCA welcomed the Members and Invitees to the 12th Meeting of the Environment Sub-group. The list of participants is enclosed at Annex.XII Min-1.

Discussion on the agenda items was taken up thereafter.

Item No.XII-1(67) : CONFIRMATION OF THE MINUTES OF THE
ELEVENTH MEETING.

It was agreed that the amendment proposed in the letter No.SSNNL/ENV/MEET/338/91 dated 7.6.1991 & No.SSNNL/ENV/MEET/336/91 (Annexure XII(1-a) and (1-b) of Specialist (Environment), SSNNL, Govt. of Gujarat may be incorporated in the minutes.

The comments contained in the letter No.SSNNL/ENV/MEET/337/91 dated 7.6.1991 annexed at XII (1-c) are also incorporated alongwith the statement of the Chairman, Environment Sub-Group viz. Chairman directed that terms of reference for the studies may be drawn up based on the studies carried out for Ukai and Kadana Projects and the same may be forwarded to MOE&F for consideration".

With reference to letter No.SSNNL/ENV/341/1/91 dated 7.6.91 annexure XII. (1-d), it was decided to add that studies are to be completed by the end of the year without making any change in the text of the minutes.

The minutes were confirmed with the above amendments.

Item No.XII-2(68): REVIEW OF ACTION TAKEN ON THE DECISIONS OF THE PREVIOUS MEETING.

1. Consideration of Policy Issues (Item No.XI-2(64) B-1)

a) Catchment Area Treatment and Cost sharing:

The Chairman expressed the need for treating all the critically degraded areas in the free draining catchment. He further added that treating the degraded catchment area pari-passu with construction works is to be done not merely for the directly draining areas but for the entire critically degraded areas. He pointed out that the catchment area treatment plans submitted by the States show that catchment treatment, pari-passu with the construction works is contemplated only for the directly draining areas and this is not acceptable. He desired to know from the States when and how the remaining degraded areas of the catchment are planned for treatment so that their action plans could be suitably compressed so as to complete the treatment of balance areas well before impoundment commences.

Dr.Maudgal, Advisor, Min. of Environment and Forests stated that the project authorities were required to treat the entire free draining degraded catchment and the States had planned to do so all along. Subsequently, treatment of directly draining areas as Phase-I was thought of so that work could start immediately pending final planning for treatment of entire free draining catchment. He emphasised that treatment of the entire free draining catchment which is critically degraded need to be treated pari-passu with engineering works. Shri Dayal, Vice Chairman and Managing Director, SSNNL, Govt. of Gujarat stated that treatment of all the free draining catchment need not be at project cost. Shri Gokak, Secretary (Forests), Govt. of Maharashtra stated that it was never the idea to neglect the balance areas and in fact Govt. of Maharashtra has selected three such areas which are outside the directly draining catchment and the plan for the same have been prepared and handed over to the World Bank. Regarding source of funds for treatment of such areas, he hoped to meet them either from the Sardar Sarovar project authorities or from the State Government. Member (Civil) also stated that the indicative water shed plans prepared by

Maharashtra for submission to the Bank were prepared for covering all the critically degraded catchment in Maharashtra as a part of the Narmada Basin Development Project for which World Bank is considering loan assistance. Chairman, Environment Sub-Group desired preparation of firm action plans within three months for treating all critically degraded free draining catchment by the project authorities *pari passu* with the construction of the dam and also the funding arrangements.

Executive Member, NCA drew the attention of the committee to the approach of Planning Commission regarding catchment area treatment which under para (c) Annex-XII (7) of the agenda refers only to treating that part of the catchment area at project cost where the damage is directly attributable to the project and, such treatment costs are those which must immediately be incurred as a result of execution of the project and would not have otherwise been incurred by the Deptt. of Environment and Forests/Agriculture, as part of their plan activities. However, Dr. Shekhar Singh informed the Sub-Group that lot of discussions have taken place in the Planning Commission before issue of the circular referred to in the agenda papers. The rationale, according to Dr. Shekhar Singh, was that the entire directly draining catchment needs to be treated but only part of the cost may be attributed to the project which is not covered for treatment under any other scheme/project in hand. This has to be ascertained and accounted for by the project authorities. Shri Debnath informed the Sub-Group that according to a study it has been found that silt from the catchment area is not going to affect the life of the reservoir in a big way and the silt coming into the reservoir is already accounted for during the planning process. Studies conducted by the World Bank also supported this view. Dr. Shekhar Singh pointed out that catchment area treatment is required not only for arresting the silt but also for regulating the water flow. Shri Panwar and Dr. Maudgal wanted to know the details of the study as they both refuted the findings as quoted by Shri Debnath who went on to add that even if fresh silt flow is stopped from the slopes in the catchment, the silt already carried into the river upstream would fill up the reservoir making the stabilisation period for catchment area treatment, as suggested by Dr. Shekhar Singh, redundant. Such an argument, if any thing, only reinforces the need for quick catchment treatment because silt delivery is not a one time phenomenon and has to be stabilised at source.

Chairman, however, reiterated that the question of treating all the freely draining degraded catchment area is already decided and that treatment work should be planned and started to be completed pari-passu with the construction works and that plans for treatment of areas other than directly draining should be prepared within three months as already stated by him. He stated that he would like to write on this issue once more to the Secretary, Min. of Water Resources and, in case, no consensus emerges in the matter would have to be taken up to the Review Committee of NCA.

b) Extension of time for Environmental and Forestry Approval.

Chairman stated that the Environmental clearance was given to the project authorities by the Min. of Environment and Forests on the basis of an assurance, which was also included in the conditional clearance, that Environmental studies will be completed by 1989. A look at the status of environmental studies and action plans makes it quite clear that even many of the studies are still not completed and yet, despite a clear directive of the Review Committee in September, 1990, the NCA has not sought for formal extension for the time limit for completing the studies, formulation and implementation of action plans.

Shri Debnath sought to explain that Catchment area treatment and compensatory afforestation are planned for implementation pari-passu with the construction schedule. However, Chairman, Environment Sub-Group asserted that although there appears to be some progress on catchment area treatment and compensatory afforestation, larger issues still remain to be resolved. Except for the progress made on these two items in the State of Gujarat, the overall progress in the other two States of Madhya Pradesh and Maharashtra is not at all satisfactory and, unless work is speeded up the progress of the construction work at the project would have to be slowed down. He also expressed unhappiness over non-completion of studies on flora, fauna carrying capacity, command area development and archaeological aspects etc.

2. Time frame for preparation of Action Plan and Implementation of Environment safeguard measures [Item No.XI-2(64)]

Govt. of Madhya Pradesh has submitted a statement of expenditure incurred on Environmental components upto July, 1991 which is placed at Annexure-XII Min-2. The Govt. of Gujarat has made available the estimated cost of the various components of environmental safeguard measures which are placed at Annexure-XII Min-3. The expenditure incurred by Govt. of Gujarat on Environment and Ecology is reported to be Rs.3.49 Crores. The break up of expenditure on different items, is still awaited. The details of total expenditure estimated to be incurred by Govt. of Maharashtra and the expenditure so far incurred on environmental aspect are still awaited.

Item No.XII-3(69) : PRESENT STATUS OF STUDIES/SURVEYS AND
ENVIRONMENT ACTION PLANS

The progress reported by the States on each component is as under :

1) Phased Catchment Treatment

Concern was expressed over the continuing trend in reduction of catchment area to be treated as in evident from the fact that the earlier estimate of 1.10,000 ha has now been reduced to 90,000 ha. Project authorities were therefore, advised to verify their data. Chairman also directed that our CCF at the Bhopal Regional Office should attend the meetings in future to report his assessment of the catchment area treatment and compensatory afforestation programme.

Narmada Sagar Project

Out of the 6000 ha of the non-forest area targetted during the current year, the Govt. of Madhya Pradesh is reported to have completed 3800 ha of non-forest area with treatment by khus plantation as on 15th August, 1991 and it is expected that target for the current year will be achieved. Target of treating 1.199 ha of forest area by Khus plantation has been achieved.

It is reported that the treatment of the catchment area under the Datuni Pilot Project is envisaged under the treatment of the catchment area for Narmada Sagar Project as a whole. The progress reported on Datuni Pilot Project alone during the current year is 900 ha in non-forest areas and 1160 ha in forest land, thus the total progress achieved on the Datuni Pilot Project including 40 ha carried out earlier, is 2100 ha against 3500 ha of the final target.

Sardar Sarovar Project

Govt. of Madhya Pradesh

The progress reported on treatment of non-forest areas till 15th August, 1991 is 3000 ha. It is expected that the target of 6000 ha for the current year will be achieved during the current financial year.

Govt. of Gujarat

The Govt. of Gujarat has indicated a revised target of treating 5000 ha for the current year against the target of 6000 ha envisaged in catchment area treatment plan submitted to Ministry of Environment & Forests. Govt. of Gujarat proposes to make up this difference of 1000 ha of catchment during final year thus raising the target of 94-95 from 4670 to 5670.

The Chairman cautioned the Govt. of Gujarat against the changes contemplated in the action plans submitted to the Min. of Env. & Forests and stated that the reduction in the target made during the current year is not acceptable to the Min. of Env. & Forests because during the later years treatment of the critically degraded areas of catchment other than those draining directly into the reservoir are also required to be taken up for completion pari-passu with the engineering works. Shri F.S. Jasol, Secretary (Rehabilitation) agreed to look into the schedule of targets. The Chairman also desired that evaluation of the quality of afforestation work should be done by the Regional Office and reported.

Govt. of Maharashtra

Shri Gokak, Secretary, Forests, Govt. of Maharashtra informed that at present there is no catchment area treatment plan because the agitationists in the area do not permit the officers of Govt. of Maharashtra to conduct surveys for preparation of the detailed plans. However, Govt. of Maharashtra has prepared an indicative watershed plan for 3 villages which do not fall into the categories of the watersheds identified for treatment. These treatment plans have been furnished to the World Bank for seeking assistance under the Narmada Basin Development Project.

In reply to a question of the Chairman, Dr. Shekhar Singh explained that people of the area in Maharashtra are against the Sardar Sarovar Project and not catchment area treatment. Hence, officials posted on behalf of the SSP authorities are not allowed to work there. On the other hand if these officers are sent there for the same work but with the message that the work to be carried out by them is to bring benefits

to the people of the area and that they are not from any organisation connected with SSP, local people might allow them to work. Chairman desired that the benefits should be explained to the people and they should be convinced about the beneficial aspects. Chairman, also expressed unhappiness over the delay in submission of the plans and consequently their implementation by Maharashtra even though the catchment area in Maharashtra requiring treatment is quite high but nothing has yet been started. He therefore, desired that detailed plans be submitted within a month. He also desired to know the clear position with regard to the nature of obstruction of the work by the people of the area and the action proposed by the the Govt. of Maharashtra for formulation and implementation of environmental plans pari-passu with the engineering works. Shri Gokak, Secretary (Forests) Maharashtra assured that the situation is improving and it may be possible to complete the works pari-passu with the construction of the dam and related works. He promised to send the CAT plans within one month.

Chairman desired that a note on the methodology followed by the agencies in all the three States for identifying critically degraded areas may be submitted to the Ministry of Environment & Forests within one month.

ii) Compensatory Afforestation

Narmada Sagar Project

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh has identified 10,143 ha non-forest and 70,802 ha degraded forest land for taking up compensatory afforestation. Till the end of July, 1991 NVDA has taken over 5,179 ha of non-forest land from revenue authorities. An area of 11,776 ha (8704 ha of forest and 3072 ha of non-forest) was afforested during the years 1989-90 and 1990-91. During the current year an area of 14,344 ha of forest land and 2167 ha of non-forest land has been afforested by utilising the stock of 75 nurseries raised at different places in the project area. Thus the total area covered so far under compensatory afforestation is 28,287 ha (23,048 ha forest and 5,239 ha of non-forest area).

Sardar Sarovar ProjectGovt. of Madhya Pradesh

The Govt. of Madhya Pradesh has reported progress on 1573 ha of afforestation out of which 1200 ha is non-forest land and 373 ha of forest land, till the end of August, 1991.

Govt. of Gujarat

Emphasising his often repeated statement that compensatory afforestation should be done in the impact area Dr. Shekhar Singh desired that Govt. of Gujarat may be asked to follow this concept rather than continue with plantation work in the Kutch area. However, it was explained that if the State Government certifies that the non-forest land is not available in the impact areas or in the entire state then the proposal for afforestation either in the non-forest areas away from the impact areas or in the degraded forest areas can be agreed to. In this case, however, all the degraded areas in the impact zone are already being covered. As such, the plantation raised by Govt. of Gujarat in Kutch region have been approved. Shri. Jasol, Secretary (Rehabilitation), Govt. of Gujarat informed the sub-group that the Govt. of Gujarat has nevertheless taken up additional plantations over and above the target given by the Min. of Env. & Forests. In reply to another question from the Chairman, to cover some additional areas he explained that the Govt. of Gujarat would consider this suggestion of the Chairman for taking up some more plantations on a voluntary basis but not as a compulsion.

Govt. of Maharashtra

Shri Gokak, Secretary (Forests), Maharashtra pointed out that as per the Forest (Conservation) Act, 1980 the ineligible encroachers will not be eligible for regularisation, but they can take part in community forestry. He enquired whether the plantations so raised could be counted against compensatory afforestation. The Chairman replied in negative and stressed that the State Government will have to raise the compensatory afforestation. Chairman desired to know the progress in respect of the afforestation programme by Govt. of Maharashtra against diversion of 2700 ha of forest land at Taloda released for R&R works. Shri Gokak replied that there is a

perceptible progress in the overall compensatory afforestation works against the project and that 5000 ha of the land is already afforested and another 1300 ha of the land falling in the districts of Amaravati and Dhule is given to the Forest Development Corporation and office of the Forest Development Corporation is also shifted to Dhule District and that the entire 13000 ha of the land is proposed to be afforested by next year. However, Chairman desired that the statements be verified first before accepting these figures. To a question from Dr. Shekhar Singh, Shri Gokak replied that afforestation of the non-forest lands will be taken up within the impact area of the project.

iii) Command Area Development

Narmada Sagar Project

Govt. of Madhya Pradesh

It was reported that Indian Institute of Bangalore and Consulting Engineering Services, New Delhi have completed the studies on ground water modelling and surface and sub surface drainage. Based on these studies a master plan for drainage, control of water logging and salinity is proposed to be drawn up. Consultants have been shortlisted and the preliminary reports furnished by the consultants are under scrutiny. Shri Thapliyal, Member (Env.), NVDA informed that appropriate consultants will be assigned the job. Regarding studies on effect of run-off from the fields due to application of pesticides, insecticides and chemical fertilizers in the command area it was stated that J.N. Agriculture University, Jabalpur and State Pollution Control Board have been contacted by NVDA. Further action will be taken by Govt. of Madhya Pradesh after getting the replies. Time frame not indicated.

Sardar Sarovar Project

Govt. of Gujarat

The participants were informed that the Govt. of Gujarat has submitted a copy of the terms of reference on carrying capacity received from NEERI, Nagpur. Chairman desired distribution of the copies to all the members also for their comments. This is now enclosed at Annexure-XII Min.-4. Chair-

man further desired that while finalising TORs the findings of the reports of earlier studies carried out in the command area should be duly noted. He stated that a 10-15 year development perspective in the area with respect to specially roads, industrial growth, infrastructure developments, construction of canals, land use changes due to agriculture and settlement etc should be projected as an integral component of the Command Area Development plan. Water quality and vector control should also be included in the integrated command area management plan. //

iv) Survey of Flora and Fauna and Carrying Capacity Studies

Narmada Sagar Project

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh submitted the progress report prepared by the Friends of Nature Society, Bhopal as on August, 1991. This report is placed at Annexure-XII Min.-5 and would be considered in the next meeting. The final report of the society is expected shortly.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Despite continued opposition faced by the staff on account of resistance from the anti dam activists SFRI is continuing the work in the area. Chairman desired that report of the Institute should include action required to be taken which must be completed by 1993-94.

Govt. of Gujarat

In reply to a question of the Chairman regarding action/implementation plan which are likely to emanate from the studies being conducted by the M.S. University, Shri Jasol stated that the implementation plans will also be drawn up by the same University and that the studies are expected to be completed in 1992.

Govt. of Maharashtra

Shri Gokak informed that the TORs with Pune University have been finalised. Chairman desired that this study should be completed as quickly as possible and action to be taken implemented by 93-94.

Chairman directed that areas needing total protection for ensuring bio-diversity should be demarcated on priority and notified for protection.

v) Archaeological and Anthropological SurveyNarmada Sagar ProjectGovt. of Madhya Pradesh

Madhya Pradesh representative informed that survey in 87 villages has been completed and the remaining villages will be covered by March, 1992 so that action plan can be ready by June, 1992. However, the information about monuments listed during the survey already completed and current position of the survey is still awaited.

Sardar Sarovar ProjectGovt. of Madhya Pradesh

It was stated that Archaeological survey work in 138 villages is completed so far by the State Archaeological Department and that the survey in the remaining 55 villages will be completed early in 1992 and the action plan will also be ready by March, 1992. It was however indicated that survey work is getting adversely affected due to agitation in the submergence area but, despite this, the work is likely to be completed as scheduled. The list of the monuments already identified during the survey works of the same are still awaited.

Govt. of Gujarat

Govt. of Gujarat representative informed that Hamfeshwar temple is to be relocated at a higher elevation in the same area. However the schedule of the submergence of

Shoolpaneshwar temple and details of the action plan for shifting the same are still awaited.

Chairman desired that Director, A.S.I and the Director, State Archaeological Department may also be invited for the Environment Sub-Group meeting.

vi) Seismicity and Rim Stability of Reservoir
Narmada Sagar Project

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh indicated that studies for some patches of narrow water divide will be taken up by GSI after September, 1991.

Sardar Sarovar Project

Final report of rim stability from Govt. of Gujarat is still awaited. NCA has called a meeting to review the actions to be taken for completion of the remaining survey work to be entrusted to GSI on 18.9.91.

vii) Health Aspects

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh has submitted a list of the Institutions in the districts of Khandwa, Hoshangabad, Dhar and Barwani where health services are being provided to the workers.

Govt. of Gujarat

Dr. S. Maudgal, Advisor, Min. of Env. & Forests desired to know the base line data on health aspects within the submergence and command area, facilities presently existing, proposal for augmenting the existing health facilities and the scenario with a likely increase of water borne diseases after introduction of perennial irrigation. Govt. of Gujarat agreed to submit the details desired without delay. In reply to a question Dr. Maudgal informed that comments on health plan submitted to the Min. of Env. & Forests will be sent shortly.

Govt. of Maharashtra

Govt. of Maharashtra informed that base line surveys are already completed and a draft Health Plan has been submitted. Min. of Env. & Forests desired copy of this plan which was promised to be supplied within a week.

viii) Fisheries Development of SSP/NSP ReservoirGovt. of Madhya Pradesh

The consolidated report on the Limnological studies conducted by the three Universities for the three zones for the year 89-90 was furnished during the meeting which could be discussed in the next meeting.

Govt. of Gujarat

Progress report with respect to the protection of aquatic life, with particular reference to the migratory species and on the need for installing a mechanised lift is awaited from Govt. of Gujarat.

Chairman desired to know the details of the studies on fish protection and management plans, if any, for conservation of the fish in the reservoir, canals, estuaries etc. Executive Member, NCA informed that the World Bank is considering to finance the development of fisheries in the reservoir and that the same is receiving continued attention of the States and the NCA.

Shri Panwar, Director, Wildlife Institute of India informed the sub-group that creation of a protected area in the reservoir enhances considerably the fish catch in buffer zone and therefore suggested the creation of fish Sanctuary area. Chairman opined that while the commercial aspects of the fisheries development is looked after by the interested parties, there is need to provide protection for all aquatic life including fish of without immediate economic significance thrive well in stagnant water also. Dr. Maudgal, Advisor, MOE&F stated that commercial Fisheries with introduction of carp varieties is well covered. However, the need is also to conserve the bio-diversity. Executive Member, NCA stated that there are some deficiencies in some of the studies and the

gaps are required to be identified. Shri Panwar agreed to examine and to comment on the studies already completed, if copies of these reports are furnished. Chairman was concerned that the possibility of disruption of the basic food chain due to construction of the reservoir requires to be considered on priority. Member (Civil) stated that the reports submitted by GOPA Consultants and CICFRI do not cover the conservation aspect and suggested that various studies so far conducted may be analysed for preparing specific plans for conservation.

Item No.XII-4(70) : SETTING UP OF AN ENVIRONMENTAL DEVELOPMENT CELL

Executive Member, NCA reported that Dr. Blinkhorn of the World Bank visited the office of the NCA on 6th September and had desired to have a discussion with Director, NEERI, Nagpur and Advisor, Min. of Env. & Forests. However, both of them regretted their inability to attend the meeting at Indore. While agreeing to the proposal submitted, Dr. Blinkhorn suggested a specific programme which is required to be taken up during the initial years and the same was circulated among the Members during the meeting.

Chairman, however, remarked that the EDC is not taking the shape as originally envisaged by Min. of Env. & Forests and yet the NCA is proceeding with its own course of action even when specifically advised by Min. of Env. and Forests not to do so. He, therefore, stated that even though the proposal had been initiated in the Environment Sub-Group and it would have been desirable to develop it into an autonomous Centre of Excellence. Since this is not the case, he would like the Sub-Group not to consider any further the proposal on the EDC and that the item may be dropped altogether.

Item NO.XII-5(71): ANY OTHER ITEM

The Chairman observed that:

- On the basis of the progress reported by the State authorities regarding completion of surveys and studies, formulation of action plans and their implementation, which was to proceed pari-passu with the engineering works as stipulated in the clearance, it is evident that the pari-passu clause has not been fully complied with.

The position will be watched further.

DATE AND VENUE OF THE NEXT MEETING

SSP PROJECT SITE, KEVADIA COLONY, GUJARAT.

DATE : FRIDAY, 29TH NOVEMBER, 1991.

TIME : 10.00 HRS.

A N N E X U R E S

<i>Annex.No.</i>	<i>Item in which referred to</i>	<i>Page No.</i>
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XII Min-2	XII-2(68)	2 - 3
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XII Min-4	XII-3(69)	7 - 13
XII Min-5	XII-4(69)	14 - 15

ANNEX.XII Min-1**LIST OF PARTICIPANTS OF 12TH MEETING OF ENVIRONMENT SUB-GROUP
OF NARMADA CONTROL AUTHORITY HELD ON 10.9.1991 AT NEW DELHI.**

1. Shri R. Rajamani. Secretary. Ministry of E&F - **Chairman**
2. Shri D.C. Debnath. Executive Member. NCA.
3. Dr. S. Maudgal. Adviser. Ministry of E&F.
4. Shri S.S. Patnaik. D.I.G.(Forests), Ministry of E&F.
5. Shri A.V. Gokak. Secretary(Forests). GOM.
6. Shri U.K. Mukhopadhyay. Secretary (Env.). GOM.
7. Shri D.R. Thapliyal. Member(Env.). NVDA. GOMP.
8. Shri S. Dayal. Vice-Chairman & M.D., SSNNL, GOG
9. Kr. F.S. Jasol. Secretary(Reh.). GOG.
10. Shri B.J. Parmar. Chief Engineer. SSNNL. GOG.
11. Shri N. Ramaswamy. Secretary (Narmada). GOG.
12. Shri N.V.V. Char. Secretary. SSCAC.
13. Shri K.M. Joseph. Member(Civil). NCA.
14. Shri S.M. Pai. Secretary. NCA.
15. Shri R. Vidyasagar Rao. Director (EM). CWC.
16. Dr. R.K. Katti. Director. UNEECS.
17. Shri H.S. Panwar. Director. Wildlife Institute of India
18. Shri Shekhar Singh. IIPA.
19. Shri A.K. Sinha. ICAR.
20. Shri S. Chandra. Conservator of Forest. NVDA.
21. Dr. Pawan Kumar. Specialist(Env.). NCA.
22. Shri R.K. Behri. Executive Engineer. NVDA.

ANNEX -XII - Min.-2

2. Time frame for preparation of Action Plan and Implementation of Environment Safeguard Measures [Item No.XI-2(64) B-3].

Expenditure statement upto July, 1991 is as under :-

Sl.No.	Items	NSP		(Rs. Crores)	Remarks
		Estimated cost of the project.	Expenditure upto July '91		
(1)	(2)	(3)	(4)		(5)
<u>Environmental Projects :-</u>					
1.	Rehabilitation Master Plan	--	11.06		Included in the project cost.
2.	Phased catchment area treatment	124.00	4.48		- do -
3.	Compensatory afforestation	152.00	25.02		- do -
4.	Command area development	50.00	0.18		- do -
5.	Survey of flora and fauna	0.36	0.15		- do -
6.	Carrying capacity of surrounding area				
7.	Health aspects	7.48	0.10		- do -
Total Environment Cost :			41.00		

1.	2.	3.	4.	5.
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Engineering Projects :-

Unit -I	832.32	129.74	Expenditure upto June'91
Unit -II	541.98	15.05	- do -
Unit -III	619.37	15.77	- do -
Catchment Area Treatment	124.00	4.49	
Command Area Development	50.00	0.18	
Total Engineering Projects :		2167.67	165.23

SSP

1. Rehabilitation Master Plan	-	8.42	
2. Phased Catchment area treatment	51.30	0.73	
3. Compensatory afforestation	18.00	1.44	
4. Command area development	--	--	Does not lie in MP
5. Survey of flora fauna		0.20	0.05
6. Carrying capacity			
7. Health aspects	--	--	Expenditure included in NSP.
Total Environment Cost :		10.64	

SARDAR SAROVAR PROJECT

ENVIRONMENTAL WORK PLANS AT A GLANCE

		Estimated Cost (Rs. in lakhs)
(A) FORESTS AND WILD LIFE		
i)	Compensatory Afforestation	465.00
ii)	Catchment Treatment in forest areas	4083.50
iii)	Catchment treatment (Soil conservation work) in non-forest areas.	241.88
iv)	Dan Vicinity Plantation	66.95
v)	Shoolpaneshwar Wild Life Sanctuary (Improvement and Development).	60.25
Total		4917.58
(B) FISHERIES DEVELOPMENT		
i)	Hydrobiological Studies	9.30
ii)	Fish Farm and Fish Seed Hatchery	106.08
iii)	Training of Fishermen	72.55
iv)	Assistance to primary Fishermen's Co-operatives	44.00
v)	Assistance to Apex Fishermen's Co-operative/Fisheries Development Board	138.60
vi)	Establishing Cell for co-ordination	30.00
Total		400.53

(C) PUBLIC HEALTH

Sub Sector A
Surveillance and Control of
Water Related Diseases and
Communicable Diseases.

Scheme 1	Hospital at Project site	47.31
Scheme 2	Strengthening of Laboratory services.	236.18
Scheme 3	Development of infras- tructural facilities.	179.88

		463.37

Sub Sector B
Surveillance and Control
of Malaria.

Scheme 1	Additional Staff at State level.	50.39
Scheme 2	Additional Staff at District level.	193.40
Scheme 3	Anti-malaria organisation for colonies.	92.15
Scheme 4	Residual insecticidal spray organisation.	3006.23

		3342.17

Total of Sub sectors A & B
Total estimated cost of
environmental work plans (A+B+C) 9123.65

Additional Environmental Improvements approved so far

(Rs. in lakhs)

(i)	Creation of habitat for the Great Indian Bustard (highly endangered)	12.00
-----	---	-------

bird) - first stage covering
201 ha. (Second stage covering
400 ha. will be taken up
later on)

ii)	Improvement of support watering facilities at six locations.	14.25
iii)	Inspection and transport facilities.	3.40
iv)	Project Impact Area Plantation.	1077.00

Grand total of Environmental Protection Measures for Sardar Sarovar Project.	10230.30
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ANNEX -XII - Min. 4

ENVIRONMENTAL IMPACT OF SARDAR SAROVAR PROJECT ON THE COMMAND AREA

SCOPE OF WORK

Preparation of Environmental Impact Statement incorporating Environment Management Plan for Command Area of Sardar Sarovar Project.

OBJECTIVES OF THE STUDY

- To assess existing environmental status covering major environmental components, viz. water, land, biological, climate, socio-economic, health and cultural
- To identify potential impacts on various environmental components during pre-construction, construction and operational phases of the project
- To predict significant impacts through identification, calibration and validation of appropriate mathematical/ simulation models
- To evaluate impacts of the project through appropriate evaluation techniques
- To prepare an Environmental Management Plan (EMP) outlining control strategies to be adopted for minimising adverse impacts - To delineate post-construction environment quality monitoring programme to be pursued by project proponent

SCOPE OF WORK UNDER EACH ENVIRONMENTAL COMPONENT

I. WATER ENVIRONMENT

- Study of water resources with respect to quantity and quality
 - Prediction of siltation in the canal network to plan appropriate management practices/ strategies for enhancing operational life
 - Prediction of changes in salinity of water due to waterlogging
 - Prediction of changes in surface and ground water quality
 - Estimation of anticipated impacts on aquatic ecology including fisheries
 - Overall impact of the project in the command area
- Expert Group
has been
constituted
by GOVT
headed by Mr. N.G.K.
Mehta to study
siltation aspect.
- The mathematical
modelling study will
give likely water
logged area and
salt balance.
- Commissioner of
Fisheries and
General Inland
Fisheries Division
are being carried
out the study.

II. LAND AND BIOLOGICAL ENVIRONMENT

- Delineation of landuse pattern and practices in the command area including establishment of land holdings through remote sensing
 - Prediction of impacts on landuse pattern in command area with emphasis on forest and agricultural lands
 - Prediction of changes in cropping pattern in the command area
 - Estimation of changes in flora and fauna in the command area
- The study is
done by ORCs

III CLIMATE AND WEATHER

- Estimation of changes in microclimate due to enhanced evaporation losses
- Prediction of impacts arising out of construction activity

IV SOCIO-ECONOMIC AND HEALTH COMPONENTS]

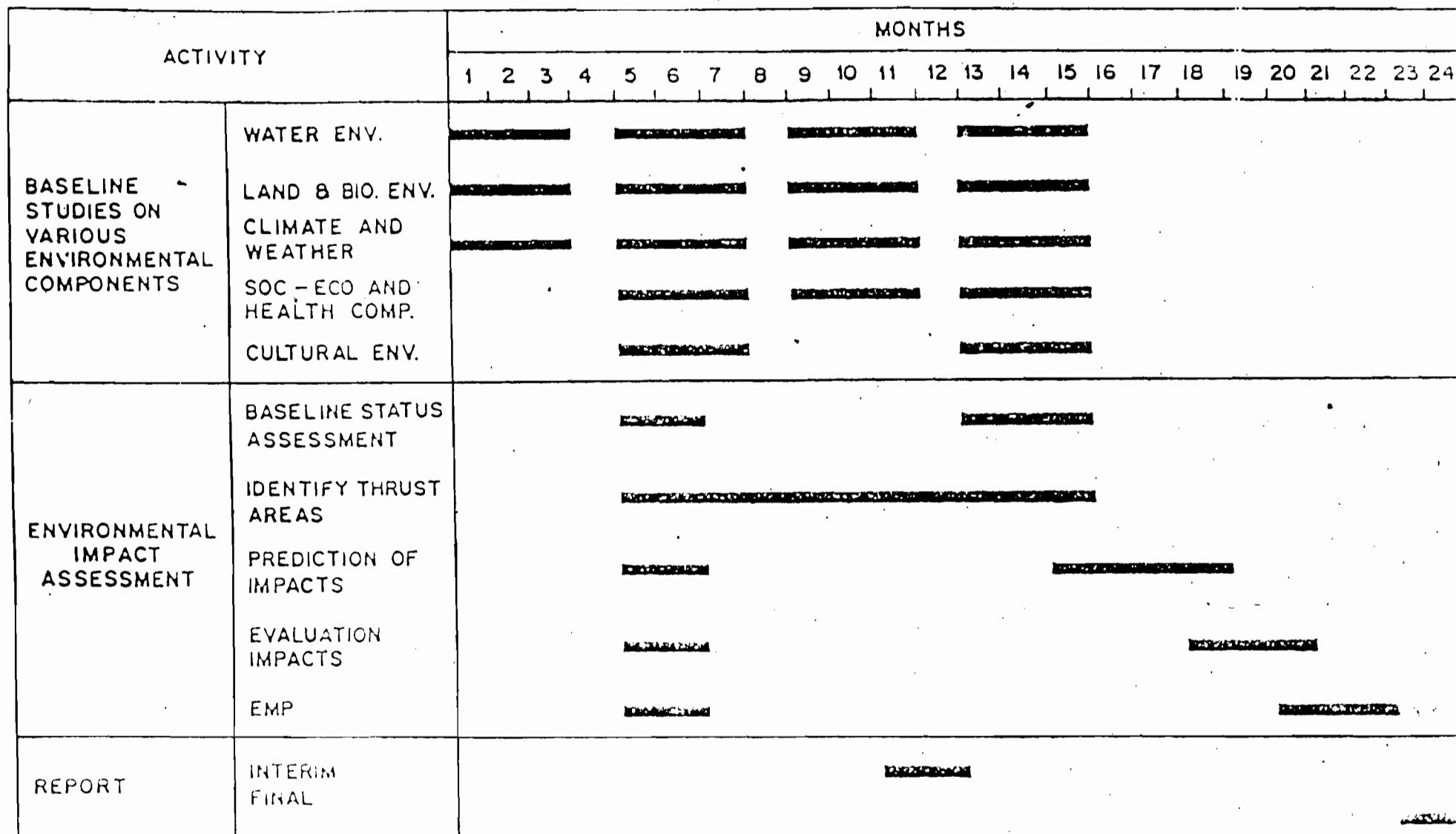
- Collection of baseline data on human settlements, health status of community and existing facilities for social welfare and health care
- Estimation of disruption in social life due to project activities || centre for social studies, Surat has done this study
- Assessment of aesthetic impairment
- Prediction of anticipated health problems due to vector borne diseases || transported through canal network
- Prediction of health problems due to changes in population, density and distribution of emigrant construction workers
- Assessment of economic benefits to community and environment due to proposed activity

V CULTURAL ASPECTS

- Assessment of possible damage to monuments of historical, cultural and religious importance due to canal network

PROJECT PERIOD - 24 Months

ACTIVITY BAR CHART



LEGEND :- ■ PROPOSED SCHEDULE

ENVIRONMENTAL IMPACT OF SARDAR SAROVAR PROJECT ON THE COMMAND AREA

TERMS OF REFERENCE FOR STUDIES ON CARRYING CAPACITY
AND COMBINED AREA DEVELOPMENT OF SARDAR SAROVAR
PROJECT

The terms of reference for carrying capacity study include inter alia the following :

- Assessment of the present status of natural resources and a detailed resource inventory of all watersheds in the basin;
- Present land use status in all the watersheds in the basin; Land use plan for Region 4 is prepared.
- Assessment of the "Status of Environment" in the basin;
- Identification and demarcation of ecologically sensitive and biologically rich regions for total protection;
- Demarcation of critically degraded eco-systems for priority rehabilitation on the basis of time bound action plans;
- Assessment of Supportive Capacity of the region;
- Estimation of Assimilative Capacity of air, water and land through field surveys and Modelling Techniques in the basin;
- Evolve alternate development scenerios on the basis of Supportive and Assimilative Capacity; and Cropping pattern study is done by CRG
- Suggest the ideal project-mix for sustainable development of the basin; and
- Organisational restructuring needed, if any.

...2/-...

COMMAND AREA DEVELOPMENT :LAND

- Land capability survey of the areas which are proposed to be brought under irrigation along with soil profiles;
- Status of present agricultural practices viz and viz agro-climatic conditions and evaluation of the suitability of present land use;
- Status of land erosion due to water and wind; and
- Identification of areas prone or already affected by water logging/salinity.

Soil Survey
is ~~done~~
being
carried out

Regrada-
lisation
study is
done by
CPCB

Bhal area
and Bara
links are
identified

WATER

- Assessment of precipitation, water availability — both surface as well as ground in terms of quality and quantity;
- Estimation of present and proposed water use in various segments of the command;
- Estimation of present and proposed ground water utilization along with recharge rate; and
- To assess the impact of use of fertilizers and pesticides on quality of surface as well as ground water with needed treatment measures.

Ground
water
survey

Mathemati-
cal modelling
of Ground-
water and
Drainage
study up to
Cah is comp-
leted. For

remaining
area study
is in progress

MANAGEMENT PLAN :

- Detailed Management Plans for command area development covering proposed drainage works on farm development, conjunctive use of water and training programmes for the farmers;
- Suggest cropping pattern for sustainable results;
- Evolve Management Plans for preventing the contamination of water bodies due to farm run off, pollutants from industries and sewage effluent etc. in the command.

For drainage
& conj use the
studies are
completed in
progress. An
exp. group
is working on
Water Manage-
ment

-: 3 :-

- Creation of green belts to check wind erosion; and
- Delineate the prescribed land use for sustainable yield.

- 40 -

Annex-XII Min-5

PROJECT ON WILDLIFE RETRIEVAL & CONSERVATION

This study has been taken up by the Friends of Nature Society (FONS), Bhopal, which comprises Forestry and Wild life professionals with wide experience.

FONS have checked the checklist of mammals, reptiles, fishes and insects as prepared by Zoological Survey of India. They have added new occurrences. However, no species has been found which is not found elsewhere in the country.

The rare endangered and threatened species have been identified and population estimates in respect of larger mammals have been made by visual sighting method. This estimate is now to be cross checked by statistically based sampling by indirect count methods in the coming open season. The visual count does not indicate any serious problem areas.

Map showing distribution and concentration of identified species will be prepared as soon as the cross check by indirect count method is completed.

Migration or rather shifting routes for the wildlife have been studied and the areas for post-inundation habitats have been located on map and reconnoitred in the field. The prospects for wild life seem to be much better after the filling up of the reservoir than what they are today.

As yet FONS do not see any prospect of intra specific or inter specific conflicts as the extent population intensity is very very low.

FONS have identified future natural relocation areas and special conservation areas e.g. Sanctuaries, National Parks etc. Plans in brief for their management are being prepared. The island isolation

-41-

problem has been studied by experts coopted by FONS and they have not envisaged any problem of isolation of gene pools. Except one small island, the islands all get connected with mainland at M.D.D.L., thus eliminating prospects of isolation.

FONS have made a detailed study of the question of eco-development based on energy flows in the village ecosystem in their study areas. Based on this study a detailed plan of eco-development including farm and social forestry will be proposed so as to reduce the dependence of local population on the forests, whereby they come in conflict with wildlife.

The progress of the FONS project has got delayed because of non-availability of specialist help in time. The study on birds is already undertaken and will soon be completed.

FONS expect to submit the draft preliminary report in parts starting October, 1991. They have already submitted the Forest Clearance Plan and Map.

NARMADA CONTROL AUTHORITY

Environment Sub Group

13th meeting

29th November 1991

Agenda

**AGENDA FOR 13TH MEETING OF THE ENVIRONMENT SUB-GROUP
OF NCA TO BE HELD ON 29.11.1991 AT KEVADIA COLONY (GUJARAT)**

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XIII-1	Status report of Environmental Aspects for the period ending 30th September, 1991.	12 - 28
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**Item No.XIII-1(71) : CONFIRMATION OF THE MINUTES OF THE
TWELFTH MEETING**

Minutes of the Twelfth meeting of Environment Sub-group of Narmada Control Authority were circulated to all Members and Invitees separately.

The minutes may be confirmed.

**Item No.XIII-2(72) : REVIEW OF ACTION TAKEN ON THE DECISIONS
OF THE PREVIOUS MEETING**

1. Consideration of Policy Issues [Item No.XII-2(68)]

a) Catchment Area Treatment and Cost Sharing:

The Chairman, NCA had directed the states to start the treatment of catchment identified as per the guidelines issued by Ministry of Water Resources pending a final decision on the quantum of CAT to be charged to reservoir projects.

Chairman Environment Sub-Group during its 12th meeting held on 10th September, 1991 reviewed the action plans submitted by the State Government and stated that the action plans need to be compressed so that the works on critically degraded catchment not covered by these plans could be taken up for completion pari-passu with construction works during the later years. He further desired that the issue of the extent and cost sharing of the catchment to be treated is to be resolved by NCA within 3 months. Min. of Water Resources is apprised of the developments. The issue is listed for discussion during the 41st meeting of the NCA to be held on 29th November, 1991.

b) Extension of Time for Environmental and Forestry Approval:

During the last meeting of the Environment Sub-Group held on 10th September, 1991, Chairman had stated that a letter of request from NCA is awaited for extension of time schedule for certain environmental studies as directed by the Chief Minister's Conference held on 18th September, 1990. Min. of Water Resources addressed Ministry of Environment & Forests on the issue vide D.O. No.5/30/91-PP dt. 22.8.91. The matter was duly discussed in the last meeting and it was decided that environmental and construction schedules have to be reworked so that pari-passu clause can be ensured.

2. Time frame for preparation of Action Plan and implementation of Environment Safeguard Measures (Item No.XII-2(64)B-3)

GOMP had submitted a statement of expenditure incurred on environmental component upto July, 1991 which was circulated

alongwith the minutes of 12th meeting of the sub-group vide Annex-XII Min-1.

Estimated costs of all the Environmental Safeguard Measures and the expenditure incurred thereon separately for each item have not been furnished by the States of Maharashtra and Gujarat so far. GOG had, however, reported an expenditure of Rs.3.49 crores under Environment and Ecology but break up of the expenditure between different items is not furnished. GOM and GOG may furnish the desired information.

States are requested to furnish the up-to-date progress and expenditure under this sub-head itemwise.

Item No.XIII-3(73):PRESENT STATUS OF STUDIES/SURVEYS AND ENVIRONMENT ACTION PLANS

The latest status report of studies and activities regarding Environmental Aspects of SSP and NSP for the quarter ending September, 1991 is attached (Annex.XIII-1). The progress/present position of the different measures are given below briefly for review by the Sub-Group.

i) Phased Catchment Treatment

Narmada Sagar Project

The GOMP has submitted Action Plan for Catchment Area Treatment of NSP in June,1991. According to this, the treatment is proposed to be completed by 1996-97 covering a total non forest area of 47,000 ha and a forest area of 6,424 ha at a total cost of Rs.22.23 Crores. It is proposed to treat a total area of 7,199 ha during the current year at an estimated cost of Rs.3.18 crores. The progress reported as on August,1991 is 5000 ha by khus plantation. Latest progress is to be reported by GOMP.

A detailed map of the catchment treatment works for the pilot project of Datuni area is still awaited.

Sardar Sarovar Project

Government of Madhya Pradesh

The detailed Action Plan has been submitted by the GOMP to the MOE&F and according to this, it is proposed to treat 72,000 ha of degraded forest and 18,000 ha of non-forest areas. An area of 6,000 ha will be covered in the current year (1991-92) and 19,000 ha every year subsequently till 1995-96. Another 8,000 ha will be treated during 1996-97, thus completing the entire program. At the price level of 1990 GOMP has projected a total expenditure of Rs.43.93 crores. The progress reported as on August,1991 is 3000 ha by khus plantation. The latest progress may be reported.

Government of Gujarat

The detailed action plan alongwith the drawings as desired by the Chairman was supplied to the MOE&F. Govt. of Gujarat vide letter No.SSNL/ENV/271/91 dated 27.6.91 has revised the plan for completion by 1994-95. According to the plan 6000 ha is targetted for the current year whereas during the last environment sub-group meeting GOG has indicated a reduced target of 5000 ha. Chairman, Environment Sub-Group, however has cautioned GOG for reducing the target. GOG has agreed to look into. The actual position is to be indicated by the GOG. Catchment area treatment works are reported to be completed in 3970 ha till September, 1991. The latest progress may be indicated by GOG.

Govt. of Maharashtra

The catchment area treatment plan for cultivable area received from Govt. of Maharashtra was submitted to MOE&F earlier. Thereafter the detailed catchment area treatment plans for forest and non-forest areas separately prepared by GOM for presentation to the World Bank Narmada Basin Appraisal Mission were also forwarded as desired by the MOE&F. A detailed catchment area treatment plan, including the map of the area, for the forest areas covering 21227 ha catchment, identified as per the guidelines issued by the MOWR is received. The progress of works on preparation of similar plan for agricultural areas may be reported by GOM. Besides, the action plans submitted by GOM needs to be compressed as emphasised by the Chairman during the earlier meetings of the sub-group.

ii) Compensatory Afforestation

Narmada Sagar Project

Govt. of Madhya Pradesh

Govt. of Madhya Pradesh has reported a total progress of 28287 ha of compensatory afforestation as on August, 1991 against a target of 25676 ha till 1990-91 rains. As such GOMP is ahead of the scheduled target.

Sardar Sarovar Project

Govt. of Madhya Pradesh

GOMP has indicated the progress of 1573 ha of the area against the scheduled target of 1980 ha for the year 1991-92 as on August, 1991. The latest progress report is awaited from GOMP. GOMP was expected to prepare the detailed plan for clear felling of trees. GOMP may indicate the present position.

Govt. of Gujarat

Till 1990-91, rain plantation were completed in 2150 ha of non forest land and 4520 ha of degraded forest in the catchment besides 2555 ha of degraded forest land outside catchment. Progress reported during the current season in non-forest areas in Kutch district is only 170 ha due to reduced rainfall in the area. The latest progress in all the areas may be reported by GOG.

Govt. of Maharashtra

Certain clarifications were sought by MOE&F from GOM on the proposals submitted for afforestation of 19205 ha of land including 13000 ha of degraded forest and 6205 ha of non forest land. During the last sub-group meeting significant progress in an area above 6000 ha was reported against the expenditure of Rs.4,38,78,000 by GOM. Details of the works accomplished are awaited. It was further assured that the balance area as proposed will be afforested during the next year for which an estimate of Rs.9,29,18,000 is projected. The actual position needs to be detailed and confirmed by the GOM.

iii) Command Area Development

Narmada Sagar Project

Govt. of Madhya Pradesh

GOMP is to report on the progress on the proposals for drawing a master plan for drainage, control of water logging and salinity. Regarding the studies the effect of run off

from the fields due to application of pesticides, insecticides and chemical fertilizers in the command area, it was stated during the 11th and 12th environment sub-group meetings that further action to be taken by GOMP will be reported after receiving details from J.N. Agriculture University, Jabalpur and Pollution Control Boards on the issues. Action taken by GOMP may be reported.

Sardar Sarovar Project

Govt. of Gujarat

Reports of the studies assigned to Consultants are expected by the end of 1991. GOG has submitted a copy of the terms of reference on carrying capacity which were enclosed with the minutes of the 12th sub-group meeting at Annex-XII-3 Min., this may be discussed.

Govt. of Rajasthan

Govt. of Rajasthan has submitted a report to Ministry of Env. & Forests during August, 1990. No comments have been received so far.

iv) Survey of Flora and Fauna and Carrying Capacity Studies

Narmada Sagar Project

Govt. of Madhya Pradesh

Progress of the studies being done by Wildlife Institute of India may be reported. The preliminary draft report of the studies conducted by Friends of Nature Society, Bhopal may also be furnished.

Sardar Sarovar Project

Govt. of Madhya Pradesh

The studies are entrusted to State Forest Research Institute, Jabalpur. They are continuing the work. The Institute has already submitted their report for the quarter ending June, 1991. The report for the quarter ending September, 1991 is now due. GOMP is to report the position.

Govt. of Gujarat

The studies are being carried out by M.S. University, Vadodara, their interim report I and II were forwarded to MOE&F. The final report is expected by April, 1992. Up-to-date progress is to be reported by GOG.

Govt. of Maharashtra

GOM is reported to have entrusted the studies on Flora, Fauna and carrying capacity to School of Environmental Science, Pune University, Pune. The TOR is already finalised and the study is expected to take 2 years. The final report may be available by the end of 1992. The time frame needs to be confirmed by GOM.

v) Archaeological & Anthropological Survey

Narmada Sagar Project

Govt. of Madhya Pradesh

GOMP stated that the survey in 87 villages are completed and for remaining 167 villages, it is likely to be completed by March, 1992 and the action plan could be ready by June, 1992. However, the information about the monuments listed during the survey already completed and current position of the survey is still awaited.

Sardar Sarovar Project

Govt. of Madhya Pradesh

It is stated that the archaeological survey in 138 villages is completed by State Department of Archaeology and Museum and the survey in remaining 55 villages will be completed by 1991-92. The list of the monuments already identified during the survey works and their corresponding submergence schedule is still awaited.

Govt. of Gujarat

It was informed that the Hamfeshwar temple is to be relocated at a higher elevation in the same area whereas the Shoolpaneshwar temple is to be shifted at a nearby village Gora about 15 Kms downstream of the same bank. Construction works are expected to commence after the monsoon. The progress on the works may be reported. Besides, the details of the action plans are also needed.

vi) Seismicity and Rim Stability of Reservoir

Narmada Sagar Project

Govt. of Madhya Pradesh

GOMP indicated that studies for some patches of narrow water divide will be completed during the field season programme of 1991-92 by GSI as discussed during the meeting held by NCA for the purpose.

Sardar Sarovar Project

GSI had earlier completed Rim Stability Survey works in 130 sq.Km. area in Madhya Pradesh and entire area in Gujarat. A meeting to review the actions to be taken for completion of the remaining survey works entrusted to GSI was held by NCA on 18.9.91 and modalities are worked out. A lump sum amount of Rs.1 lakh is paid by NCA towards advance payment of the work to GSI. GSI is expected to complete the works within current field season. GSI in its report on rim stability had suggested some additional studies to wipe out suspicion about the leakage from the reservoir to adjacent basins. GOMP during the meeting held on 18.9.91 to discuss rim stability was directed to initiate tracer studies as suggested by GSI in consultation with CW&PRS or Bhabha Atomic Research Centre (BARC). Steps taken may be reported.

vii) Health Aspects

Govt. of Madhya Pradesh

GOMP has submitted the list of the institutions in the districts of Khandwa, Hoshangabad, Dhar and Barwani where health services are being provided to the workers.

Govt. of Gujarat

During the last meeting of the environment Sub-group, Min. of Env. & Forests has called for a base line data on health aspects which are awaited from GOG. The comments of the MOE&F on the health plan modified on the suggestions of MOE&F and submitted after the last meeting are awaited.

Govt. of Maharashtra

Copy of the health plan received from GOM was forwarded to MOE&F. The progress on preparation of final health plan by GOM is awaited.

viii) Fisheries Development of SSP and NSP Reservoir

During the last environmental sub-group, Chairman had expressed concern about the conservation aspect of the fish and fisheries in the reservoir and desired submission of reports if already available. The State Governments may like to inform the studies already completed and under progress on the conservation aspect of the fisheries development for consideration of the sub-group.

Govt. of Madhya Pradesh

A consolidated report of the Limnological studies conducted by the 3 Universities for the 3 zones for the year 1989-90 was furnished during the last meeting of Environment Sub-group.

Govt. of Gujarat

Govt. of Gujarat may like to submit the progress of studies by Central Inland Capture Fisheries Research Institute and Fisheries development in Estuary. The progress achieved in breeding Hilsa fish in captivity may be furnished.

ANY OTHER ITEM

DATE & VENUE OF NEXT MEETING

A N N E X U R E

STATUS REPORT OF STUDIES AND ACTIVITIES
REGARDING THE ENVIRONMENTAL ASPECTS OF
SARDAR SAROVAR PROJECT (SSP)
SEPTEMBER, 1991

The present status of studies/preparation of action plans and implementation, in respect of suggested Environmental Safeguard Measures is as indicated below:

Suggested Environmental Safeguard Measures

- 01) Phased Catchment Area Treatment.
- 02) Compensatory Afforestation.
- 03) Command Area Development.
- 04) Flora, Fauna, Wildlife & Carrying Capacity.
- 05) Seismicity.
- 06) Health Aspects.
- 07) Archaeological & Anthropological Studies.
- 08) Fisheries.
- 09) Rim Stability Analysis.

01) PHASED CATCHMENT AREA TREATMENT

- All India Soil & Land use survey organization, New Delhi submitted it's report on prioritization of watersheds in April, 1991.

- The total catchment area of SSP below NSP is 2468973 ha.

	Madhya Pradesh	Gujarat	Maharashtra	Total for the Basin
Total Catchment	2248601	36761*	163611	24,68,973 ha
Very High & High	541825	35412	163354	6,93,591
Directly draining Very High & High	90000	29575	25395	1,44,973

*According to Govt. of Gujarat, the actual catchment area is only 30229 ha and entire area is planned for treatment.

- The extent of catchment area to be treated as part of reservoir projects is yet to be finalised at Government of India level. However, pending a final decision, following the guidelines of the Ministry of Water Resources, lands identified as of 'high' and 'very high' erodibility categories situated in the Sub-watersheds directly draining into the reservoirs are being taken up for treatment by the State Governments.
Government of Madhya Pradesh (90,000 ha)

In SSP catchment in M.P., 29 sub-watersheds have been identified for treatment. They cover an area of about 90,000 ha., 20% of which is estimated to be forest land. Treatment has been planned separately for forest and non forest areas.

The programme and progress is given below:

Progress during the current season includes only the measures of khus plantations. Other measures are in progress.

Programme and Progress of Catchment Area Treatment in M.P. (in ha.)

	91-92	92-93	93-94	94-95	95-96	96-97	Total esti- mated cost at price level of 1990 (Rs.crores)
Target/Progress as on August '91							
Non-forest area/ha	6000	15000	15000	15000	15000	15000	6000
(72,000 ha)	3000						
Forest area/ha							
(18,000ha)	*	4000	4000	4000	4000	4000	2000
Total	90000	6000	19000	19000	19000	19000	8000
	3000						
							43.53

*For Forest areas, advance preparation will be done.

Government of Maharashtra (25,4000 ha)

The total catchment area of the SSP in Maharashtra is 163611 ha. Out of this, 25400 ha is proposed to be treated. The treatment plans for the non-forest and forest areas are prepared separately.

Programme and Progress of Catchment Area Treatment (in ha.)

	Yr. I	Yr. II	Yr. III	Yr. IV	Yr. V	Yr. VI	Yr. VII	Total	Cost
Forest Area	2027	3200	3200	3200	3200	3200	3200	21227	29.41
(21,227ha)									
Non Forest Area	740	929	1175	815	512	-	-	4171	2.20
(4,171)									
25398 ha									
Say 25,400 ha									

The catchment area treatment works are yet to commence.

Government of Gujarat (30,229 ha)

The total catchment area of the SSP in Gujarat is 36,761 ha. of this, a total of 29,575 ha is identified for treatment. However Govt. of Gujarat has planed to treat 30229 ha.

The catchment area treatment measures have been planned separately for forest and non-forest areas covering 27204 ha and 3025 ha respectively.

a) Forest Area (27,204 ha)**Programme and Progress for treatment (Area in ha.)**

<u>1990-91</u>	<u>1991-92</u>	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>Total</u>
<u>Progress Target/Progress</u>					
<u>as on Sept.91</u>					
4528	5000/3970	6000	6000	5676	27204

b) Non-Forest Area (3025 ha.)

The plan is phased for completion in five years. Till the rains of 1990, an area of 897 ha has been treated. The works to treat 830 ha. area are under progress during the current season.

02) Compensatory Afforestation**Government of Madhya Pradesh**

A total of 6547 ha of degraded forest and 2190 ha of non-forest land located in districts of Jhabua, Dhar and Khargone is identified for afforestation works in lieu of submergence of 2732 ha forest area. The work of compensatory afforestation in the districts of Dhar and Jhabua has been assigned to Madhya Pradesh Van Vikas Nigam (MPVVN). The compensatory afforestation work in non-forest and degraded forest land identified in Khargone district has been entrusted to the Divisional Forest Officer, Kaveri Forest Division.

Programme and Progress of Afforestation (Area in ha.)

	DEGRADED FOREST	NON-FOREST	TOTAL
Already planted during			
i) 1990 rains	132	716	848
ii) 1991(Aug.1991)rains	1200	373	1573
Total area targatted to be planted 1991-92	1580	400	1980
1992-93	1580	400	1980
1993-94	1580	400	1980
1994-95	1675	274	1949
	-----	-----	-----
	6547	2190	8737

Government of Maharashtra

The forest area diverted due to submergence is 6488 ha. The total area to be put under compensatory afforestation is 19205 ha being 6205 ha non-forest area and 13000 ha of degraded forest. A detailed compensatory afforestation scheme has already been submitted by the Government of Maharashtra to the Ministry of Environment & Forests on 14.05.90 for approval. Ministry of Environment & Forests has sought certain clarifications from Govt. of Maharashtra which are still awaited. A plan on compensatory afforestation prepared by Govt. of Maharashtra was submitted to World Bank during Sept. 1991. Accordingly to this plan the programme of compensatory afforestation is given below:-

Programme of Compensatory Afforestation

Year	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99to2001	Total
Plan- Adv. 3600 3600 3600 3600 3600 3600 1000 Subsequent 19000 tation prep. works tending operations									
Cost (In crores)	3.075	5.224	5.72	5.98	6.10	4.43	9.43	4.76	37.72

In addition, compensatory afforestation is also required to be undertaken in 2,700 ha. of non-forest land in lieu of the forest land in Taloda area released for resettlement works. For this, non-forest land to the extent of 2,900 ha has already been identified. The GOM has issued orders on 22.04.91 to transfer these lands to the forest dept. Ministry of Environment and forests, has asked for the details of land identified and other

clarifications. The present position is awaited from the Government of Maharashtra.

Government of Gujarat

A total of 4165.9 ha of forest area has been diverted for SSP in Gujarat. A work plan for 4650 ha of non-forest land in nine villages of Kutch district and of 9300 ha of degraded forest land outside the basin, in the districts of Surat, Bharuch, Vadodara, Panchmahals and Sabarkantha, is under implementation. Besides 25560 ha of the forest area below density 0.6 in the catchment is also planned for afforestation works.

	1991-92	1992-93	1993-94	1994-95	Work done till rains of 1990
Target/progress as on Aug'91					
Non Forest Area (4650 ha)	900/170	1225	375		2150
Degraded forest (outside-the catchment) (9300 ha)	3300/2555	3000	3000		-

13,950 ha.					

Additional Activities

(a) Dam Vicinity Plantation (235 ha)

Planted till rains of 1990 - 202.5 ha

(b) Forest Plantation (500 ha)

Ravine lands on the left bank of the Sabarmati in village Ratanpur (300 ha) and Pirojpur (200 ha). In pirojpur an area of 6 ha is planted against the target of 35 ha till Sept. 91.

(c) Additional Plantation in Non-forest Areas (1088 ha)

Non-forest land in Kutch district. Lands have already been released. The plantations will be completed by 1994-95.

03) COMMAND AREA DEVELOPMENT (INCLUDING DRAINAGE STUDIES)

Government of Madhya Pradesh

No command area in Madhya Pradesh.

Government of Maharashtra

No command area in Maharashtra.

Government of Gujarat

Master Plan for surface and sub-surface drainage has been prepared upto Mahi River Crossing. Services of six Consultants have been engaged for carrying out studies beyond Mahi Crossing. These include studies related to ground water, drainage, conjunctive use of surface and ground water, silting aspects of main canal, planning and design of micro-level canal net work etc. Reports are expected by the end of the year 1991.

Government of Rajasthan

The Government of Rajasthan, has submitted a report on Environmental & Ecological aspects and remedial measures for Narmada Canal Project. Copy of the report is submitted to Ministry of Environment and Forests.

04) FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

Government of Madhya Pradesh

Study has been entrusted to the State Forest Research Institute, Jabalpur, in collaboration with H.S.G University, Sagar and Rani Durgavati University, Jabalpur. The study commenced in April, 1990 and is expected to be completed in three years by March, 1993. Action plan will be ready by March, 1994 and implementation will be done by March, 1996. The Institute has submitted interim reports for the quarters ending March & June, 1991.

Government of Gujarat

01) Basic Studies

Studies were conducted by M.S. University, Vadodara in 1983. Fresh study for the SSP submergence area in Gujarat has been entrusted again to M.S. University, Vadodara. An inception report and interim reports I & II have been furnished. Final report is expected by April 1992.

02) Wildlife Conservation Measures

The area of the Shoolpaneshwar Sanctuary has been enlarged from 151 sq.kms. to 448 sq.kms. habitat improvement measures in the enlarged Shoolpaneshwar Wildlife Sanctuary to foster the flora and fauna of the area or scheduled for completion in five years.

03) Wildlife Management Study for Sardar Sarovar Submergence Area

The above study has been assigned to a group with a Principal Investigator (of the rank of Conservator of Forest). The report would be available by end of 1991. A workshop or approaches to integrated wild-life management in Gujarat was organised in October, 1990. Report is made available.

04) Additional Environment Improvement Programme.

Sardar Sarovar Narmada Nigam Ltd. has decided to undertake the following additional environmental improvement programme in the catchment area and its vicinity.

	Estimated Cost (Rs in lacs)
i) Creation of a habitat for the great Indian Bustard (highly endangered bird of the country).	26.75
ii) Improvement of support watering facility at six locations.	14.75
iii) Providing inspection and transport facilities.	3.40

TOTAL:	44.90
	=====

Government of Maharashtra

School of Environmental Science, Pune University are assigned the work. Terms of Reference are finalised. Work is planned for completion is two years i.e. by 1993.

05) SEISMICITY

Government of Gujarat

The design of the dam allows for a horizontal seismic coefficient of 0.125 g., and it covers additional risk due to reservoir induced seismicity. An eminent Indian Consultant Dr. Jai Krishna, who was the Vice Chancellor of the Roorkee University had been engaged as the Consultant to the Project. The design of the dam had also been referred to the Central Water & Power Research Station, Pune, and Earthquake Engineering School at Roorkee, for dynamic analysis. Advice had also obtained from the World Bank Consultants viz - Dr. Glough and Dr. Bolt, of Burkley University. The design of the dam has also been approved by the Dam Safety Panel comprising eminent engineers.

Establishing Seismological Observatories:

Installation and Commissioning of seismological instruments have been completed in four observatories at Kevadia, Naswadi, Karjan and Kawant. The remaining five observatories viz. Alirajpur, Barwani, Sagbara, Kukshi and Shahada are being commissioned.

No separate study regarding Seismicity Aspect is required in Madhya Pradesh and Maharashtra.

06) HEALTH ASPECTS

Government of Madhya Pradesh

The State Director of Health Services, has conducted detail

ed survey during 1982-83. Health plan regarding immediate service to be provided and continued health services to the population has been prepared. Provision for hospitals, dispensaries, mobile units and evaluation cell & monitoring cell has been made. The total anticipated expenditure including the cost of strengthening of health institutions has been worked out as Rs.748.73 lacs.

Government of Maharashtra

Report has been prepared on the following aspects:

- a) Strengthening anti malaria programme in the border area.
- b) Provision of mobile dispensaries.
- c) Providing sub centres.
- d) Construction of primary health services.

The total expenditure anticipated is Rs.2,577.00 lacs.

Government of Gujarat

Two studies relating to schistosomiasis had been carried out in 1985 by the National Institute of Communicable diseases and concluded that there is no threat to the people in the project area. Subsequently, a team led by the Chief of Schistosomiasis Division WHO, Scientist from British Council, London, and Environment Advisor, World Bank carried out investigations and confirmed the above.

The work plan on health aspects has been furnished to the Ministry of Environment & Forests, and World Bank. Total implementation will take about 17 years time. The programme covers the villages on the periphery of reservoir and the catchment area.

The work plan submitted would be implemented in a phased manner keeping in view the progressive development of irrigation in the vast command area of the project. A twenty five bed hospital is already set up and operating in the main colony of the project.

07) ARCHAEOLOGICAL AND ANTHROPOLOGICAL STUDIES

ARCHAEOLOGICAL STUDIES

Government of Madhya Pradesh

Survey for identification of monuments is being carried out by the State Department of Archaeology and Museum. Out of 19 villages, survey is completed for 138 villages and for the

remaining 55 villages it is expected to be completed by March, 1992. Detailed action plans are still awaited from the Government of Madhya Pradesh.

Government of Gujarat

Inventory survey of 19 villages, coming under submergence carried out by the Director of Archaeology, has identified the following two temples for shifting.

- 01) Shoolpaneshwar Mahadev Temple at Surpan, District Bharuch.
- 02) Hamfeshwar Mahadev Temple at Chhota Udaipur,

Shifting of these monuments is proposed in three phases. Identified monuments are not listed as protected monuments. Sites have been finalised to relocate Shoolpaneshwar and Hafeshwar temples in consultation with trustees of the temples. Shoolpaneshwar temple will be shifted & reconstructed near Gora, about 15 kms., down-stream on the same bank. The construction work is expected to commence after the monsoon. Whereas, Hamfeshwar temple will be shifted and reconstructed at a higher elevation near the present location.

Government of Maharashtra

No work is proposed.

ANTHROPOLOGICAL STUDIES

Government of Madhya Pradesh

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.

Government of Maharashtra

No study is proposed.

Government of Gujarat

No study is proposed.

08) FISHERIESGovernment of Madhya Pradesh

Studies of important fish/fauna specially the Mahaaseer has been included in the studies being conducted by the three Universities of the State, for the upper Narmada, Rani Durgavati University, Jabalpur, Middle Narmada, Barkatullah University, Bhopal and lower Narmada, Vikram University, Ujjain. All the three Universities have initiated the studies in their respective areas as per MOU in 1989. Progress report for the period ending September 1990 has been received. The study period is three years.

Government of Maharashtra

Department of Fisheries, Government of Maharashtra, has submitted a draft outline for the fresh water fisheries development in Maharashtra area.

Government of Gujarat

Central Inland Capture Fisheries Research Institute, Barrackpore, Calcutta, (Local office at Vadodara) has undertaken the studies in respect of aquatic life upstream and downstream of Sardar Sarovar in Narmada River in Gujarat State. Report of the first phase of pre-impoundment survey has been received.

The design plans and estimates for a 10 ha., fish farm and fish hatchery complex have been finalised. The plan is to be implemented in 9 years and will include Hydrobiological studies, establishment of fish hatchery and fish farm training of Fishermen, establishing and assisting primary fishermen's cooperatives, establishing and assisting an Inter-state Fisheries Development Board and a Cellat Directorate for monitoring.

NARMADA CONTROL AUTHORITY

The Narmada Control Authority, had commissioned a socioeconomic study to Central Inland Capture Fisheries Research Institute, Barrackpore, for possible fisheries development in the entire Narmada Basin excluding Bargi reservoir to the confluence of the Narmada and the Arabian sea including estuarine areas. The proposals to establish an Inter-state Apex Body with participation by the States and NCA is under consideration.

09) RIM STABILITY ANALYSISGovernment of Madhya Pradesh & Govt. of Maharashtra

Geological Survey of India, Nagpur Division, was assigned the work by SSNNL Gujarat. Now the work has been transferred from Nagpur Division to Bhopal Division and is going. GSI has completed works in 130 sq.km area in Madhya Pradesh and entire area in Gujarat. The work on remaining areas measuring 170 sq.km in Madhya Pradesh and entire area in Maharashtra is likely to be completed by the end of current working season of G.S.I. i.e. April '92.

Government of Gujarat

Rim Stability analysis has been completed by the Geological Survey of India, Jaipur Branch, in the Gujarat portion of the reservoir. No more work in this respect is required.

STATUS REPORT OF STUDIES & ACTIVITIES
REGARDING THE ENVIRONMENTAL ASPECTS OF
NARMADA SAGAR PROJECT
SEPTEMBER, 1991

01) PHASED CATCHMENT AREA TREATMENT:

The free draining area of Narmada Sagar Project down-stream of Bargi Dam is about 38,952 sq.kms. As per the guidelines of MOWR, directly draining watersheds of 'very high' and 'high' priority categories only are to be treated. This is, however, subject to a final decision on the subject yet to be arrived at. Works on prioritisation of the watershed was entrusted earlier to GSIT&S, Indore. However, the work is now entrusted to "All India Soil & Land Use Survey Organisation, New Delhi, and they are carrying out the prioritisation for the entire catchment of NSP.

AIS&LUS has divided the catchment area down-stream of the Bargi Dam into nine sub-catchments. These sub-catchments are further divided into watersheds and sub-watersheds. Preparation of maps and reports relating to five sub-catchments has been completed and these cover the entire area around the periphery of the Narmada Sagar Reservoir. Out of 638 Sub-watersheds covering only 25 sub watersheds of 'high' and 'very high' priority directly drain into the reservoir, an area of 58,510 ha an proposed to be treated. About 20% of this area i.e. 11,510 ha is estimated to be forest land and the rest 47000 ha non forest land.

Total Forest area to be treated:

a) Forest land	11510
b) Pilot project	2415
(Area is an additionality)	-----
	13925

The above area will be treated under following categories:-

a) Under compensatory afforestation	7460
b) Under CAT plan.	6465

Programme and Progress of Works

Programme of Catchment Area Treatment(58510)

	Area treated till Aug '91 Total	91-92	92-93	93-94	94-95	95-96	96-97
Non-forest area (47000ha)	5200	6000	9000	9000	9000	9000	5000
Forest area (6465ha)	1200	1199	2175	1050	1000	1000	-
	----- 6400 -----						

Progress indicated during the current season pertains to measures of khus plantations only; the other measures wherever necessary are in progress.

02) 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 permitted to be diverted for power house. Thus a total of 41420 ha of forest land has been permitted to be utilised for the construction of ISP.

The Government of Madhya Pradesh, has identified 10143 ha of non-forest and 70802 ha of degraded forest land.

Programme of Compensatory Afforestation

Work done till Aug. 1991.	91-92	92-93	93-94	94-95	95-96
Degraded forest' area 23048 (70,802ha)	12400	12528	12400	12400	12370
Non Forest Area 5239 (10,143ha)	1500	1534	1500	1500	1037
	-----	-----	-----	-----	-----
80,945 28287	13900	14062	13900	13900	13407
(Say 81,000)					

03) 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 of cropped area over a net C.C.A. of 1.23 lakh ha.

The implementation of the plan would be taken up in three phases for completion in 6/2007.

04) FLORA, FAUNA, WILDLIFE AND CARRYING CAPACITY

Studies on these aspects were entrusted to Wildlife Institute of India, Dehradun in December, 1989 and are expected to be completed by March 1993. Action plan will be ready by March, 1994. Implementation of the action plan will be completed by March, 1996. Progress report upto December, 1990 has been submitted by Wildlife Institute of India.

Friends of Nature's Society, Bhopal, is entrusted with preparation of Wildlife Retrieval and Conservation Plan on consultancy basis. A position report was submitted in July, 1989 and a preliminary draft report was expected by October, 1991. The final draft will take another three months and may be available by November/December, 1991. The progress report as on August 1991 is submitted.

05) 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. These studies are to be taken up in consultation with GSI. The Director, GSI has been approached for the same.

Establishment of Seismic observatories in the Narmada Sagar Complex area is under correspondence with IMD, DGTD and CWC. Meeting of IMD, CWC, DGTD and NVDA Officers for finalising the issue was held on 18.3.91. A list of instruments and broad specifications were agreed. Draft Tender papers are being finalised.

06) HEALTH ASPECTS

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 is signed with the

Department of Preventive and Social Medicine, Gandhi Medical College, Bhopal, whereas, for studies on health aspect in project impact areas of SSP and NSP work is proposed through a cell of monitoring and evaluation under Directorate of Health Services, Bhopal.

Pre-impoundment and post-impoundment Limnological studies being carried out by three Universities will take care of water quality aspect.

07) FISHERIES DEVELOPMENT

The aspect relating to study of the availability of important aquatic fauna/fish, especially the migratory species has been included in the Limnological studies being conducted by the 3 Universities of the State; the Upper Narmada, (Bargi Reservoir) Rani Durgavati University, Jabalpur, Middle Narmada (Tawa, Barna and Kolar Reservoirs) Barkatullah University, Bhopal, Lower Narmada, Vikram University, Ujjain. All the three Universities have initiated the studies in their respective areas as per MOU. Their report for the period 1990 is submitted.

08) ARCHAEOLOGICAL AND ANTHROPOLOGICAL SURVEY

A survey of the 254 villages is required for identification of the archaeological monuments falling within the submergence area. State Department of Archaeology and Museum was entrusted with the survey of 87 villages which has been completed. The survey has identified 150 artifacts and 30 monuments besides Siddeshwar temple, Nimawar, Dewas and Joga Fort, Hoshangabad, which are likely to be affected.

As only lower bastion in north of the Joga Fort is likely to be affected by scour action of water and the Siddeshwar temple is well above the FRL of 860 ft., these two structures are not considered as affected by the project. However, other structures/monuments will be considered for shifting or protection after their archaeological significance is established through joint inspection of the competent authorities.

Archaeological Survey of India, was entrusted with the survey of 167 villages. So far they completed the survey of only 20 villages and identified 40 artifacts. State Department of Archaeology and Museum, M.P. is given this survey work also which will be completed by March 1992 and action plan would be ready by June, 1994. Action will be taken to preserve material of archaeological importance in consultation with experts.

ANTHROPOLOGICAL:

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 Sangrahalaya has constituted a working group for the retrieval of bio-cultural material in Narmada Basin. Survey of tribal art and handicraft is entrusted to M.P. Adivasi Kala Parishad. These works are in progress.

केवल सरकारी प्रयोग के लिए
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नर्मदा नियंत्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

पर्यावरण उपदल
Environment Sub-Group
तेरहवीं बैठक का कार्यवृत्त
Minutes of the Thirteenth Meeting

29 नवम्बर, 1991

केवडिया कॉलोनी, गुजरात में हुई
Held at Kevadia Colony, Gujarat

29th November, 1991

इन्दौर
जनवरी, 1992

INDORE
January, 1992

**MINUTES OF THE 13TH MEETING OF ENVIRONMENT SUB-GROUP
HELD ON 29TH NOVEMBER, 1991
AT SARDAR SAROVAR PROJECT GUEST HOUSE, KEVADIA COLONY, GUJARAT.**

I N D E X

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XIII-1(71)	Confirmation of the Minutes of the Twelfth Meeting.	2
XIII-2(72)	Review of action taken on the decisions of previous meeting.	3
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XIII-4(74)	Any other item Date and Venue of next meeting.	11

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**MINUTES OF THE 13TH MEETING OF ENVIRONMENT SUB-GROUP
HELD ON 29TH NOVEMBER, 1991
AT SARDAR SAROVAR PROJECT GUEST HOUSE, KEVADIA COLONY, GUJARAT**

Shri R. Rajamani, Secretary, Ministry of Environment & Forests and Chairman of the Environment Sub-group of NCA welcomed the Members and Invitees to the 13th Meeting of the Environment Sub-group. The list of participants is enclosed at Annex.XIII Min-1.

Discussion on the agenda items was taken up thereafter.

**Item No.XIII-1(71): CONFIRMATION OF THE MINUTES OF THE
TWELTH MEETING**

Minutes of the 12th meeting of Environment Sub-group held on 10th September, 1991 at Paryavaran Bhawan, New Delhi were circulated vide letter No.Env.4(8)/91/ND dated 17.11.91. Attention of the Chairman of the Sub-group was drawn to the note circulated by Prof. Katti on Environment Development Cell. Chairman pointed out that minutes are correctly recorded as per the discussions held in the meeting. If any member wants to raise any further issue subsequently, this can form part of the proceedings of the meeting in which the issue is considered.

The recorded minutes were therefore confirmed.

**Item No.XIII-2(72):REVIEW OF ACTION TAKEN ON THE DECISIONS OF
PREVIOUS MEETING**

1. Consideration of Policy Issues (Item No.XII-2(68))
- a) Catchment Area Treatment and Cost Sharing:

Chairman pointed out that the environment sub-group during its last meeting held on 10.9.91 had recommended that a decision on the extent of Catchment Area to be treated is to be taken by NCA within 3 months. It is observed that the issue is listed for consideration in the 41st meeting of NCA to be held in the afternoon of 29.11.91. He desired that the decision of the NCA on the same may be reported to the sub-group.

- b) Extension of time for Environmental and Forestry Approval:

Chairman brought to the notice of the sub-group that MOE&F has written a letter on 25.11.91 to the Secretary, Ministry of Water Resources stressing the need to rework the schedules for environmental protection works and construction of the project.

2. Time frame for preparation of Action Plan and Implementation of Environment safeguard measures [Item No.XII-2(64)]

Executive Member, NCA requested the State Governments to furnish detailed cost estimates and expenditure incurred on environmental works. Shri P.A. Raj. Vice Chairman & MD, SSNNL stated that estimates are readily available. Break up of expenditure will also be made available shortly. Mr. A.D.Jadhav, Dy. Secretary (Env.), Govt. of Maharashtra stated that the cost estimates for flora, fauna and carrying capacity studies entrusted to Pune University is Rs. 34 lakhs. He also indicated the expenditure incurred on compensatory afforestation during 1990-91 as Rs. 4.72 crores.

Dr. S.K.Sinha, Chief Conservator of Forests, Govt. of Gujarat stated that so far, Rs.2.3 crores was spent on compensatory afforestation and Rs. 4.5 crores for catchment area treatment. Additional expenditure has been incurred on plantation in command area and in vicinity of dam. Chairman pointed out that the details of expenditure furnished by Gujarat during the 12th meeting, did not include the cost incurred on R&R. Similarly GOM also did not furnish the estimates and expenditure on R&R. ~~Shri. S.Shanker Menon, Secretary (R&R), Govt. of Maharashtra promised to send details.~~

Chairman while reviewing the figures made available on environmental works desired from GOM and GOG the detailed break up of estimates and upto date expenditure on each individual item of environmental and R&R works and studies. The detailed estimate and expenditure furnished by Govt. of Madhya Pradesh is annexed herewith at Annex XIII Min-2.

**Item No.XII-3(73):PRESENT STATUS OF STUDIES/SURVEYS AND
ENVIRONMENT ACTION PLANS**

The progress reported by the States on each component is as under:

1) Phased Catchment Treatment

Chairman directed the State Governments that the detailed plans for treatment of the areas indirectly draining into the catchment and at present not covered by the plans under implementation currently are to be made ready pending a resolution of the issue so that when funds are provided, works can commence immediately for pari-passu completion with the project works. Shri.I.S. Rao, Vice Chairman, NVDA stated that a very large area as well as huge cost is involved and also in view of the constraints of availability of trained personnel, treatment of entire critically degraded area ahead of construction of dam needs a review. Chairman however reiterated his views as stated above and pointed out that there had been no difference of views earlier on the need to treat all such areas.

Narmada Sagar Project

Chairman, while reviewing the progress of catchment area treatment works, pointed out that as per the plans submitted, the total area to be treated is 58510 ha, whereas the programme is given for treatment of only 53465 ha. It was explained that the balance area is identified for treatment under compensatory afforestation works. Chairman directed Mr. B.K. Chengappa, Conservator of Forests, Govt. of India, Bhopal to verify and find out the reasons, if any, for justifying the catchment area treatment against compensatory afforestation works. Mr. I.S. Rao, also promised to verify and provide clearer picture soon. Chairman further directed Mr. Chengappa, to visit catchment treatment, and compensatory afforestation areas to verify whether the government of Madhya Pradesh is really geared up to meet the demand in terms of manpower and funds to tackle areas as large as 30,000 ha of catchment treatment and 15,000 ha of compensatory afforestation, annually.

GOMP reported a progress of 8700 ha by khus plantations against the target of 7699 ha under catchment treatment.

Sardar Sarovar Project

Govt. of Madhya Pradesh

GOMP reported a progress of 9800 ha against the target of 6000 ha in treatment of non forest areas as on date.

Govt. of Gujarat

GOG reported the progress of catchment treatment works during the current year as 3970 ha by October, 1991. Chairman directed Mr. Chengappa to examine the progress on catchment area treatment works in Gujarat also. He also refused to accept the low figure of catchment area proposed in Gujarat and directed that GOG should reconcile their figures with NCA and AIS & LUSO, New Delhi.

Govt. of Maharashtra

The sub-group was informed that because of the problems created by agitationists in the catchment area, GOM officials are finding it difficult to proceed with the treatment works. Chairman however pointed out that the area in Maharashtra appears to be as high as that of Gujarat but the works are yet to commence and expressed that if the situation continues like this, impoundment in the reservoir may not be allowed. Besides, he pointed out that during the last meeting also he had stressed the need to convince the people in the area about the benefits of the catchment treatment works which will any way be useful to them. Mr. Menon, Secretary (R&R), GOM stated that the situation in the submergence area is creating problems on hearing that people have come to work in the area, drums are beaten and 2000 to 3000 people assemble and make it difficult for officials to work. However, he expressed that government is going to make serious efforts in this direction and hope that the position will improve by end of December, 1991. He informed that there will be no constraint on availability of funds. Chairman pointed out that in the circumstances, pari-passu implementation has been affected.

ii) Compensatory Afforestation

Narmada Sagar Project

Govt. of Madhya Pradesh

GOMP reported a progress on 28287 ha including 23048 ha forest and 5239 ha of non forest area as against the target of 25676 ha by September, 1991.

Sardar Sarovar Project

Govt. of Madhya Pradesh

GOMP reported the progress on 1573 ha during the current year including 1200 ha of forest area 373 on non forest area upto September, 1991 against the target of 1980 ha. Regarding detailed plan for clear felling of trees, GOMP indicated as under: (i) Friends of Nature Society, Bhopal is to submit its final report in November, 1991

- (ii) SFRI, Jabalpur is to prepare a felling plan indicating the receiving areas for migration of existing wildlife by November, 1991 and
- (iii) Wildlife Committee constituted by GOMP Forest Department is likely to take atleast 3 months for finalising the plans.

Therefore the future plans for clear felling and cut in regular fellings could be indicated after February, 1992 only.

Govt. of Gujarat

Against the original target of 900 ha for the year 1991-92 the achievement is only 258 ha. The failure of monsoon in Kutch is the main reason for not achieving the target. The total progress as on October, 1991 is 2408 ha.

Govt. of Maharashtra

GOM reported a progress in 8425 ha area involving an expenditure of Rs. 4.72 crores during 90-91 and indicated that pre monsoon works are completed in 9 districts. It is further proposed to take up pre monsoon works in 8552 ha of area and first year operation in 8425 ha and the proposed outlay is Rs.9.37 crores. In reply to a question of Chairman, Mr.Chengappa replied that GOM has raised plantations in degraded forest areas only. Chairman pointed out that GOM has not attended so far to the clarifications desired by MOE&F on their compensatory afforestation plan. Mr.Sexana, Conservator of Forests, Dhule promised to check up and inform shortly.

iii) Command Area Development .

Narmada Sagar Project

Govt. of Madhya Pradesh

For drawing up a master plan on drainage control of water logging and salinity, consultants have been shortlisted by GOMP and that some data would have to be made available to the consultants for study before the work of master plan preparation is taken up by them. Hence GOMP has decided to carry out certain field observations including data collection in this regard. Regarding the studies on effect of run off from the fields due to application of pesticides, insecticides and chemical fertilizers in the command area, it was stated that the reports have still not been received from J.N. Agriculture University, Jabalpur and Pollution Control Boards. Chairman desired that GOMP may also draw up terms of references for "Carrying Capacity Studies" of command area development as being drawn up by the Govt. of Gujarat.

Sardar Sarovar Project

Govt. of Gujarat

Shri P.A. Raj, Vice Chairman & Managing Director, SSNNL stated that Govt. of Gujarat is having a dialogue with NEERI on carrying capacity of command area. Chairman desired that communication links like roads are to be included in the development plan. He further stressed that quality of roads is important which if not maintained or upgraded may cause environmental damages. He further stated that time required for the above studies should be reduced to the extent possible keeping in view that not only the studies but implementation of the resulting action plans are also required to be completed *pari passu*.

In reply to a question from Chairman, Vice Chairman, SSNNL indicated that final report of studies entrusted to consultants on Engineering aspects may be available soon. Executive Member, NCA further stressed that schedule of implementation of the action plan resulting from the studies is also to be made available.

Govt. of Rajasthan

Chairman expressed concern for non participation of Rajasthan in the meeting. Referring to the report submitted by Govt. of Rajasthan to Min. of Env. & Forests. Chairman desired that it is to be pursued.

iv) Survey of Flora and Fauna and Carrying Capacity Studies

Narmada Sagar Project

Govt. of Madhya Pradesh

The preliminary draft report from Friends of Nature Society, Bhopal on retrieval and conservation of wildlife expected by October, 1991, has not yet been received. It should be updated.

Sardar Sarovar Project

Govt. of Madhya Pradesh

Studies have been entrusted to State Forest Research Institute, Jabalpur and the quarterly report for the period ending October, 1991 is made available and is placed at Annex-XIII.MIN.3. ~~Chairman~~ desired that the studies should be speeded up.

Govt. of Gujarat

Govt. of Gujarat reported that notification for the Shoolpaneshwar sanctuary is already issued. The report on

progress of studies by M.S. University, Vadodara is still awaited.

Govt. of Maharashtra

Govt. of Maharashtra indicated that the work on flora and fauna studies has been assigned to Pune University and are expected to take 2 years. However the exact time frame for completion of these studies is still awaited.

v) Archaeological and Anthropological Survey

Narmada Sagar Project

Govt. of Madhya Pradesh reported that survey in 89 villages out of 254 villages has been completed by State Archaeological department and in the remaining villages it will be completed by March, 1992 and the action plans will be ready by June, 1992.

Sardar Sarovar Project

Archaeological survey work in 169 out of 193 villages is completed by State Archaeological department and in the remaining villages it is likely to be completed by December, 1991. The action plan will be ready by March, 1992.

Govt. of Gujarat

The Sub-group was informed that the work on shifting of the temples is in progress. Detailed progress of works on shifting of the temple is still awaited from Govt. of Gujarat.

vi) Seismicity and Rim Stability of Reservoir

Narmada Sagar Project

GOMP informed that procurement action for seismic instruments for observatories in Narmada Sagar project is under progress. Regarding rim stability studies, GSI has been requested by GOMP to take up the studies on some patches of narrow water divide during the 91-92 working season and continue the same till completion. GSI however indicated that the studies will be taken up after September, 1991.

Sardar Sarovar Project

GOMP has reported that as decided during the meeting held on 18.9.91, GOMP has taken action to initiate tracer studies as suggested by GSI. In response to the demand made by Prof. Ramaseshan, Chairman directed that a copy of the report wherein GSI has made suggestions for tracer studies may be made available to Prof. Ramaseshan.

vii) Health Aspect

GOMP reported that the health plan submitted by NVDA during 9th and 10th sub-group meetings is duly approved by NVDA and ready for implementation. However for the preventive part, the epidemiological study and surveillance have to be carried out by the Gandhi Medical College, Bhopal. The MOU is approved by NVDA and is being signed. After this is signed the studies will start. The cost of this study is Rs. 10.73 lakhs for a period of 3 years.

Govt. of Gujarat

During the 12th meeting of environment sub-group, MOE&F has called for base line data on health aspects which are still awaited from Govt. of Gujarat.

Govt. of Maharashtra

Govt. of Maharashtra has earlier submitted a draft health plan and was to report on its finalisation. However the final health plan as well as the progress thereon is still awaited.

Chairman stressed that although the documents submitted to MOE&F by the State Governments are quite bulky, but the perusal of the same reveals that no data is included on the present health status of the areas going under submergence. In order to find out the benefits which may accrue after implementation, the action plans prepared by each State Govt should also include the present health status of the people living in the submergence area. The plan should not include only whatever normal health infrastructure the State Government was any way to provide but also extra amounts for special provisions arising from implementation of project like extra equipment, more funds for baseline data build up etc.

viii) Fisheries Development of SSP/NSP Reservoir

Chairman pointed out that in the report on Limnological aspects submitted by the three universities the needs for detailed survey of the entire river on fish fauna along with the studies on food cycle, climatic damages etc have been stressed. He asked NCA to explore and find out if the studies on conservation aspects as carried out are sufficient. If not CICFRI or other agency may be contacted for this. Then Mr. Sud, Secretary, Fisheries, Govt. of Gujarat however pointed out that the state fisheries department is not invited to the sub-group meetings and as such is not aware of the development in this regard. He further pointed out that according to his information no studies on development of fisheries except for the limited works carried out by the research staff of CICFRI located at Vadodara is available. Chairman requested SSNNL to ensure proper coordination with fisheries department of the state. He further stated that concerned officer of the state fisheries department may also be invited, if so required.

Govt. of Madhya Pradesh

In the status report furnished by GOMP it is reported that the study of the fish fauna of Sardar Sarovar Project area is already undertaken by the fisheries cell of NVDA. The studies are under progress.

Govt. of Gujarat

Govt. of Gujarat was required to furnish the report on progress of studies conducted by CICFRI and also the progress achieved in breeding Hilsa fish in captivity. These reports are still awaited from Govt. of Gujarat.

Item No.XIII-4(74):ANY OTHER ITEM

Prof. R.K. Katti circulated a note on the need for establishing a centre of excellence on Environment Development in the country, initially to meet the needs of NCA. Prof. Katti and Prof. Ramaseshan supported the opening of an environment development cell under NCA so that the data on environment control could be applied directly to a major project and desired that their opinion in this regard may be passed on to the NCA. Chairman however stated that the EDC brought up for discussion earlier was not taking the shape as desired by MOE&F and as such MOE&F has disengaged itself. No further discussion appears necessary on this issue. However if some members want that their individual opinion may be recorded for passing on to NCA it can be done. The note circulated is at Annex.XIII Min.4.

Date and Venue of next meeting

18th February, 1992, 10.00 A.M.
at
Paryavaran Bhavan, CGO Complex, New Delhi.

A N N E X U R E

A N N E X U R E S

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ANNEX-XIII.MIN.1**List of participants attended the 13th meeting of
Environment Sub-group held on 29.11.91 at 10.00 AM
in Kevadia Colony, Gujarat**

1. Shri R. Rajamani, Secretary, Min. of Env. & Forests, New Delhi.
2. Shri D.C. Debnath, Executive Member, NCA, Indore.
3. Shri P.A. Raj, Vice Chairman & M.D., SSNNL, Gandhinagar.
4. Shri I.S. Rao, Vice Chairman, NVDA, Bhopal.
5. Shri K.M. Joseph, Member (Civil), NCA, Indore.
6. Shri C.V. Sarma, Member (Power), NCA, Indore.
7. Shri S.M. Pai, Secretary, NCA, Indore.
8. Shri S. Shanker Menon, Secretary (R&R), Govt. of Maharashtra
9. Prof. R.K. Katti, Director & Consultant, Bombay.
10. Prof. S. Ramaseshan, Professor, DCE, IIT, Kanpur.
11. Shri V.G. Lagnankar, CE & Jt. Secretary, Govt. of Maharashtra
12. Shri Sunil Sud, Secretary, Fisheries, Govt. of Gujarat.
13. Shri D.R. Thapliyal, Member (E&F), NVDA, Bhopal.
14. Shri M.S. Parasnis, Chief Conservator of Forests, Maharashtra
15. Shri S.P. Narawane, Regional Manager, Forest Development Corporation Nasik, Maharashtra.
16. Shri N.M. Dange, Chief Engineer, North Maharashtra, Nasik
17. Shri A.D. Jadhav, Dy. Secretary (Env), Govt. of Maharashtra
18. Shri S.V.P. Halakatti, Dy. Supdt. Archeologist, Bhopal.
19. Shri B.K. Chengappa, Conservator of Forests, MOE&F, Bhopal
20. Shri A.V. Gururaja Rau, Spl. (Env), SSNNL, Gandhinagar.
21. Dr. Pawan Kumar, Spl. (Env.), NCA, Indore.
22. Shri Dilip Singh, Divisional Manager, FDCM
23. Shri J.N. Sexana, Conservator of Forests, Dhule.

24. Dr. S.K. Sinha, Conservator of Forests, Gujarat.
25. Shri D.K. Kaushik, Director, Env. Dte, CWC, New Delhi.
26. Shri M.M. Husain, Director of Agriculture, NVDA, Bhopal.
27. Shri Devendra Kumar, Dy. Conservator of Forests, Maharashtra.

**Time frame for preparation of Action Plan and Implementation
of Environment Safeguard Measures [Item No.XII-2(64) B-3].**

Expenditure statement upto September, 1991 is as under :-

Sl.No.	Items	NSP		Remarks
		Estimated cost of the project.	Expenditure incurred	
(1)	(2)	(3)	(4)	(5)
Environmental Projects :-				
1.	Rehabilitation Master Plan	--	11.06	Included in the project cost.
2.	Phased catchment area treatment	124.00	4.99	Included in the project cost (upto Oct'91)
3.	Compensatory afforestation	152.00	28.59	Expenditure included in the project cost.
4.	Command area development	50.00	0.18	- do -
5.	Survey of flora and fauna	0.36	0.15	- do -
6.	Carrying capacity of surrounding area			
7.	Health aspects	7.48	0.10	- do -
Total Environment Cost :			45.07	

Engineering Projects :-

Unit -I	832.32	142.99	Expenditure upto Sept'91
Unit -II	541.98	16.45	- do -
Unit -III	619.37	17.01	- do -
Catchment Area Treatment	124.00	4.99	Expenditure upto Oct'91
Command Area Development	50.00	0.18	
<hr/>			
Total Engineering Projects : 2167.67 181.62			
<hr/>			

1.	2.	3.	4.	5.
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SSP

1. Rehabilitation Master Plan	-	8.42	
2. Phased Catchment area treatment	51.30	1.26	(upto Oct'91)
3. Compensatory afforestation	18.00	1.59	
4. Command area development	--	--	Does not lie in MP
5. Survey of flora fauna			
		0.20	0.10
6. Carrying capacity			
7. Health aspects	--	--	Expenditure included in NSP.
<hr/>			
Total Environment Cost :		11.37	

FOURTH
QUARTERLY REPORT AND REVIEW OF PROGRAMME
(1st July 1991 - 30th September, 1991)

IMPACT ASSESSMENT OF MADHYA PRADESH LAND
TO BE SUBMERGED UNDER SARDAR SAROVAR PROJECT
AND ADJOINING ECOSYSTEM : FLORA, FAUNA AND
OTHER BIOTIC COMPONENTS

Dr. Ram Prasad
IFS

DIRECTOR

STATE FOREST RESEARCH INSTITUTE,
JABALPUR (M.P.)

SEPTEMBER, 1991

FOURTH
QUARTERLY REPORT AND REVIEW OF PROGRAMME

PERIOD : 1st July 1991 to 30th September 1991

1. TITLE OF THE PROJECT :

"Impact assessment of Madhya Pradesh lands to be submerged under Sardar Sarovar Project and adjoining ecosystem: flora, fauna and other biotic components".

2. NAME OF THE PRINCIPAL INVESTIGATOR AND INSTITUTION:

Dr. Ram Prasad. IFS. Director,
State Forest Research Institute. Polipathar,
JABALPUR (M.P.) - 482008

3. OBJECTIVES :

Objectives set for the present investigations have already been discussed in the previous reports and therefore these are not being reproduced here.

4. STUDY SITES OR AREA OF WORK :

Already given in previous reports.

5. AREA OF INVESTIGATION DURING THIS QUARTER :

During the period July to September, '91 submergence and impact areas of Dharmपुरी, Kukshi Tahsils (Dhar), Alirajpur tahsil (Jhabua) and Barwani, Kasrawad Tahsils (Khargone) were visited.

Villages coming under submergence in Dhar and Barwani areas. Khargone, Anjad, Barwani, Sandul, Awalda, Bhavti, Kasrawad, Chikalda, Nisherpur, Kukshi, Dahi, Katerkeda, Dharamrai, Chhachkuwa, Kuklot, Kulwat, Mahelgaon, Kakrana, Jhandana village were inspected and surveyed for tree population and other socio-economic aspects particularly the dependance of man and their bovine population on the existing forest/tree growth (Map - 1). Intensive socio-economic survey was however made in ten villages given in Table 4 to 9.

6. PLAN OF WORK FOR THE PERIOD UNDER REFERENCE :

Survey of the submergence areas and impact areas was done to get an overview of this project :

a) Survey of certain localities including forest and revenue areas and villages of above districts for collecting information on flora and fauna.

Study of ecological status of plant species found in the survey areas (Density, Frequency, Cover, Abundance etc.) was also done.

b) Ethnobotanical information of the plant species present in the submergence and impact areas was also done.

c) Enumeration of tree species found in the submergence and impact area was also carried out.

7. METHODOLOGY OF INVESTIGATIONS :

Methodology for the collection of the informations pertaining to the ecological status, floristic composition, ethnobotanically important plant species, enumeration of growing stock, live-stock as well as socio-economic status have been same as described in the previous reports.

8. IMPACT AREAS OF S.S.P. :

5 km on either side of the submergence area (along the length of river) was marked on the map. This was considered as likely impact area. This area was divided into a grid of 3km x 3km. Villages coming under each 9 sq. km. have been selected for further studies, floral, faunal and carrying capacity. For the purpose 50 per cent villages in agricultural area and 75 per cent villages in forested areas have been selected for survey.

The estimated impact area of S.S.P. in addition to the submergence area is as under :

Total Assessment Study Area of S.S.P. :

1.	Submergence area	196 sq km (193 villages)
2.	Impact area estimated	1140 sq km (94 villages)
		50 % of total impact villages

Total = 1336 sq km (287 villages)

9. MONTHWISE WORK DONE :

July 91

Third quarterly report of S.S.P. was prepared and submitted. A field trip was made for the survey of various localities of submergence and impact areas.

August 91

various forest compartment and villages were visited and informations regarding the flora, fauna, socio-economic aspect in submergence and impact areas of Dhar and Jhabua and Khargone districts were collected.

A revised and detailed First Interim Report (90-91) from 1.9.90 to 31.3.91 of S.S.P. was prepared and submitted vide letter NO. 2622 dated 26.8.91 to NVDA. Field Director visited the area and recorded various observations.

September 91

Some impact villages of the Dhar and Khargone districts were visited for collection of informations on socio-economic, vegetational and ethno-botanical aspects. The data collected has been processed and tabulated.

10. SOCIO-ECONOMIC SURVEY :

In the first year of the project period, data was collected on most of the villages affected by submergence. A pilot survey was also conducted in Alirajpur tehsil of Jhabua district. The main idea was to find the socio-economic profile of people living in the area and also to quantify the extent to which they depend on forests for meeting some of their basic requirements of fuelwood, fodder, minor forest produce, timber, etc.

In Alirajpur tehsil, 26 villages are being affected by S.S.P. Out of these, a 50 per cent sample was randomly selected for the purpose of study. The analysis of the above data is continuing and additional information is being collected to complete the study.

The impact area has been defined in the enclosed MAP - 1. A total number of 188 villages fall in the impact area. A sample of 50 per cent villages has been selected for the study of impact. Of the total households in the villages, 5 per cent were selected randomly covering all social and economic groups.

The survey in impact area was done in Khargone and Dhar districts. The survey is to continue till all the villages are covered in the project.

The villages surveyed in Khargone were Piplaji, Kundiya, Kalibari, Gajnera, Kuli, Borgone, Talun and Alayapani. In Dhar district two villages Densa and Gangpur were surveyed.

The family size of the total respondents was 6.2 persons. (Table 4). Most of the respondents were in the age group of 30-45 years (about 40 per cent) and below 30 years (34 per cent) as given in Table 5.

The main occupation of the people is agriculture. However, the land holding size is small. About 41 per cent farmers have marginal holdings (below 1 ha) and 22.0 per cent have small holdings. Thus 89 per cent of the holdings were small. About 25.9 per cent of respondents were landless. This indicates that a substantial proportion of farmers have too small holdings and barely manage to earn a living (Table 6).

Farming being the primary occupation, 18 per cent are farmers and 43 per cent combine farming as well as work as agricultural labour. About 38 per cent work only as labour. Fuelwood collection and farming as primary occupation were only reported in Densa Forest Village (Table 7).

As indicated by the marginal size of land holdings the proportion of people living below the poverty line are about 88 per cent (Table 8).

Energy consumption pattern and sources of fodder for livestock were ascertained. In Khargone, where forests are not available, the most popular substitute for firewood is cotton stalks. Thus agricultural residues are being used by 54 per cent population for cooking food. Due to forest destruction in the past, only 17 per cent use fuelwood for cooking. Remaining 29 per cent use both fuelwood and agricultural residues (cotton stalks). However, it is to be mentioned that even fuelwood is not from any forests but from lopping of Sandeshra (*Delonix elata*), Babool (*Acacia nilotica*), Neem (*Azadirachta indica*) etc. Which are planted by villagers to provide live fence to the agricultural crops (Table 9).

11. RESULTS OBTAINED :

On the basis of work done during this quarter the various aspects involved in the present investigation have been tabulated.

12. ANALYSIS OF RESULTS :

Processing and analysis of collected details is in progress.

13. MODIFICATION REQUIRED :

Not felt so far.

14. WORK PLAN FOR NEXT QUARTER :

1st October, 1991 to 31st December, 1991.

- (i) Survey of various impact areas, forest areas and villages of Khargone district.
- (ii) Collection of various plant species present in Khargone district.
- (iii) Collection and recording of various faunal species present in the Khargone district.
- (iv) Ethnobotanical studies with special reference to collection of information of multifarious plant species found in Khargone district.
- (v) Enumeration of tree species in different girth and quality classes in the impact and submergence area of Khargone district so as to determine the physical loss of biomass.

- (vi) Assessment of ecological status of flora particularly the plant density, frequency, abundance and cover of ground vegetations in Khargone district.
- (vii) Survey and collection of information in various villages regarding dependance of man and his live-stock on various forest products in Khargone district.
- (viii) Preparation of fifth quarterly report of the S.S.P. and synthesis of results obtained.

15. SYNTHESIS OF RESULTS OBTAINED :

Several forest and revenue villages have been visited by the field team and data regarding different aspects have been collected.

15.1 Population and Land :

Survey was done to study the likely of submergence on population and land in Kasrawad tahsil of Khargone, Dharmपुरi tahsil of Dhar and parts of Jhabua district. It was observed that there are 15 villages in which only the Govt. land is coming under submergence and less than 10 per cent agriculture land of 10 villages are likely to be affected. In addition 26 villages were also visited in the above mentioned tahsils in which the agricultural land upto 10 % and more than 10 % are coming under submergence. (Table 1).

15.2 Occupation and Source of Income :

There are 3 types of persons observed during the survey: farmers (land holders), agricultural labours (daily and weekly based), family industries and cottage industries: in which all the members of the family are involved in manufacturing of baskets, craft items, utensils etc. These finished products are sold in the weekly markets. Some of these are also sold for bartering items of food, kerosene oil and cloths.

15.3 Vegetational Compositions :

Ground vegetation species have been collected and listed. The plant species collected have already been given in previous reports. However, these have again been listed in Table 2.

15.4 Faunal :

Very few wild animals have been observed by survey team members. The species enumerated in the previous reports have been compiled on the basis of oral enquiries from local inhabitants and forest officials.

16. CONSTRAINTS :

- (1) The survey work continued to suffer on account of stiff resistance by anti-SSP/Narmada Project. The agitationists have well spread net work throughout the affected areas. Infact villagers are so much infuriated that even spotting a

particular type of Jeeps makes them resist giving any informations. Several such incidents took place during survey. However, with great risk the parties continued working in the areas.

- (2) The funds have not been released by the NVDA authorities and situation has come when certain staff may have to be retrenched and this may hamper the works.

17. PHYSICAL PROGRESS :

Physical Progress	Scheduled	Actual
1. Advertisement for staff	Already done in previous quarter	
2. Staff in position field staff	5	4
3. Date of ordering equipment	N.A.	-
4. Date of installation of equipment	N.A.	-
5. No. of field surveys during the quarter	3	3
6. Aspects planned for completion	Study of vegetational and faunal components.	
7. Reasons for short fall/ not achieving the targets envisaged	Anti-dam agitation, non-co-operation of villagers, problems faced: work slow due to the blocking of roads after heavy rains.	
8. How this shortfall is proposed to be made up	Waiting for better working environment, after agitation slows down and areas become accessible.	
9. No. of research staff in position during the period of report	8	4

18. FINANCIAL PROGRESS :

Expenditure incurred upto 30.9.91

S.No.	Item	Amount (Rs.)
1.	Honoraria-Salaries	1,12,737
2.	Wages for hiring labours to assist	34,278
3.	Contingent Field expenses	1,06,966
4.	T.A./D.A.	20,941
5.	House rent allowance	7,650
6.	Organising seminars	1,215
7.	Maintenance, fuel & oil	36,063
8.	Stationery/Postage/Printing	6,306
9.	Contingent expenses	55,592
10.	Rent expenses for field office/station	18,264
11.	Contractual services photocopy drawing	2,492
Grand Total		4,02,504

Certified that an amount of Rs.4,02,504/- (Four Lakh Two Thousand Five Hundred Four only) has been incurred on Scheme during 1990-91 and 1991-92 i.e. from the starting of scheme i.e. from 1.9.90 to 30.9.91.

Dated:



**Project Director
 &
 Director
 State Forest Research Institute,
 Jabalpur, M.P.**

Table 1 : No. of villages coming under submergence of Kasrawad and Dharampuri Tahsils and Jabua District.

S.No.	Subergence of S.S.P.	No. of villages			TOTAL
		Kasrawad Tahsil (Khargone)	District Jhabua	Dharampuri Tahsil (Dhar)	
1.	Govt. land only	3	3	9	15
2.	Less 10% Agri. land (House holding unaffected)	1	6	3	10
3.	10% Agri. land and little House holding	1	-	5	6
4.	10% Agri. land and complete House holding	1	1	2	4
5.	More than 10% Agri. land only	-	-	-	Nil
6.	More than 10% Agri. land little House holding	-	4	-	4
7.	More than 10% Agri. land with House holding	-	12	-	12
Total		6	26	19	51

Table 2 : List of Plants collected during this quarter.

S.No.	Botanical Name
(A) Trees	
1.	<u>Acacia nilotica</u> (L.)Del. Willd
2.	<u>Acacia catechu</u> , Willd
3.	<u>Adina cordifolia</u> Hook f.
4.	<u>Aegle marmelos</u> Correa
5.	<u>Ailanthus excelsa</u> , Roxb.
6.	<u>Albizia amara</u> Boivin
7.	<u>Albizia procera</u> , Benth
8.	<u>Albizia lebeck</u> , (Linn.) Benth.
9.	<u>Anogeissus latifolia</u> , Wall.
10.	<u>Anona squamosa</u> , Linn.
11.	<u>Asadirachta indica</u> , A. Juss.
12.	<u>Bauhinia malabarica</u> (Roxb.)
13.	<u>Bauhinia pumila</u> Linn.
14.	<u>Coswellia serrata</u> , Roxb.
15.	<u>Cutea monnina</u> Lam. (Lank,) Taub.
16.	<u>Careya arborea</u> Roxb.
17.	<u>Cassia fistula</u> , Linn.
18.	<u>Calbergia latifolia</u> Roxb.
19.	<u>Colonia elata</u> (Linn.) Labile
20.	<u>Crotophyra melanocylon</u> , Roxb.
21.	<u>Euphorbia officinalis</u> , Benth
22.	<u>Feronia limonia</u> (Linn) Salmgile
23.	<u>Ficus umbellata</u> , Linn.
24.	<u>Ficus hispida</u> , Linn.
25.	<u>Grewia tiliaefolia</u> Vahl.
26.	<u>Hardwickia binata</u> Roxb.
27.	<u>Holoptelia integrifolia</u> , Planch.
28.	<u>Mesua indica</u> , Mel.
29.	<u>Mangifera indica</u> , Linn.
30.	<u>Morinda oleifera</u> , Lank.
31.	<u>Mussaenda coccinea</u> Roxb.
32.	<u>Phoenix sylvestris</u> Roxb.
33.	<u>Rondegia pinnata</u> , Linn. Pierre.
34.	<u>Pterocarpus marsa</u> Lam. Roxb.
35.	<u>Sterculia urens</u> Roxb.
36.	<u>Syzygium cumini</u> Linn. Skeels.

37. Tamarindus indica Linn.
38. Tectona grandis Linn.
39. Terminalia arjuna (L.)
40. Terminalia tomentosa W. & A.
41. Orichtia tinctoria L. Br.
42. Zizyphus maurandia Lamk
43. Zizyphus xylopyra, Willd.

(B) SHRUBS AND TREES

44. Achyranthes aspera Linn.
45. Ageratum conyzoides Linn.
46. Andromeda mexicana Linn.
47. Arleria oriontia Linn.
48. Cassalopia scolaria Roxb.
49. Calatropis procera W. Br.
50. Cassia auriculata Linn.
51. Cassia tora Linn.
52. Calophyllum tamarosum Roxb.
53. Cordia alliodora Linn.
54. Cyperus rotundus Linn.
55. Cature stramonium Linn.
56. Euphorbia hirta Linn.
57. Indigofera pulchella Lamk.
58. Indigofera pulchella Willd.
59. Lantana camara Linn.
60. Loesia aculeata Roxb.
61. Sida aculeata Lamk.
62. Solanum elaeagnifolium Linn.
63. Solanum nigrum Linn.
64. Passerina eriochloa Wotte.
65. Mibulus terrestris Linn.
66. Triplex procumbens Linn.
67. Vitex negundo Linn.
68. Xanthium strumarium Linn.
69. Zizyphus nummularia W. & A.

(C) CLIMBERS

70. Asparagus racemosus Willd.

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71. Cuscuta reflexa Roxb.
 72. Dendrophthoe falcata, (Linn.)
 73. Gloriosa superba Linn.
 74. Viscum nepalense Spreng.
 75. Zizyphus oenobolia, Mill.

(D) GRASSES

76. Aplusa varia, Hack subsp. mutica Halck.
 77. Coix lacryma Jobi-Linn.
 78. Cymbopogon martinii, Nees
 79. Cynodon dactylon, Pers.
 80. Dendrocalamus strictus Nees.
 81. Dichanthium annulatum, (Forsk) Stapf.
 82. Eragrostis tenella Beauv. ex A & S.
 83. Ischaemum rufosum Balish.
 84. Ischaemum laxum Hack.
 85. Themeda subtrivalvis, (Linn. O. Ktze.)

Table 4: Family size of Respondents

Village	Family Size
Piplaj	5.2
Kundiya	4.9
Kalibari	5.0
Gajnera	5.4
Kuli	5.9
Borgaon	4.9
Talun	4.9
Alyapani	6.1
Densa	7.4
Gangpur	7.4
Average Size of Family	6.2

TABLE 5: AGE GROUP OF RESPONDENTS

Village Name	0-30 Yrs.	30-45 Yrs.	Above 45 Yrs.
1. Piplaj	2	2	6
2. Kundiya	3	2	3
3. Kalibari	3	2	4
4. Gajnera	5	3	2
5. Kuli	3	3	4
6. Borgaon	5	4	2
7. Talun	6	2	1
8. Alyapani	4	2	1
9. Densa	6	22	5
10. Gangpur	10	12	6
	47	54	34
	(34.8)	(40.0)	(25.2)

Note: Figures in parenthesis denote per cent to total

TABLE 6 : SIZE OF LAND HOLDINGS

Village	Landless	Marginal Farmers	Small Farmers	Medium Farmers
Piplaj	-	4	-	6
Kundia	3	2	1	2
Kalibari	4	3	2	-
Gajnera	6	3	1	-
Kuli	5	2	2	1
Borgaon	6	3	2	-
Talun	4	4	1	-
Alyapani	4	1	2	-
Densa	-	20	12	1
Gangpur	3	14	10	1
	35	56	33	11
	(25.9)	(41.9)	(22.0)	(8.1)

Note: Figures in parenthesis denote per cent to total

TABLE 7 : OCCUPATION PATTERN

Village	Farming	Agriculture Labour	Farming & Agri Labour	Farming & Fuelwood Collection
Piplaj	6	-	4	-
Kundia	1	3	4	-
Kalibari	1	7	1	-
Gajnera	1	6	3	-
Kuli	2	5	3	-
Borgaon	2	6	3	-
Talun	5	2	2	-
Alyapani	1	4	2	-
Densa	1	-	13	14
Gangpur	4	5	19	-
	24	38	59	14
	(17.8)	(28.1)	(43.7)	(10.4)

Note : Figures in parenthesis shows per cent to total

TABLE 8: INCOME OF GROUPS

Village	Income Groups		
	0-6400	6400-10000	Above 10000
1. Piplaj	6	4	-
2. Kundiya	7	1	-
3. Kalibari	8	1	-
4. Gajnera	9	1	-
5. Kuli	8	2	-
6. Borgaon	9	2	-
7. Talun	8	1	-
8. Alyapani	6	1	-
9. Densa	33	-	-
10. Gangpur	25	3	-
	119	16	
	(88.1)	(11.9)	

Note: Figures in parenthesis denote per cent to total

TABLE 9: ENERGY CONSUMPTION PATTERN

Village Name	Agricultural Residue	Fuelwood	Agricultural Residues & Fuelwood
1. Piplaj	8	-	2
2. Kundiya	8	-	-
3. Kalibari	7	-	2
4. Gajnera	9	-	1
5. Kuli	5	2	3
6. Borgaon	6	-	5
7. Talun	7	-	2
8. Alyapani	4	-	3
9. Densa	-	21	12
10. Gangpur	19	-	9
	73	23	39
	(54.1)	(17.0)	(28.9)

Note: Figures in parenthesis denote per cent to total

* * * * *

/francis/

ANNEX-XIII. Min- IV

Dtd:-29/11/1991.

To:
 Mr. SM.Pai,
 Secretary,
 Environment Sub-Group of N.C.A.,
INDORE.

Sub:-Item No.XII-4(70): Setting up of an
 environmental development cell -
 Minutes of the 12th meeting.

Dear Sir,

Regarding the above item I have the following
 points to be brought to the kind notice of the
 Sub-Group.

- 1) It is mentioned in the minutes that it is the intention of Ministry of Env. & Forests to develop EDQ into an autonomous centre of Excellence. This point was not made clear to the sub-group, when the first draft was prepared some of us prepared the draft with above intention. However, it was disappointing to see that such a centre of Excellence which is similar to TIFR etc. was to be executed through the auspices of a CSIR laboratory as a part of a sub-section. Similar exercises to set up such centres of excellence jointly taken up by the Ministry of Science and Technology and Ministry of Education in the past in already existing educational Institutions have failed. In view of this, deviation started taking place on this matter.
- 2) The above subject was discussed in the advisory committee of Ministry of Water Resources and the members including me felt that the emerging technology would ~~not~~ be applied to a major project immediately if the cell is set up under the auspices of NCA. Once it grows the cell can be reshaped.
- 3) If it is still the intention of Min. of Environment & Forest to set up an autonomous Institute of excellence with an intention to take up the problem of NCA in the first instance by the Institute, I would like to endorse the concept fully in the principle. There is a need to work out a viable management structure.

Please put it up before the Sub-group.

Yours sincerely,

 (R.K.Kittu)

Member, Env. Sub-Group of NCA.