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SOUND SOCIO-ECONOMIC DEVELOPMENT IN THE HUMID TROPICS*

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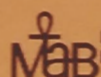
***BIODIVERSITY CONSERVATION THROUGH
ECODEVELOPMENT
PLANNING AND IMPLEMENTATION LESSONS FROM INDIA***

by

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 **UNITED NATIONS
EDUCATIONAL,
SCIENTIFIC AND
CULTURAL ORGANIZATION**

 **MAN AND THE BIOSPHERE
PROGRAMME**



**THE
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EDITORS' FOREWORD

The Biosphere Reserves or similar managed areas that are joining the *South-South Cooperation Programme*, are requested to produce an overview of their covering area containing first hand information on its conditions and urging problems.

These reports will be primarily used as background materials for the comparative projects agreed upon in the programme of activities established at the Chiang Mai meeting, held in May 1994. For more details please report to the newsletter South-South Perspectives (N° 1, October 1994 [28 pp.], UNESCO, Paris [France]).

Given the rich information value of these reports, there are being made available to a wide audience. They may be obtained by contacting UNESCO/MAB Secretariat, Division of Ecological Sciences.

For other documents available in the series, see the back-cover

Shekhar SINGH
BIODIVERSITY CONSERVATION THROUGH
ECODEVELOPMENT.

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ABSTRACT

India covers 2% of the world area and supports 16% of the world's population. This country harbours 6,5% of the world Animal and 33% of the world plant species. The network of protected areas comprises over 65 national parks and 425 sanctuaries covering 10 millions ha.

The notion of protected area is very old in India (c. 2500 BP) and is known as *abharayana*. Current modern protected areas are ruled under the Wild Life Protection Act (1972) amended in 1991. The protected areas are not distributed uniformly across the biogeographic provinces of the country. 40% of National parks and 8% of sanctuaries had completed their legal procedures. Human pressures are exerted on protected areas such as grazing by livestock, extraction of fodder, timber and non timber forest products, illegal occupation and use by people and/or government agencies. Management plans are reported for 50% of the national parks and 31% of the sanctuaries. The major constraints (pressures and root causes) exerted on protected areas are described.

Ecodevelopment is the strategy used for biodiversity conservation. The main objectives and strategies of the concept are enumerated. An indicative planning for eco-development is also detailed at village level. Some issues of eco-development are considered such as relocation of human populations, prevention of the magnetic syndrom, establishment of tradeoffs over additionalities, and political polarisation.

The implementation of the eco-development concept is described step by step including planning, institutional structures, transitional phase planning, financial arrangement and criteria for site selection.

An indicative plan is developed as case study for the Great Himalayan National Park and the Kalakad Mudanthurai Tiger Reserve.

Project description is summarised for eight protected areas representative of the varied ecological zones of India. Six of them are Tiger Reserves (Buxa, Periyar, Simlipal,

Ranthambhore, Pench, Palamau), Nagarahole is a valuable habitat for both tigers and elephants. Gir harbours the last surviving population of asiatic lion.

RÉSUMÉ

L'Inde occupe 2% de la surface du globe et héberge 16% de la population mondiale. Ce pays réunit 6,5% des espèces animales et 33% des espèces végétales du globe. Le réseau national d'aires protégées comprend 65 parcs nationaux et 425 réserves répartis sur 10 millions d'ha.

La notion d'aires protégées est très ancienne en Inde (c. 2500 BP) où elle est connue sous le nom d'*abharayana*. Les aires protégées modernes actuelles sont régies par le *Wild Life Protection Act* (1972) modifié en 1991. Les aires protégées ne sont pas distribuées uniformément dans les différentes provinces biogéographiques du pays. La procédure légale n'a été complètement effectuée que pour 40% des parcs nationaux et 8% des réserves. Parmi les pressions anthropiques exercées sur les aires protégées on peut citer le paturage du bétail, les prélèvements de fourrage, grumes et autres produits forestiers, l'occupation et l'utilisation illégales par les gens et/ou les administrations gouvernementales. Des plans de gestion ont été élaborés pour 50% des parcs nationaux et 31% des réserves. Les principales contraintes (pressions et causes premières) exercées sur les aires protégées sont décrites.

L'écodeveloppement est la stratégie employée pour la conservation de la biodiversité. Les principales stratégies et objectifs de ce concept sont énumérées. Une planification indicative de l'écodeveloppement est également détaillée au niveau du village. Quelques unes des **issues** de l'écodeveloppement sont envisagées comme le déplacement de populations humaines, la prévention du syndrome magnétique, et la polarisation politique.

La mise en oeuvre du concept d'écodeveloppement est décrite étape par étape et comprend la planification, les structures institutionnelles, la planification de la phase de transition, le montage financier et les critères pour la sélection des sites.

Un plan indicatif est développé sous forme d'étude de cas pour le Great Himalayan National Park et pour la Réserve de Tigres Kalakad Mudanthurai.

La description des projets de huit aires protégées représentatives de la variété écologique de l'Inde est résumée. Six d'entre elles sont des Réserves de Tigres (Buxa, Periyar, Simlipal, Ranthambhore, Pench, Palamau), Nagarahole est un excellent habitat à la fois pour les tigres et les éléphants. Gir abrite la dernière population survivante du lion asiatique.

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I. INTRODUCTION

India is one of the megadiversity countries of the world with:

- over 15,000 flowering plant species
- totally over 45,000 species of plants
- over 77,000 species of animals
- 1,178 bird species, and
- 10 recognised biogeographic zones.

It is among the top twelve countries of the world in respect of the diversity and endemism of species and harbours 6.5% of the world's species. About a third of the flowering plants species and 18% of the total species are endemic to India [IIPA 1993].

India is also a very densely populated country with the population expected to cross a thousand million by the turn of the century. India has a population density of nearly 300 people per square kilometer and supports over 16% of the world population in a little over 2% of the world's area. Apart from the human population, India also has a domesticated livestock population which is more than 500 million. Being among the poorer countries of the world, over sixty percent of the population is still rural.

Despite there being a great demand on land and other natural resources, India has managed to set up a network of protected areas comprising of over 500 national parks and sanctuaries and covering over 4% of the land area. A large proportion of these protected areas (PAs) have been set up in the last ten years.

II. WILDLIFE MANAGEMENT IN INDIA

Certainly the most ambitious of governmental efforts, at conserving wild biodiversity in India, has been the setting up and maintaining of a network of wildlife protected areas (national parks and sanctuaries). India currently has 65 national parks and 425 sanctuaries covering approximately 13,308,000 ha. The number of parks and sanctuaries have increased at a very rapid pace, especially in the last decade. In 1975 there were only five national parks and 126 sanctuaries covering 2,500,000 ha. This increased to 19 parks and 210 sanctuaries by 1983 and to 53 and 247 respectively by 1985, covering 10,000,000 ha.

II.1 History

The notion of *abhayaranya* (inner sanctuaries), propagated in Kautilya's *Arthashastra* (c. 2500 BP) corresponds very closely to the notion of a national park as it is being increasingly understood today. Also, historically, in many parts of the country village communities protected forest groves and tanks which they designated sacred. These also had the level of protection that is now being sought for national parks.

Certain communities, like the *Bishnois* of Rajasthan, traditionally conserved their environment and fiercely protected the trees, forests and wild animals in their surrounds even

at the cost of their lives. Though not well or comprehensively recorded, numerous forests and wilderness areas across the country were protected for centuries because they were considered to be the abodes of Gods or of the spirits of the elders. In short, for thousands of years much of the wilderness areas were protected in their pristine glory, by village communities.

Such areas, then, formed the historical network of what we are now trying to recreate as national parks and sanctuaries: a network of areas which were free to evolve and grow as nature intended them to and which were repositories of the genetic diversity of the country.

With the advent of hunting as a “sport”, for pleasure rather than for food, there evolved another notion of “sanctuaries”: areas well stocked with “game”. It is often thought that hunting, as a “sport”, got established as a part of the lifestyles of the rulers and other powerful people, during the Mughal period (16th to 18th Century). However, there is little doubt that it transformed into a major threat to the very survival of many wildlife species with the advent of the British Raj in India (19th Century). During this period, many of the local princes set up hunting preserves in order to entertain British dignitaries and organised elaborate shoots.

According to P.D.Stracey, a distinguished forester of the time: “The original idea of a sanctuary in India was a shooting-block closed to shooting and declared as such by the Conservator of Forests from time to time. While there is still provision for this in certain States, there arose the modern conception of a sanctuary as a part or whole of a government forest permanently closed to shooting and in some cases to forest exploitation, grazing and other such revenue operations as in Assam.” [Stracey 1963, p. 116]

The idea of a national park first saw the light of day in India in 1936 when the Hailey (now Corbett) National Park of the Uttar Pradesh was created. Beyond the fact that this park was declared as such after special legislation was introduced, there is no difference between it and an ordinary sanctuary in regard to the prohibition or capture and killing of animals and birds, while the area experiences the normal forest work and exploitation of a forest reserve.

In short, as time passed, the notion of protected areas degenerated from the traditional *abhayaranyas* and sacred groves to hunting preserves and shooting blocks. There was some recovery in the mid thirties through to the 1970s, but the stress, even then, was more on protecting one or a few species of animals, especially prominent mammals, rather than on the whole ecosystem.

Gradually, however, the protection of plants and of the complete ecosystem became an explicit objective. From the setting up of the first national park, in 1935, to the enactment of the Wildlife (Protection) Act, in 1972, the approach to wildlife conservation changed considerably. The 1972 act stipulated total protection for the habitat of a national park and a high level of protection for the habitat of a sanctuary. It included, in the term “wildlife”, all fauna and flora.

The 1991 amendment to the act further strengthened this approach and also, for the first time, put certain plant species into schedule I of the Act, thereby stipulating total protection for them.

II.2 Current legal provisions

National parks and sanctuaries in India are set up under the Wild Life (Protection) Act of 1972 (hence forth referred to as WL Act) as amended in 1991. But while this is the first national legislation with the provision of setting up national parks and sanctuaries, various earlier laws provided for partial or full protection of species and ecosystems.

Under the WL Act, as amended in 1991, wildlife habitat is protected by setting up national parks and sanctuaries.

II.2.1 National parks

National parks are given a higher level of protection, considering no grazing is permitted within them and it is specified that: “ No person shall destroy, exploit or remove any wild life from a National Park or destroy or damage the habitat of any wild animal or deprive any wild animal of its habitat within such National Park except under and in accordance with a permit granted by the Chief Wild Life Warden and no such permit shall be granted unless the State Government, being satisfied that such destruction, exploitation or removal of wild life from the National Park is necessary for the improvement and better management of wild life therein, authorises the issue of such permit. ” [Section 35 (6) of the Act]

II.2.2 Sanctuaries

Sanctuaries are accorded a lesser level of protection, for in sanctuaries grazing and rights might be permitted. certain other types of activities might also be permitted in sanctuaries, but again only “ for the improvement and better management of wildlife ”.

Under the WL Act, national parks are fully protected from all human disturbance and, consequently, correspond to the revised category Ia (Scientific Reserves) of the IUCN categorization system for protected areas.

In a sanctuary, on the other hand, grazing and various rights can be permitted. A sanctuary, therefore, corresponds to IUCN category IV (Habitat and Wildlife Management Area).

II.3 Current management status

As earlier mentioned, India has an impressive network of 65 national parks and 425 sanctuaries, covering over 4% of the country's land area. Almost all the states and Union Territories in India have one or more wildlife protected area.

However, the total number of PAs, and their collective area, though important indicators of the status of biodiversity conservation through PAs, are not enough. The status of biodiversity conservation through the network of wildlife protected areas (national parks and sanctuaries) can be assessed by judging:

- How adequately it covers various species and biogeographic regions.
- How well protected and managed it is.

11.3.1 Adequacy of Coverage

At the behest of the Ministry of Environment and Forests (MoEF), Government of India (GOI), the Wildlife Institute of India (WII) developed a biogeographic classification for India and surveyed the coverage of the various regions, provinces and biomes, and of endangered species, by the protected area network. The WII report comes to the following conclusions:

“ The biogeography classification recognizes ten broad biogeographic zones containing 25 biotic provinces (e.g. North West, West, Central and East Himalayas of the Himalayan Zone). Provinces may be divided into smaller regional units. These are described, justified and mapped in the report.

“ The review of protected area adequacy is based on four main criteria: that each state has a duty to conserve its full range of resources; that each ecological formation within each biogeographical division be protected by at least one area of national park status, that major protected areas need to be of sufficient size to contain viable populations of key species; and that core areas need the protection of viable peripheral buffers. The report is concerned with identifying requirements for adequate long term conservation. Recommendations are made on the basis of biological importance not ease of implementation.

“ In mid 1987 there were 54 parks of 21,003 sq km and 372 sanctuaries of 88,649 sq km giving a combined coverage of 109,652 sq km or 3.3% of the country. These protected areas are not distributed equally within the states or biogeographic regions.

“ These PAs are not distributed uniformly across the states or across the biogeographic zones or provinces of the country. Some states and zones are relatively well covered, others very poorly covered ” [Rodgers and Panwar 1988].

11.3.2 The adequacy of management and protection

A survey of the management status of wildlife protected areas was carried out by the Indian Institute of Public Administration (IIPA) at the behest of the MoEF. The findings of this survey were brought out in two reports. The first (Kothari *et al.* 1989) published mostly state level data pertaining to the human pressures and management status, among other things, for all national parks and sanctuaries.

The second report (Mehta *et al.* 1991) gave details about the human pressures and the state of management of national parks, disaggregated to park level. The data used for the

study were of the period 1979-1989. Given below is a summary of the main findings of this survey.

II.3.2.1 Legal steps

Only 21 (40%) of the 52 national parks responding had completed their legal procedures. Significantly, this meant that only 21 of the 52 parks were legally national parks.

Only 16 (8%) of the 209 sanctuaries responding had completed their legal procedures.

II.3.2.2 Human Pressures

Many of the national parks and sanctuaries include areas which tribals and other local people have used, sometimes for hundreds of years, to meet their biomass, water and other forest based requirements. Many of these uses have not been codified into rights, and in recent years the increase in population and the degradation and decrease of wilderness areas has made many of these uses more intense and widespread.

However, given the objectives of wildlife protected areas, most such uses are inimical to the proper protection and management of national parks, and some to the protection and management of sanctuaries. As already described, the Wildlife (Protection) Act stipulates that there would be no human uses of a national parks and only grazing and such rights as are permitted by the Chief Wildlife Warden, in sanctuaries. Human pressures need, therefore, to be prevented in national parks and regulated in sanctuaries.

II.3.2.2.1 Human Population

Information was obtained separately for human populations residing inside each park or sanctuary and those living in areas adjacent to it (i.e. within a 10-km. radius). An area of 10 km was specified because studies have shown that, by and large, direct sustained impact on the PA comes from people living inside the PA or within 10 km of the boundary.

Population within parks and sanctuaries: Of the 32 national parks and 138 sanctuaries responding, 18 (56%) and 100 (72%) respectively reported human populations within their boundaries.

Since the absolute quantum of population inside is not a good indicator of the potential biotic pressure it can put on to the ecosystem, the data base was used to work out population densities. This was worked out by a simple division of the total population with the total area of each park and sanctuary. Contrast this with the average population density of India, which is about 2.5 per ha. The data obtained revealed the following ranges of density.

Population adjacent to parks and sanctuaries: Of the 23 national parks and 132 sanctuaries responding, 19 (83%) and 115 (87%) respectively, reported populations in their adjacent areas.

An index of population pressures was worked out for each protected area by dividing the total population reported from adjacent areas with the total area of the park or sanctuary.

(Note that the index thus worked out was in relation to the area of each park and sanctuary, and not in relation to the area adjacent).

Table 1: Ranges of density around Protected Areas

DENSITY (persons per ha.)	NO. OF PROTECTED AREAS AND TOTAL		
	National Parks	Sanctuaries	Total
> 10.00	0	3	3
5.0 to 10.00	0	3	3
1.0 to 4.99	0	24	24
0.5 to 0.99	1	14	15
0.1 to 0.49	4	35	39
0.01 to 0.09	11	22	33

The ranges of index of population pressures on national parks and sanctuaries is presented below:

Table 2: Population pressure on national parks and sanctuaries

PRESSURE (No. of persons per ha.)	NO. OF PROTECTED AREAS AND TOTAL		
	National Parks	Sanctuaries	Total
> 1000.00	0	2	2
100.0 to 1000.00	0	3	3
10.0 to 99.00	2	9	11
5.0 to 9.90	2	11	13
1.0 to 4.99	6	38	44
0.5 to 0.99	1	19	20
0.1 to 0.49	3	26	29
0.01 to 0.09	2	6	8

II.3.2.2.2 Rights and Leases

As already mentioned, all rights and other uses have to be prohibited within national parks. In sanctuaries certain rights can be allowed, however, these should be within the carrying capacity of the area.

In 19 (43%) of the 44 national parks and 128 (68%) of the 187 sanctuaries responding there existed some rights or leases. This meant that these 19 national parks were still not being protected according to the legal requirements. Also, data collected regarding the completion of legal procedures (and quoted earlier) revealed that only 16 sanctuaries

responding had completed the prescribed procedures. As at that time it was mandatory to extinguish all rights even in sanctuaries (prior to the 1991 amendment), it would mean that these 128 sanctuaries reporting the existence of rights had not completed their legal procedures and were, as such, not being managed as stipulated.

II.3.2.2.3 Grazing by Livestock

Of the 36 national parks and 138 sanctuaries responding, 14 (39%) and 101 (73%) respectively, allowed grazing of livestock within their boundaries.

Of the 36 national parks and 138 sanctuaries responding, 24 (67%) and 114 (83%) respectively reported incidence of grazing. In other words, grazing was occurring, though it was not authorised, in 10 of the national parks responding (42% of those which had grazing) and in 13 (11% of those with grazing) of the sanctuaries.

Since different kinds of livestock have different ecological impacts, the overall livestock figures were broken up into separate figures for cattle, goats, and sheep, and their densities worked out (number of livestock divided by area in ha. of park/sanctuary). Tables 3a to 3c present densities of cattle, goats, and sheep for each park and sanctuary, arranged in descending order. The range of densities obtained was as follows:

Table3 a: Density of Cattle in Protected Areas

DENSITY (No. of cattle per ha.)	NO. OF PROTECTED AREAS AND TOTAL		
	National Parks	Sanctuaries	Total
> 10.00	0	1	1
5.0 to 10.00	0	1	1
1.0 to 4.99	1	10	11
0.5 to 0.99	0	22	22
0.1 to 0.49	5	57	62
0.01 to 0.09	8	32	40

Note that the national density was roughly 0.81 cattle per ha., if one took the 1982 figure of 260 million heads of cattle. Relative to this, an extremely high cattle density was reported from Sailana Sanctuary (M.P.), which had over 15 cattle grazing per hectare. Of the national parks, Keibul Lamjao (Manipur) reported a density of 2.5, which was alarming considering this is the last home of the greatly endangered Brow-antlered deer (*Cervus eldi*).

Density of goats for India as a whole was roughly 0.30 per ha., given the 1982 figure of 95 million goats in India. Relative to this, Gamgul Siahbehi Sanctuary (H.P.) and Sailana Sanctuary (M.P.) reported very high goat densities of 4.44 and 3.86 per ha., respectively. Of the national parks, Sariska (Rajasthan) reported grazing density of nearly 1 goat per hectare, over three times the national average.

Table3b: Density of Goats in Protected Areas

DENSITY (No. of goats per ha.)	NO. OF PROTECTED AREAS AND TOTAL		
	National Parks	Sanctuaries	Total
1.0 to 4.99	0	6	6
0.5 to 0.99	1	7	8
0.1 to 0.49	1	22	23
0.01 to 0.09	6	36	42

The density of sheep in India was roughly 0.15 per ha., if one took the 1982 figure of 48 million sheep in the country. As in the case of goats, Gamgul Siahbehi Sanctuary (H.P.) reported the highest density of sheep from amongst sanctuaries, with 5.55 sheep per hectare. Of the national parks, Pench (Maharashtra) topped the list with 0.35 sheep per hectare, more than twice the national density.

Table3c: Density of Sheep in Protected Areas

DENSITY (No. of sheep per ha.)	NO. OF PROTECTED AREAS AND TOTAL		
	National Parks	Sanctuaries	Total
5.0 to 10.00	0	1	1
1.0 to 4.99	1	7	7
0.5 to 0.99	0	4	4
0.1 to 0.49	3	24	27
0.01 to 0.09	6	25	31

II.3.2.2.4 Extraction of Fodder

Of the 51 national parks and 204 sanctuaries responding, 7 (14%) and 63 (31%) respectively reported permitting extraction of fodder and from all these areas fodder was, in fact, being extracted.

II.3.2.2.5 Extraction of Timber and Non-Timber Forest Products

The extraction of timber and other, non-timber, forest produce are prohibited, by law, from national parks. Unless the extraction is for the better management of the wildlife, after the 1991 amendment, it can be allowed from a sanctuary only if it is a right that has been allowed by the Chief Wildlife Warden.

Timber: Of the 44 national parks and 183 sanctuaries responding, 7 (16%) and 78 (42%) respectively reported extraction of timber.

Non-Timber Forest Product: 14 (36%) of the 39 national parks and 104 (56%) of the 185 sanctuaries responding reported extraction of non-timber forest produce (NTFP).

II.3.2.2.6 Use and Occupation by other Government Departments and Agencies

The Wild Life (Protection) Act 1972 specifies that the control of national parks and sanctuaries must vest with the Chief Wild Life Warden of each state (section 33 for sanctuaries, and section 35 (6-8) for national parks).

What this implies is that any activity by a government agency or department, in a national park or sanctuary, has to be cleared by the Chief Wildlife Warden.

Despite this, of the 45 national parks responding, 25 (56%) reported use or occupation by government departments and agencies other than the Wildlife Wing. Similarly, of the 188 sanctuaries responding, 119 (63%) had such uses. Some prominent example of such were Dharangad Wild Ass Sanctuary (Gujarat), which was under partial occupation of the army. Incidentally, Palamau National Park is currently under threat from a proposed army cantonment and firing range.

There is external control over mines in Kudremukh National Park, Karnataka, over hotels and tourist facilities in Periyar National Park, Kerala, over a private fort in Bandhavgarh National Park, among others. In many cases, the control over the whole protected area was not with the wildlife authorities (eg. Simlipal Sanctuary in Orissa, Shimla Water Catchment Area Sanctuary in Himachal Pradesh, and various sanctuaries in Karnataka).

II.3.2.2.7 Thoroughfare

Of the 47 national parks and 204 sanctuaries responding, 22 (47%) and 117 (57%) respectively, reported the existence of a public thoroughfare.

II.3.2.2.8 Illegal Occupation and Use

Of the 36 national parks and 176 sanctuaries that responded, 3 (8%) and 46 (26%) respectively reported incidence of illegal occupation or illegal use, or both. "Occupation" in this context, means the spatial location of people or buildings, or both, while "use" refers only to activities without involving spatial location of people or buildings, as for tourism or other recreational purposes.

II.3.2.2.9 Encroachment

Three (7%) of the 44 national parks and 32 (20%) of the 160 sanctuaries responding reported encroachment. Though encroachment is also "illegal occupation", a distinction is sought to be made here between illegal location by governmental or other outside agencies (occupation) and by local people (encroachment).

II.3.2.2.10 Offences

Of the 45 national parks and 172 sanctuaries responding, 31 (69%) and 96 (56%) respectively reported incidence of one or more types of offences.

II.3.2.3 Management

II.3.2.3.1 Management Plan

Of the 52 national parks and 208 sanctuaries responding, 26 (50%) of the parks and 65 (31%) of the sanctuaries reported the existence of management plans. In all the other areas management was carried out, on an ad hoc basis with an annual perspective, rather than a five or ten yearly one.

II.3.2.3.2 Zoning

Eighteen (38%) of the 48 national parks and 41 (19%) of the 221 sanctuaries responding, reported the existence of zones.

II.3.2.3.3 Relocation of Human Population

Of the 16 national parks and 88 sanctuaries which have human population inside them and which have responded to this question, 5 (31%) of the parks and 4 (5%) of the sanctuaries had proposed to relocate a part or whole of their population prior to 1984.

Actual relocation till 1984 has been done in 4 (25%), of the national parks and 3 (3%) of the sanctuaries having human population and responding. This represents 80% of the parks and 75% of the sanctuaries where relocation was proposed. This does not however mean that relocation has been complete, i.e. that all the villages proposed for relocation have been shifted.

II.3.2.3.4 Research and Monitoring

Sixteen (42%) of the 38 national parks responding and 38 (23%) of the 166 sanctuaries responding reported that research work had been undertaken or was underway.

Monitoring was reported from 9 (20%) of the 46 national parks and only 21 (11%) of the 193 sanctuaries responding.

II.3.2.3.5 Management Practices Pertaining to Forest Fires, Floods, Droughts and Water Pollution

Forest Fires: 12 (32%) of the 37 national parks responding and 38 (23%) of the 165 sanctuaries responding reported the existence of fire lines, while 8 (21%) and 22 (13%) respectively reported the existence of other fire fighting measures. 53% of the parks and 39% of the sanctuaries responding reported the incidence of forest fires, which gives some idea of the shortage of proper anti-fire facilities. However, these figures are not strictly comparable, since some parks and sanctuaries which reported the existence of fire lines had had no incidence of fire.

Floods: Of the two national parks and 14 sanctuaries reporting floods from among the areas responding, one (50%) and five (36%) respectively reported taking any flood control measures. These measures included creation of embankments, strengthening of bunds, provision of better drainage, and others.

Droughts: Of the four national parks and 28 sanctuaries reporting the incidence of drought from among those responding, all 4 national parks and 16 (57%) sanctuaries had taken some remedial measures. These measures included creation of artificial water points, digging of wells, and others.

Water Pollution: Of the five national parks and 20 sanctuaries reporting incidence of water pollution from among those responding, three (60%) and eight (40%) respectively had taken some remedial measures. Measures ranged from lodging of protest with the relevant authorities to chemical treatment.

II.3.2.3.6 Personnel

The data show that 45 (90%) of the 50 parks and 171 (87%) of the 196 sanctuaries responding have staff positioned in or for them. The data further show that of the 45 parks reporting existence of staff, 30 (67%) had at least one staff member trained in wildlife. Corresponding figures for sanctuaries were 61 (36%) out of 171.

II.3.2.3.7 Association of NGOs

The involvement of people and people's organisations in wildlife management has been recognised as crucial to the protection of wildlife areas. The National Wildlife Action Plan, drawn up by the Government of India, repeatedly stresses this point: "The involvement of Non-Government Organisations is of great importance to the total conservation effort of the country and there is an urgent need to define the role of such organisations and identify particular ways in which they can be of assistance" (Department of Environment, undated). There has also been a task force, set up by the Indian Board for Wildlife, to report on ways and means of eliciting public support for wildlife conservation (Indian Board for Wildlife, 1983).

Unfortunately, there does not seem to be much evidence of association of NGOs with parks and sanctuaries. Of the 47 national parks and 198 sanctuaries responding, only eight (17%) and 23 (12%) respectively reported association of NGOs.

II.3.2.3.8 Equipment

Nationwide, of the 40 national parks and 159 sanctuaries responding, 27 parks (68%) and 79 sanctuaries (50%) reported the existence of one or more kinds of equipment. The list included firearms, night lights, wireless sets, etc.

II.4 Major constraints

II.4.1 Pressures

The major pressures on the wildlife protected areas in India are:

- Disturbance and destruction due to commercial pressures from the government and from private entrepreneurs and corporations. These include pressures due to extraction of

timber and other forest produce, excessive or inappropriate tourism, mining, and inappropriate land use.

- Disturbance and destruction due to illegal activities like poaching.
- Disturbance and destruction due to infrastructural development activities of the government. These include pressures due to the construction and maintenance of public roads, irrigation and hydro-electric dams, townships, and defence establishments.
- Disturbance and destruction due to calamities like fires, floods, landslides and droughts.
- Disturbance and destruction due to pressures from religious and cultural activities within or on the periphery of the PA.
- Disturbance and destruction due to local and transboundary political problems.
- Disturbance and destruction due to the livelihood activities of local communities living in and around the PAs. These would include cultivation, habitation, fishing, grazing of livestock, collection of fuelwood, collection of other forest produce, and use of resources like water and soil.

11.4.2 Root Causes

The major causes for the persistence of these pressures in the PAs in India can be summarised as follows:

- Despite there being a cadre of wildlife managers drawn from among foresters, many of whom are knowledgeable and dedicated, the management of most PAs is weak. Few have good management plans and most have inadequate, ill equipped and poorly trained, field staff. Budgets, in most cases, are small and totally insufficient to properly manage the areas.
- Though there are strong laws in support of wildlife conservation, the enforcement of these laws is poor. This is at least partly due to the weak management capabilities described above, and partly due to high levels of conflict with local populations and a lack of support from other wings of the government.
- Inadequate management capabilities, low budgets, and a lack of support from other wings of the government is mainly a result of a lack of political will to set up and manage PAs.
- This lack of political will is at least partly a manifestation of the lack of popular public support for wildlife management and partly due to an inadequate appreciation of the value of wildlife conservation among policy makers. The all too common conflicts over access to and use of natural resources within the PA, between PA managers and the local communities living in and around PAs, further alienates even right minded politicians and administrators from national parks and sanctuaries. The lack of political will is exacerbated when governments and corporations are faced with the prospect of foregoing revenues and profits in order to conserve wildlife.

III. ECODEVELOPMENT FOR BIODIVERSITY CONSERVATION

This section describes the concept and some of the participatory features in the ongoing ecodevelopment programmes in India. Specifically, it takes as examples the biodiversity conservation component of the IDA supported Forestry Research, Education and Extension Project (FREEP), under which two protected areas have been taken up for ecodevelopment, and from the GEF supported India Ecodevelopment Project, which is in the final stages of negotiations and is going to take up seven (originally eight) protected areas.

III.1 The rationale for ecodevelopment

National parks and sanctuaries in much of India today are like biodiversity supermarkets, surrounded by thousands of hungry people and cattle who look upon the resources inside the park just as hungry people would look at a supermarket's food laden glass window. How long can walls, fences, moats and even armed guards keep these people and their cattle out? How fair is it, in any case, to keep them out?

Historically, the same government which set up these protected areas showed little interest in providing any alternatives to those whose access to basic livelihood resources was cut off by the establishment of these PAs. Those few who had 'legal' titles to these resources eventually got some compensation. However, the many who used them because their forefathers and mothers had used them for generations, perhaps from much before laws were formulated and titles established, got nothing, not even sympathy. They were often considered encroachers who had 'illegally' usurped 'public' resources and who should be grateful that they were not all being packed off to prison.

Such an approach inevitably led to tensions and conflicts between the local people and PA managers, especially after India became independent and the citizens of free India became increasingly aware of their political power. It became progressively difficult to remove people and their impacts from parks and sanctuaries, and where people were forcibly removed or restrained, they often retaliated by killing wild animals and burning forests.

Attitudes hardened among foresters and other wildlife enthusiasts on the one hand, and rural and tribal community leaders on the other. The Government of India, especially by the enactment of the Wild Life (Protection) Act of 1972, and through other policy initiatives, gave lip service to the cause of wildlife conservation, but did little to resolve what soon became known as the conflict between wildlife and people.

An often quoted, and misquoted, statement of the then Indian Prime Minister, Mrs. Indira Gandhi, that "poverty was the greatest polluter.." further encouraged those within and outside the government who wanted to reduce the debate to one of 'development versus environment' or 'people versus tigers'.

Looking back today, it seems clear that the predominant attitude towards the environment, even as late as the nineteen seventies, was ill informed. Even a preliminary

assessment of facts would have shown that true development could not come about without a judicious use of natural resources; that the fruits of economic development could never benefit the poor unless their basic needs, especially for potable water, breathable air and for a sustained supply of fuelwood, fodder, and other natural products and services, were first met. In other words, whether poverty brought about pollution or not, pollution certainly caused or, at the least, exacerbated poverty.

Similarly, even a superficial political analysis would have shown that what was sought to be projected as a human animal conflict was actually a conflict between two classes of human beings, one who acquired and held on to a disproportionate amount of resources, far beyond their legitimate needs, and the other who did not even have the little needed for survival. A large proportion of the poor and the landless were marginalised from that 96% of the country's area which was outside the PA network and, consequently, forced to turn to the remaining four percent within PAs. Clearly justice demanded that first these lands outside parks and sanctuaries be redistributed and their holdings rationalised, rather than the nation be forced to commit ecological suicide just because powerful vested interests insisted on holding on to what was legally and morally not theirs.

In operational terms this meant that we had to:

- i. Fight for the equitable distribution of productive resources (especially land) at least in the areas adjacent to (outside) the PA. If this land was redistributed, the local people would not need to commit ecological suicide by destroying the sanctuaries and forests, and thereby their own future.
- ii. Insist that sustainable alternatives were identified or developed for meeting those basic subsistence needs of the local people which were earlier being met from the protected area. These could include:
 - Biomass for: fuel, construction, artisanal production (including grasses, bamboo, leaves, wood), food, social and cultural uses.
 - Other natural resources like water, stone, sand, clay, top-soil, and minerals.
 - Incomes through the collection and sale of any of the above.
 - Land for habitation, cultivation and related activities.
- iii. Ensure that the management of the protected areas was people friendly and at the same time ecofriendly.
- iv. Ensure that the local people felt a sense of ownership in the PA and a stake in its well being. This implied the involvement of local communities in the management of the PA. It also implied that the local people, who had sacrificed the most for the PA, be the first recipients of any of the financial benefits that might flow from the PA. As there was ordinarily not much forest working in a protected area, the main financial benefits would be in regular and daily wage employment for protection work, and through activities related to tourism.

v. Ensure that the sacrifice and concern of the local communities was not negated by the government or by other disinterested people who destroyed, or allowed the destruction of, the protected area in the name of “development” or to earn a little profit.

It was only in 1991 that an effort to actualise this approach was finally made. The Government of India codified and operationalised, in 1991, an ecodevelopment strategy for wildlife protected areas in India.

III.2 Ecodevelopment: The concept

III.2.1 Objectives

Ecodevelopment is a strategy that attempts to conserve ecologically valuable areas, especially protected areas (PAs), in a manner that:

- ensures that the negative impact of such a conservation effort, on people living in and around these PAs, is minimised¹;
- empowers the local communities to have an increasing² say in the management of the protected area;
- creates among the local populations a sense of ownership towards the PA; and
- strengthens PA management capabilities.

III.2.2 Strategies

It seeks to meet these objectives by various methods.

- It seeks to conserve protected areas by stopping those activities that degrade the PA.
- It seeks to minimise possible negative impacts, on the local people, by identifying and developing alternative, sustainable, sources and locations for those basic needs which are no longer sustainably obtainable from the PA.
- It seeks to empower the local communities by involving them in the process of decision making for the PA. As a first step, this is done through the setting up of PA management advisory committees. These committee would discuss various management issues

¹ The term “minimised” is used here because though ecodevelopment seeks to ensure that those who are dependent on the PA for their basic economic needs are not adversely affected, the social, cultural and religious dependence on the PA might not be easy to fully compensate for.

² The term “increasing” signifies that what is anticipated is a transition process. Initially, the PA will continue to be managed by the government with the involvement of the local communities through committees and informal consultations. In time, the consultations would get formalised and the committees would become more powerful.

The next stage would be joint management, where the PA would be jointly managed by the government and the local community. This could begin by reserving certain PA management jobs for the local people. It could progress to a memorandum of understanding between the local communities and the government, spelling out their respective powers, functions and duties towards the PA.

The final stage could be the total taking over of the management by the local communities, with the government playing only a watchdog function and stepping in only when there is a breakdown of the management.

including the incidence of poaching and other illegal activities in the PA. Advice and co-operation of the local community is sought in trying to control such activities.

As local community leaders become conversant with management issues of the PA, and where they show an interest in getting more involved with its management, their role is enhanced by, for example, appointing some of them as wildlife wardens or as members of anti-poaching squads.

This relationship needs to be gradually formalised with a certain number of posts, in the PA staff, being reserved for the local people. Depending on the response of the local communities, an increasing role in the management of the PA, especially in the control of illegal activities, can be played by the local people. At some point, certain types of activities can be almost totally handed over to them. For example, they can, through co-operatives or other appropriate institutional structures, manage tourism facilities and activities in the PA. They can also take a primary role in protecting the PA by forming PA protection committees, similar to those formed by villagers as a part of joint forest management.

However, though in joint forest management the villagers are compensated for their time and effort by getting a share of the forest's resources, this is not possible in the case of national parks and sanctuaries. This is because the extraction of resources for human use is prohibited in national parks and restricted in sanctuaries. Consequently, some other compensation package would have to be worked out around PAs.

- It seeks to create a sense of ownership among the local communities not only by empowering them to have a greater say in the management of the PA but also by ensuring that financial earnings from the PA, mainly in the form of tourism related activities, are also channelised solely or primarily to the local people.

Once the linkage between the state of the PA and earnings from tourism related activities has been established in their minds, the local communities will have a greater stake in protecting the PA.

- It seeks to strengthen PA management capabilities by involving the local people in the management and by winning their support and cooperation. This not only reduces the pressure on the PA but also effectively increases the human resources available for its protection, as many of the local villagers start functioning as guardians of the PA.

The needs of the local communities are not the only threats to the PA. In many cases commercial interests and even activities of other government departments pose an equal or greater threat. To counter these, the PA staff has to be made more effective through training and provision of equipment. Management plans have to be developed and adequate finances have to be made available. Legal provisions aimed at conservation of the area also have to be strengthened. The ecodevelopment project attempts to do all this.

It also seeks to promote research activities designed to support PA management, and education and awareness activities related to the PA and to biodiversity conservation.

For a detailed description of the concept, see annexe I.

III.3 Planning and implementation

Ecodevelopment projects are being planned and implemented in two phases. The first phase is the indicative planning stage. An indicative plan lays down the objectives, broad methodology and the rationale for the project. An indicative plan also indicates the approximate investment required for the project. For the village level activities, this estimate is extrapolated from estimates developed for a few sample villages, on the basis of discussions with the local villagers.

The indicative plan does not lay down detailed expenditure patterns nor does it determine what specific activities would be carried out in which village. It only lays down the process to be followed in the second phase, the detailed planning and implementation phase, for determining the specific activities to be taken up and the detailed patterns of expenditure. This is determined through a process of micro planning, which is described later.

The indicative plan, in a sense, lays down the context of the project and designs the various project parameters, as described in the next section.

The ecodevelopment project does detailed planning and implementation simultaneously. Once the project proposal has been appraised and approved on the basis of the indicative plan, detailed management planning and micro planning is taken up. The micro plans that are developed are implemented as they are developed, as described in the later sections.

III.4 Indicative planning for ecodevelopment

In the initial stages there was some confusion on how micro level planning was to be done. The World Bank representatives, who would be involved in appraising the project, were keen that the project proposal be complete in every detail and every bit of expenditure be identified. They were also keen that this be done in a participatory manner, in partnership with the local communities. However, it seemed undesirable to approach the villagers at this stage when it was not even certain that the project would be approved and, even if it was finally approved, when the funds would become available. Apart from the expectations one would raise among the villagers: expectations that might not be fulfilled, at least not in the near future, there was also the real danger that by the time the project came to the implementation stage, the ground realities might have changed and, consequently, sticking to micro level plans made five years earlier would not be desirable. Besides, the time required to prepare proper, participatory, micro level plans, would further delay the appraisal and approval of the project, if such plans had to be prepared for all the villages prior to the project being considered.

The need was for a flexible project design where the money was not committed in advance to specific activities but was available to be allocated and used according to the preferences of the community. This was, however, contrary to the established practices of the World Bank and there was initial reluctance at allocating huge amounts of money without

specifying exactly what it was to be spent on. Fortunately, the desirability of having a flexible project design was finally recognised by the World Bank and, perhaps for the first time in the Bank's history, a project was designed where a bulk of the funds were put into an amorphous 'ecodevelopment fund' without any break up of what it was to be spent on.

Out of this grew the idea of preparing an indicative plan. Such a plan would be based on a participatory planning exercise in only a small sample of villages³. The overall costs of ecodevelopment for the whole project area would be determined by extrapolating from the cost of ecodevelopment in the sample villages.

Needless to say, the actual activities to be funded would not be determined at this stage. These would actually be decided, village by village, when the real micro level planning started as a part of project implementation.

What would, however, be specified in great detail, in the indicative plan, is the process by which this money is to be allocated and the broad parameters within which the money is to be spent. In order to ensure that this flexibility in project design actually results in participatory decision making and cuts out delays, financial powers are delegated to the micro level planning teams who can sit in a village and, based on a discussion with the villagers, sanction the required expenditure there and then without any further reference to higher authority.

The indicative plan also contains various other elements. Some of these are described below.

III.4.1 Choice of areas

The first step towards planning for ecodevelopment involves the selection of areas. After the first level prioritisation of PAs with significant biodiversity value and threats, a decision has to be made to select the number to be taken up.

For the FREEP and the India Ecodevelopment Project (IEP), a total of 10 areas were to be selected, eight to be taken up under the IEP and two under FREEP. The major debate was regarding whether the first priority should be given to PAs with high level of pressures which are therefore in urgent need of attention but also more difficult to tackle, or to those with relatively less pressures and therefore more likely to show success quickly.

There were clear advantages in both types of choices. However, as the ecodevelopment approach was new and much learning was required it was decided to be cautious. Consequently, most areas selected had light to medium pressures, while a few heavy

³ The urgent requirements of these few villages included in the sample exercise would be met out of the project preparation funds (PPF), so that even these villagers would not have to wait for many long years, till the actual project became operational, to get any investments.

pressure areas were also included only because they were Project Tiger⁴ areas and therefore had a relatively better management infrastructure.

Distribution across states was also kept in mind and no two areas were selected from the same state.

III.4.2 Compilation of secondary data

The next step is to compile all available secondary data, including maps and satellite imagery, for the selected areas.

For FREEP and IEP, apart from collecting such data for the PA, a socio-economic survey of the areas adjacent to the selected PAs was also done prior to the sample micro level planning exercise, so that the macro profile of each region was also available to the micro level planning teams. Detailed maps were also developed, based on remote sensing imagery and on available topographic maps. These were subsequently checked against maps developed by the village communities.

III.4.3 Institutional arrangements

A central coordinating NGO/ Institution is recommended to coordinate project preparation. It is advantageous to have such an agency outside the government so that it can easily interact with other NGOs and is not bound down by often cumbersome and time consuming government procedures.

For FREEP and IEP, the Indian Institute of Public Administration (IIPA) was appointed as the national coordinating agency. State and local level NGOs and institutions were also identified for each PA, to give regional and local level support to the national coordinating NGO and to participate in micro planning and monitoring. Some of these NGOs and institutions were also involved in training PA personnel, the villagers and other NGO personnel. Certain national level expert institutions and individual consultants were also identified. Personnel from the identified NGOs and institutions, along with wildlife staff from each of the selected PAs, were trained in the basic techniques of ecodevelopment planning, including methods of participatory rural appraisal (PRA).

III.4.4 Sample Micro level planning

As a first step the PA management staff, along with NGO representatives, sits with villagers in each of the sample villages chosen and agrees upon:

1. the negative impacts that the people have on the PA.
2. The negative impacts that the PA has on the people.
3. The best methods for reducing these impacts.

⁴ Project Tiger areas have special funding from the Government of India and, as such, usually have better management infrastructure than other PAs.

Based on these exercises, micro level plans for each of the sample areas are written, laying down the list of activities to be taken up, the costs involved, and specifying the villagers role in the ecodevelopment process, including their agreement to release pressure on the PA, to form themselves into appropriate institutions for taking up ecodevelopment, and to take on the responsibility of seeing ecodevelopment through.

Based on these sample micro level plans, an indicative plan is written up stressing more the approach to be followed in determining what to do in the project rather than laying down in advance the actions required.

Detailed micro level plans for all the remaining impacting villages around each PA are developed during the project implementation phase, using the methodology developed during the indicative planning process.

Though ecodevelopment promotes a site specific approach and, as such, it is difficult to prescribe a universal formula which must be applied to all areas. However, generally speaking, the three basic elements are:

- a. Participation of the local people to the extent where they not only make the decisions, within a very wide framework, but also manage ecodevelopment activities themselves, through their own institutions.

- b. Integration of various sectoral initiatives. Generally there are various income generation and other development activities being taken up by various departments of the government, and in some cases by non governmental organisations, around national parks and sanctuaries. These represent, if properly harnessed and focused, a great potential for ecodevelopment both in terms of financial and of human resources. On the other hand, if there is no coordination between these different sectors then very often the activities of one agency can be at cross purposes to those of another. In any case, ecodevelopment itself involves activities which are strictly speaking within the purview of rural development, agricultural extension, tribal development, or other such sectors. Consequently, it is essential that there work be integrated within the project.

- c. Site specific micro level planning. In rural development activities there was a great thrust on replication of strategies and approaches. The idea seems to have been that if some formula worked in one place then it would work everywhere. However, whatever its merits, the imperative to replicate almost always degenerated into generalised strategies which were inappropriate to every specific location, even while appearing attractive at a national level. Consequently, the ecodevelopment approach stresses on site specific, painstaking, micro level planning. Such a micro level plan has a far better chance of, on the one hand, capturing all the nuances of the local level reality, and on the other reflecting the priorities and preferences of the local community. See annexes II and III for plan outlines.

To support the micro level planning team, and to provide the village communities with information about the availability of markets, and about the social and environmental impacts of various activities, a list of possible income generating activities, along with their

pre-requisites, impacts and prospects for being economically viable, was developed in advance and provided to the planning teams.

III.4.5 Management Planning

Ecodevelopment is unlikely to succeed if it is not supplemented by effective management of the PA. Therefore, along with eco-development planning the management plan also has to be developed, and in a manner that interfaces with the eco-development plan and creates an opportunity for the participation of the local people in PA management. For this, the PA managers, other outside experts and the local people have again to sit together. Very often there is a need to orient the local population in principles of wildlife management relevant to the specific PA.

To summarise, minimisation of impacts is achieved through developing alternative sources of biomass and incomes, and by protecting crops, livestock and human being from wild animals. Where this fails, adequate compensation needs to be provided for.

The detailed strategy for doing all this is developed by villagers, at the village level, with the help of a micro level team. Specialist teams are also available, on call.

The villagers, through an appropriate village level institution, enter into a memorandum of understanding with the forest department to restrict or abandon activities degrading the PA. In return, the PA management would make available financial and other resources, as per the village plan, to develop alternatives and to protect life and property

III.5 Micro level planning for eco-development

Ecodevelopment planning is done at a village level, by the villagers, who are facilitated by a micro level planning team consisting of a representative of the forest department, usually a forester, representative of the local NGO, and some local community representatives⁵. Prior to the setting up of these planning teams, an appropriate local level NGO is identified for each of the protected areas. Representatives of the identified NGOs, along with the concerned forest staff, are trained in methods of participatory micro planning, including participatory rural appraisal (PRA) methodology and in interactional analysis.

To ensure that, at the village level, the decisions made are with the minimum of class, caste, gender and age bias, various methods of interaction are identified. Apart from village discussions, which often get dominated by the articulate, the upper caste, or the men, separate group discussions are held with women, with backward classes, with the old and with special interest groups. In addition, choices are indicated through a voting system where individuals indicated their choice by placing a pebble near the icon which represents their choice.

The micro planning process seeks to determine:

⁵ In the initial stages, the team is accompanied by a representative of a national level NGO whose job it is to ensure that the teams have been adequately trained and prepared for the task.

- The negative impacts of the local people on the PA, especially in terms of grazing of livestock, collection of fuelwood and other non-timber forest produce, cultivation and habitation within the PA, use of water resources from within the PA, and hunting and fishing.

- The negative impacts of the PA on the people, especially in terms of crop depredation and attacks on livestock and human beings by wild animals, restrictions regarding access to biomass and other resources of the PA, loss of employment and curbs on the right to passage.

- Potential for developing alternate, sustainable, sources and sites to meet these various needs, especially in terms of alternate land, outside the PA, for fuel and fodder plantations, and for cultivation and habitation; viable income generation activities; alternate avenues of employment, especially in the transitional period, before earnings from alternate income generation activities have stabilised.

- Potential for protecting the local people, their livestock and crops, from depredation and attack by wild animals, especially in terms of biological control, involving local people in patrolling crops, constructing barriers (like elephant proof trenching) and shelters for livestock; and by providing speedy and adequate compensation where all methods fail.

In order to identify the most appropriate strategies for minimising negative impacts, the basic unit is a village or hamlet. The first step is to develop a village level plan which identifies the impacts by and on the village, and the potential for minimising this impact. This village level (micro level) plan is drawn up by the villagers themselves with the help of a micro level planning team.

Whereas the villagers are free to choose the activities to be taken up under ecodevelopment, these must meet the following requirements:

- They must contribute to the conservation of the PA.
- They must not be illegal.
- They must be environmentally sustainable.
- They (income generating activities) must be economically viable and sustainable.
- They must not be discriminatory to caste, class, gender or age.

These micro level planning teams, before going to the villages to participate in the formulation of the village level plan, first compile relevant secondary data on the area in general and specifically on the villages they are going to visit. They also procure and study and, where necessary, develop, maps of the area and the villages.

These teams sit with the villagers and use various methods, including PRA techniques, to ensure that the village planning exercise is genuinely participatory and the voices of all groups, especially the women and the scheduled castes and tribes, are adequately heard.

Based on these interactions, hopefully a consensus emerges on what needs to be done to minimise the negative impacts from both the PA and the community. This consensus, then,

is developed into a village plan which has the support of the villagers. The forest department, on its part, pledges the financial resources and other support required to operationalise the village level plan. The villagers, in return, undertake to restrict or abandon those activities and practices which are degrading the PA. They also take on the responsibility of managing the implementation of the plan through an appropriate village level institution. The essential elements of this consensus are then built into a memorandum of understanding (MoU) between the PA management and the village.

The villagers take up the responsibility of implementing the plan, especially in terms of handling the money, selecting the participants for various activities and ensuring that the provisions of the MoU are honoured, through an appropriate village level institution. This institution can be an existing one, like a panchayat (local self government bodies) or a mahila mandal (women's committee), or a new one like an ecodevelopment committee, set up by the villagers for the purpose.

III.5.1 Flow of funds

Funds to support these various activities flow to the village institutions in some cases through the PA authorities and in other cases through a cooperative or a society set up for the purpose, though initially all the money comes through the PA management⁶. In addition, for each village, a trust fund is set up where 25% of the wages, due to the villagers for work undertaken under the project, are deposited. A matching amount is contributed from the project funds. This trust is operated by the village institution and remains with the village even after the project has finished. It supports income generation activities, especially through revolving loans⁷. Financial powers have been decentralised so that village level expenditure, for ecodevelopment, can be speedily sanctioned.

III.5.2 Support from specialists

In some cases, the micro level planning teams might require support from specialists to find solutions to some of the village level problems. For example, in some villages availability of water might be the acute problem and ground-water experts, or engineering expertise to design micro-reservoirs, might be needed. Similarly, there might be problems with the soil, or with weeds, that might need to be tackled. For the purpose, specialist teams from appropriate institutions have been identified. These teams would visit the villages, at the request of the micro-level planning teams, and present their findings and recommendations to the villagers.

⁶ As discussed later, this is important to ensure that the villagers clearly see that the ecodevelopment support is coming to them in return for their participating in the conservation of the PA.

⁷ As discussed later, the setting up of such a trust fund was necessitated by the need to channelise the villager's share of the costs, back to the village. Also, the village trust fund helps in ensuring the sustainability of the ecodevelopment activities even after the project is over.

III.6 Ecodevelopment issues

Both in the planning and implementation of eco-development projects various issues have come up in India and in other parts of the world. Some of these issues are described below, along with possible strategies for dealing with them.

III.6.1 Relocation of human populations

Perhaps the most contentious issue associated with eco-development is the relocation of human populations living within PAs. In India the law does not permit any human habitation within a national park and only limited habitation within sanctuaries. However, many of the parks and sanctuaries have human populations within them and most of these people have strong socio-cultural roots in the area. Many of them are forest dwelling and tribal people who would find it very difficult to integrate into the wider society. They are, therefore, usually unwilling to shift out.

However, in many cases their continued residence within the PA is not only a threat to the animals and their habitat but also results in these people being denied the basic facilities enjoyed by people living outside the PA.

For the India Ecodevelopment Project a decision has been made to only relocate people when they are voluntarily willing to move. This means that if in a village only half the families want to shift out, then only half would be moved out and the remaining would be allowed to stay on, whatever the ecological implications.

In reality this approach is not as difficult as it might sound, for in each of the PAs selected there are fortunately at least a few families who want to shift out. In order to induce the remaining to voluntarily move out it has to be ensured that these few, initially rehabilitated, families are so well provided for that their example tempts the rest.

Apart from the high financial costs of such an approach, which are certainly justified, the main problem is the reaction of the host communities. In order to make the lives of these forest dwellers better than what it was inside the PA and to tempt others from following their example, they have to be provided with a level of lifestyle that is often higher than that of the host community or of people living outside the PA. This creates a potential for social tension and also makes those who did not encroach into the forests feel that they were perhaps wrong in not breaking the law. It can also lead to a situation where people purposely encroach on PA area and then demand to be relocated.

The problem can be minimised by ensuring that eco-development benefits flow to the host communities also so that even though they might not get as much as the relocated families, at least there is some lessening of the gap between the two.

Preventing the magnet syndrome: Considering eco-development strategies result invariably in investments around the PA boundary to develop alternative income generation avenues or to otherwise meet basic needs, there is a potential of such investments becoming a magnet and thereby causing immigration of poor people from other parts of the region or even

the country. Investments and opportunities in urban centers have often led to such immigration in countries like India. The resultant increase in population around PAs would, in the medium to long term, heighten rather than lower pressures on the PA.

This is a difficult problem to tackle and, fortunately, so far in India it has not emerged as a significant problem. This is because areas around PAs are usually far less developed, in economic terms, than the rest of the region or the country. Historically, forested areas have got less than their share of infrastructural development and this itself in many cases has been the reason why some wilderness survives there. In some other cases the presence of PAs in a region has inhibited development activities. This was confirmed by the socio economic survey undertaken at the early stages of the planning phase. Therefore, even after investments under ecodevelopment there would be little incentive for large scale immigration from other regions which are already far better off.

However, another way of preventing the magnet syndrome from operating is to keep the investments under ecodevelopment as low as possible and certainly of the sort that do not suddenly create a large number of jobs or wealth. Where economic development is gradual but steady, it is far more likely to be sustainable and assimilable by the local people and, consequently, not attract attention of potential immigrants. Essentially ecodevelopment is not rural development. In rural development the objective is to raise the economic and social standards of the people, for its own sake. In ecodevelopment the only objective is to conserve the PA, albeit in a socially just manner, and only that level of investment is legitimate which is required to divert unacceptable pressures from the PA.

Establishing tradeoffs over additionalities: The basic philosophy of ecodevelopment is that local communities who are negatively affecting PAs because of livelihood imperatives should be helped to develop alternative, environmentally and socially sustainable, sources of incomes and biomass. These alternatives must be of their own choosing and result in their phasing out their dependence on the PA. However, the purpose of ecodevelopment is defeated if people impacting on PAs consider ecodevelopment inputs as additional, rather than alternate, to the resources they are currently getting from the PA. Given the fact that most of these people are desperately poor and that even after a successful ecodevelopment intervention they would continue to be poor, makes their wanting to consider all inputs as additional both likely and understandable. Unfortunately, it also means that the PA would continue to be degraded.

One way in which this is prevented is by entering into a memorandum of understanding with villages. The understanding is that the village community will phase out activities which are degrading the PA in return for certain specified investments and inputs. If the village community does not keep its part of the bargain then the investments and inputs would stop. However, this threat is not very effective where ecodevelopment inputs are restricted to a specified project period of, for example, five years. In such a case it is unlikely that the people would restrain themselves after the project is over and the inputs have ceased.

To prevent this from happening, in the India Ecodevelopment Project village trust funds are being set up which will maintain inputs for perpetuity. The continued honouring of the memorandum of understanding would be linked to these trust funds.

Also, the village would, if it goes back on the understanding, be subject to action under the law, and detection and prosecution would be much more likely as the PA management has in the meantime been strengthened and the number of villages violating the law have been significantly reduced. Obviously this threat could work only where a small proportion of the villages violate their agreement. In the long run, it must be acknowledged that only the genuine interest of the local communities in conserving the PA would save it. For this purpose it is not only important to minimise the deprivations they face because of the PA, and to involve them in its management, but also to ensure that whatever revenues are forthcoming from the PA, primarily through tourism, also be channelised to them. This will give them a further stake in the PA and its maintenance.

An additional strategy is to channelise eco-development funds and other inputs through the park managers. This clearly establishes the connection between these inputs and PA management. Otherwise, given the fact that there are numerous agencies in the field attempting to provide inputs to the people, and that most of these agencies are unaware of even the existence of the PA, there is a danger that eco-development inputs would also be seen and treated as unrelated to the PA.

Political polarisation: The eco-development strategy has tended to attract criticism from at least two schools of thought. For one, it has attracted criticism from the 'deep ecologists' who believe that the conservation of biodiversity cannot go hand in hand with economic development. Such people criticise the strategy for promoting economic development around the periphery of the PA and argue that all such efforts would raise the living standards of the people living around PAs, introduce a market economy in these areas and thereby further threaten the PA.

Unfortunately, what these people forget is that the market economy has already come to these areas to stay. At present, the villager has no alternative but to poach in the PA in order to buy the things he or she needs. Through eco-development there is a possibility of providing them a legal and environmentally sustainable way of meeting these needs.

Besides, it is not for others to decide how these people should live, they must decide for themselves. Eco-development as a strategy, does not insist that people raise their standards of living. However, experience in the villages shows that almost all of them would like to do so.

The second school of thought that opposes eco-development as a strategy is that which holds that all parks and sanctuaries are illegitimate institutions and should be immediately dismantled. The areas so opened up should be handed over for use by the village communities. They maintain that eco-development is an effort to legitimise the exclusion of the local people from their natural surroundings, which rightfully belong to them.

What this school of thought seems to forget is that protected areas in India cover just about four percent of the land area. The first effort should be to give the poor rural populations their fair share of the remaining 96%, rather than to deprive the country of its future by destroying even the few remaining resources. Besides, experience has shown that if protected areas are opened up, it is never the poor who get to benefit but always the rich industrialists or hoteliers, among others. Conservation of biodiversity is clearly a critical priority for all humanity and we must find ways other than the opening up of PAs to meet the basic needs of the poor.

IV. IMPLEMENTATION OF ECODEVELOPMENT CONCEPT

IV.1 Definitions

Ecodevelopment is a strategy for protecting ecologically valuable areas (protected areas) from unsustainable or otherwise unacceptable pressures resulting from the needs and activities of people living in and around such areas.

It attempts to do this by at least three means:

- by identifying, establishing and developing sustainable alternatives to the biomass resources and incomes that are being obtained from the protection areas in a manner, or to an extent, considered unacceptable.
- by increasingly involving the people living in and around such protection areas into the conservation planning and management of the area, thereby not only channelising some of the financial benefits of conservation to them, but giving them a sense of identity with it.
- By raising the levels of awareness, among the local community, of the value and conservation needs of the protection area, and of patterns of economic growth and development which are locally appropriate and environmentally sustainable.

Though, by their very nature, ecodevelopment initiatives will differ from area to area (and even from village to village), the three basic principles defining ecodevelopment are:

- Site-specific, micro-level planning
- Sectoral integration
- People's participation.

Ecodevelopment is not just rural development, for it is not solely directed at the economic development of the rural population for its own sake, but seeks to protect an ecologically valuable area by eliciting the support of local communities.

Ecodevelopment is not policing in the sense that it does not seek to protect an area by keeping the pressures out solely or primarily through the enforcement of laws aimed at excluding local people. Rather it involves the local people in the process of protecting the park from destructive activities.

For any ecodevelopment plan to succeed, it must be backed by an appropriate management plan for the protection area. Such a plan must, in simple terms:

- define the requirements of conservation, thereby defining limits to human utilisation
- make provisions for the institutional structure and processes required to manage the area and implement the ecodevelopment activities.
- identify ways in which the local population can be involved in conservation planning for, and management of, the protection area.
- identify the interface between the management plan and the ecodevelopment plan, especially details about employment and income generation opportunities for local people and the involvement of the local communities in the planning for, and management and protection of, the area.

IV.2 Ecodevelopment Planning

As already mentioned, ecodevelopment planning needs to be site-specific, micro level, and participatory.

Ecodevelopment is not a once-and-for-all, prior-to-project-implementation, planning process. It is a dynamic, ongoing, planning process which is concurrent to implementation.

Considering the planning process is essentially participatory (using appropriate participatory rural appraisal (PRA) techniques), it involves going into village after village and taking up many days of the villager's time. Whereas this would be justified when there is a certainty that funds are going to be shortly available for responding to the needs of the village, it seems very inconsiderate to waste so much of the villager's time and unnecessarily raise their hopes when funding is uncertain or much in the future.

Therefore, detailed, microlevel, ecodevelopment planning, for this and many other reasons, is seen as starting as soon as the project is approved and running concurrently with the first phase (18 months) of the ecodevelopment project implementation.

For the purpose of determining the broad thrusts and the budget required, and to avoid raising unnecessary expectations, a small sample of villages is surveyed and the costs worked out and extrapolated for the whole area.

The planning process involves detailed discussion with the village communities on various aspects, including:

- Negative impacts of the protection area on the village (wild animals causing human death or injury, livestock death or injury, crop depredation; restriction of access to natural resources, or culturally or religiously significant locations; denial of traditional routes; ban on hunting; etc.)
- Negative impacts of the village on the protection area (illegal or unsustainable grazing; collection of timber, fuelwood and non wood forest produce; setting fire or otherwise degrading the habitat; poaching or disturbing wild animals; etc.)

- Possibilities of minimising both types of negative impacts through ecodevelopment (measures for protection of humans, livestock and crops, and for compensating death, injury and damage; generation of biomass like fuel, fodder and small timber; soil and water conservation activities, both to generate employment and to conserve the environment; income generation activities like bee-keeping, mat and rope weaving, poultry rearing, visitor facilitation and hospitality, manufacture and marketing of other artisanal goods; education and awareness; participation in protected area planning and management; etc.)
- Village level institutional structures and processes existing and required (ecodevelopment committees, panchayats, mahila mandals, etc.)
- Finances, training, research and other inputs required for implementing ecodevelopment activities.
- Constraints, if any, to the success of such activities
- Strategy for the transitional process and period, between the stopping of use of protection area and the establishment of the ecodevelopment initiative.
- Perceptions of the villagers about the protection area, its value and management strategy.

IV.3 Institutional Structures

There would be three main actors in the planning and implementation of ecodevelopment:

- The protection area (park/sanctuary) management authority, who should have adequate staff, preferably exclusive staff, to look after their part of the work.
- Local level NGOs or, where there are no suitable local level NGOs, regional or national level NGOs who are interested and capable of working in the area.
- The village community, especially the women, who need to operate out of existing institutional structures (like panchayats or mahila mandals) or, preferably, organise themselves into ecodevelopment committees.

In addition, there need to be district level co-ordination committees (chaired by the Collector and, where more than one district is involved, the chairmanship rotated among the collectors) to co-ordinate between the various field agencies and departments.

Some regional and central research and training institutions also need to be identified and involved with the planning, training, research, monitoring and evaluation activities.

For the planning process, a planning team consisting of local wildlife officials (Rangers), local NGO representatives and some local community leaders needs to be set up. They would have the task of going from village to village and finalising village level plans in consultation with the people. They would be supported by a regional/national institution which would provide regional and macro level data, and help prepare the consolidated plan for the area.

Depending on the major thrust of ecodevelopment activities identified for the area, specialist groups, comprising of members from local NGOs and specialised government agencies, will be set-up to advise on specific issues (ground-water harvesting, water conservation, bee keeping, horticulture, poultry, etc. etc.). These specialist groups will assist both in the planning process and in the implementation. Only in rare cases would there be a need to bring in experts from outside.

Independent institutions will be identified to monitor and evaluate the project, periodically and at the end.

There might be a need to set up a trust or a society, involving the local wildlife officials and NGOs, in order to:

- provide an alternate process for financially supporting some of the ecodevelopment activities.
- raise additional resources for ecodevelopment activities.
- undertake various tasks, like the training and appointment of tourist guides, development and sale of local handicrafts, development of appropriate tourist facilities, through the involvement of the local people, and to their benefit.
- develop educational and awareness programmes for visitors and local communities.

IV.4 Transitional Phase Planning

Many, perhaps most, ecodevelopment activities have a gestation period of one to three years before they start giving the intended benefits to the local people. For ecodevelopment to succeed as a strategy, it has to be ensured that during the gestation period (transitional phase) the people are not put through unnecessary hardships, nor is the protection area allowed to degrade.

Measures aimed at tiding over the transitional period could include the making available of alternate sources of biomass (fuel, fodder, etc.) to the community on terms and conditions not worse than what they were getting earlier. However, care should be taken to ensure that transitional measures do not compromise, for example by making people dependent on free handouts, the chances of success of sustainable ecodevelopment initiatives.

Such measures could also include developing alternate systems of income, for example long term employment as forest guards or occasional employment in the various management activities in the protection area. Training programmes, with stipends, intended to develop the skills required for pursuing various ecodevelopment activities can also be scheduled in the transitional period. Efforts must also be made to find employment in construction and other activities related to the ecodevelopment project and to schemes of districts agencies. Transitional planning must attempt to make accessible, to the local people, other areas in the region, especially waste, common and forest land. Whereas ecological regeneration and afforestation work in waste and common lands can provide almost immediate

employment to a significant number of the local people, forest land outside the protection area can support Joint Forest Management (JFM) initiatives.

The development of appropriate tourism can also provide almost immediate employment to the local people, especially as tourist guides or through the provision of food and accommodation to the tourists.

The Environment (Protection) Act might also need to be invoked in the buffer areas for ensuring the success of ecodevelopment initiatives.

IV.5 Financial Arrangements

The timely release of ecodevelopment funds to the park director and, further, to the concerned voluntary agencies and village committees has to be guaranteed.

There also has to be adequate decentralisation of financial powers to ensure that sanction of activities and expenditure are not delayed. It also has to be ensured that field officers have the flexibility to respond to all of the various eco-development needs.

There must also be an ability to release funds to voluntary organisations and village level committees.

IV.6 Criteria for Site Selection

From the protected areas in India, a list has to be developed of those which are threatened by the types of pressures that can be tackled by ecodevelopment. Eco-development, as a strategy, is appropriate only for those areas where the threats are due to pressures from local (rural) communities. In areas where the major threat is from a national highway, or from commercial logging by an industry, or from pollution by a factory, strategies other than eco-development might be more appropriate.

Of course, an area can have both types of pressures. In such cases, ecodevelopment can become the means of tackling pressures from local communities while other strategies can be employed to tackle non-localised problems.

After a selection has been done of potential areas for ecodevelopment, they need to be classified as follows:

- Areas where current, local community, needs for biomass (grass, fuelwood, fodder, non-timber produce etc.) are the major threats and these can be sustainably met from available resources, once these resources are better managed (closing/rotation of grazing areas, regeneration/plantation of fuelwood and other species, soil and water conservation activities etc.)
- Areas where though current, local community, needs for biomass cannot be completely met, in a sustainable manner, from local resources, there is potential for reducing local needs for biomass to sustainable levels through indirect methods.

Such indirect methods could include minor interventions like stall feeding of livestock, replacement of local breeds of cattle with high yielding breeds, or introduction of

smokeless chullahs, to major interventions like setting up schools and training programmes to enable villagers to seek non-biomass based employment, minor irrigation, water harvesting and soil conservation schemes to enhance agricultural productivity, development of cottage industries and artisanal skills, etc.

- Areas where even the combination of direct (biomass regeneration) and indirect (diversion of biomass needs) strategies would not be adequate to remove the threat to the environment and where larger, perhaps regional, interventions would be required.

Within each category, the areas should be graded in accordance with the severity of the problem.

A decision has, then, to be made on which areas are to be selected. In the long run it might be possible to cover all the areas, but in the short run a priority has to be established.

Given the circumstances, in some cases it might be preferable to first take up the easier areas (category I), especially if experience needs to be accumulated and resources are scarce. On the other hand, the more difficult areas (category II & III) might require attention more urgently and any further delay might cause irretrievable damage. Though the final decision would have to be made case by case, depending on the experience, training and confidence of the persons concerned, the resources available and the ecological value and level of threat pertaining to each area, as a general principle it is advisable to go from the simpler to the more difficult areas as the experience and confidence gained would help in facing increasing levels of difficulty.

Another factor that should influence the choice of the area is the willingness and ability of the local communities to participate in the process. Even simple problems cannot be tackled without involvement of local communities, while the most difficult ones can be overcome if the people are willing to co-operate.

Initially it is advisable to deal with each area separately, though at a later stage it might be advantageous to link up the various ecodevelopment initiatives in a region.

V. ECODEVELOPMENT INDICATIVE PLAN FOR TWO PROTECTED AREAS

The level of pressure and disturbance in most Indian protected areas (national parks and sanctuaries) is high. Traditional approaches at protecting these areas need to be supplemented by ecodevelopment.

The ecodevelopment approach has been recognised as aiming at developing alternate sources of biomass and income, to divert pressures from the protected area. This is to be achieved in participation with the affected community, and with their support and cooperation, and involves site specific, micro level, planning and integrated area development.

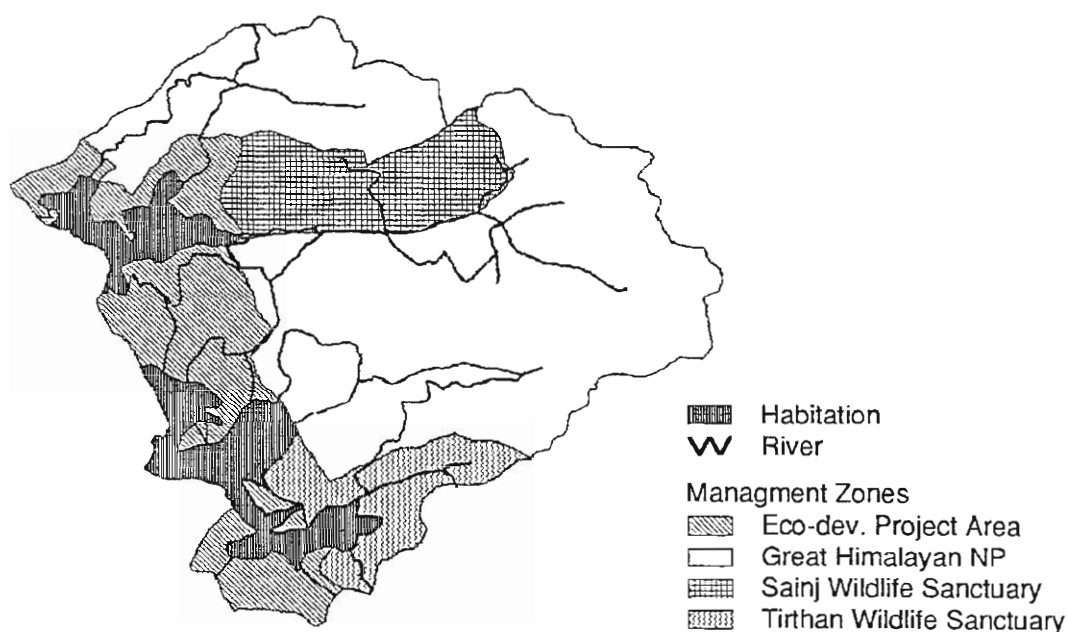
Management planning for the protected area must be concurrent and appropriate, and must lead to the upgradation, as required, of management practices and facilities.

The two sites chosen for the project are both among the best representative sites of their own ecosystems, Western Himalayas and the Western Ghats. These two ecosystems are among the most valuable in the country, in terms of biodiversity.

V.1 GREAT HIMALAYAN NATIONAL PARK

Great Himalayan National Park (GHNP), in Himachal Pradesh, is 62,000 ha. and currently is only a proposed national park with the intention to constitute it into a national park having been declared. At present, the southern 8396 ha. is a part of the earlier notified Tirthan Sanctuary. The remaining area is either reserve or protected forest. The State Government are proposing to, initially, declare the middle portion (Sainj Valley) into a sanctuary, pending the final declaration of the whole area as a national park. An additional area, to the north of the present boundary, is also being added to the national park.

Map 1: The Great Himalayan National Park



There are only four villages inside GHNP, of which recent reports suggest that two have been abandoned. The remaining two villages are in the Sainj valley and have a population of 66 persons (12 families). The project does not anticipate the need to shift them out as they can participate in management and tourism related activities.

The northern, eastern and southern boundaries of GHNP are impassable as they are mostly under permanent snow or with very steep ridges. The park itself has an altitudinal range of between 1300 and 5805 meters. The valleys and ridges run from west to east and the altitude increases from west to east.

Adjoining the western boundary of the park, there are revenue 18 villages in an approximate radius of ten kilometers. These 18 villages are subdivided into about 200 hamlets. The total population of the area is 16,618 and the area is about 38,500 ha. The approach to the park is from the west, though there is no motorable road upto or within the park.

The major pressures on GHNP come from these 200 odd hamlets where many of the people claim traditional grazing rights and also collect herbs and mushrooms from the park. It is estimated that around 35,000 sheep and goats graze in the park during the summer months. In addition, around 2500 people collect herbs and mushrooms from the park each year, again during the summer months. There is also the disturbance to wild animals and the habitat, and the use of firewood, by the graziers and herb collectors. Some fodder is also collected by villagers, from the periphery of the park, for their winter requirements.

There are no significant pressures of the park on the people as, currently, no restrictions are being imposed on the traditional uses of the park. Some of the villagers complain about crop damage by bears and monkeys, but it is not certain if these animals are from the park or from the neighbouring forests.

The project area, comprising of the area outside the western boundary of the park upto about 19 km, is remote, with almost no motorable roads. Though almost all the hamlets have electricity, there is not much other evidence of 'development'. The people have enough to eat and live well and, therefore, in a real sense are not poor. Their major constraint is cash income. Because of their remoteness and the sparseness of the population, they do not have easy access to markets for their goods. Also, traditionally, they seemed to have met their minimal cash requirements through the sale of herbs and mushrooms that they collected in the forests. There does not appear to be many other activities in the region which are done for cash income. Even the sheep and goats they keep, or the honey they collect, or the shelas and pattus (local cloth) that they make, are for their own consumption, as are their agricultural produce.

The constraint of a lack of access to markets also affects the effort to set up sustainable income generation activities under the project. This is aggravated by the fact that some of the local people, influenced by the pattern of development in Kullu valley and in some other parts of Himachal Pradesh, seem to want the setting up of apple orchards and the construction of motorable roads to be the major strategy of development for the area. The absence of active NGOs in the area is another constraint.

The income generation activities suggested as part of the project include the promotion of tourism, the production and marketing of honey and wax, wooden furniture, poultry items, handloom items, indigenous vegetables and fruits. It is also proposed to set up sheep farms, in the last two years of the project, and to cultivate the local herbs and mushrooms, thereby using and building upon traditional skills and activities available in the region to develop environmentally sustainable activities. These activities would be supported and facilitated through a strong training programme, a marketing organisation, a tourist

facilitation organisation, visitor cum training centers, production centers and the provision of start up loans and seed money, apart from other financial and material support.

The communication needs of the region would be met by the provision of bridle paths, to be built and maintained by the local people, and mules, to be operated by the villagers.

Biomass needs of the villagers are sought to be met through fuel and fodder plantations in revenue common lands, by managing some of the degraded forests in a joint participatory manner, by improving local and village grasslands and meadows, and by providing irrigation water.

There would also be an effort to improve the agricultural lands, mostly terraced, and to take up soil conservation measures in the region.

The project would be implemented through village level committees, and along with a JFM agreement, there would be an agreement renouncing the collection of herbs and mushrooms from the park. There would also be an agreement to regulate and restrict grazing activities according to the management requirements.

Adequate short term income generating activities have been identified and provided for in the project to tide over the transitional period.

V.2 KALAKAD MUNDANTHURAI TIGER RESERVE

There would also be some support, within the project for park management activities and for amenities for the park staff.

Kalakad Mundanthurai Tiger Reserve (KMTR), in Tamil Nadu, is 81,700 ha and comprises of the two sanctuaries of Kalakad and Mundanthurai.

There are four tribal villages inside the Reserve, which are inhabited by Kani tribals. There are also five cardamom and tea plantations inside the reserve, the areas being on lease to private parties and companies. There are two water reservoirs inside the Reserve, along with a residential colony of staff of the state electricity and irrigation departments.

The tribals living inside the Reserve seem to want to shift out on their own and, for the purpose, a rehabilitation plan will be prepared. It is not proposed to meet the cost of their rehabilitation from the project.

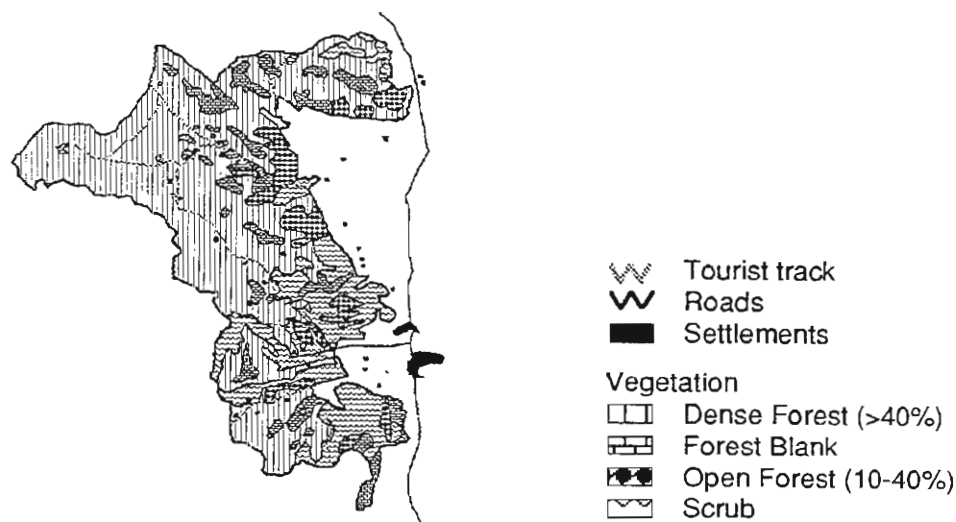
Most of the leases for the plantations inside the Reserve will expire within the next few years, except one, which is valid till 2027. The State Government has not been renewing leases which expire.

Some disturbance is caused by the people living inside the Reserve, especially by their livestock and movement within the Reserve. Management will be upgraded, and made more participatory, in order to minimise this disturbance.

The Reserve is surrounded on the west, north and south by forests and faces no significant pressures from these directions. Its western boundary runs contiguous to the boundary of the State of Kerala. The major pressures are from villages situated near the

eastern boundary. The project area of approximately upto 5 km radius from the Reserve eastern boundary is about 46,000 ha and has a population of 2,09,003, in 66 villages.

Map 2: The Kalakad Tiger Reserve



The major pressures are in the form of headloading, grazing, collection of non wood forest produce (NWFP), and of small timber. The headloaded firewood is for sale, to earn cash income, while the remaining are for the villagers' own use.

The project aims at developing fuel, fodder, fruit, small timber and NWFP plantations to meet the local biomass needs. Fortunately, the villagers are not dependent on the Reserve for their fuelwood, as they use wood from the numerous *Prosopis juliflora* trees in the region for fuel.

The need for cash income will be met through promoting income generating activities like the promotion of tourism, the production and marketing of honey and wax, poultry items, banana and cissal fiber items, and palm jaggery.

It is also proposed to support soil and water conservation and water storage initiatives in the form of check dams, wells, tanks and contour bunding.

The income generation activities would be supported and facilitated through a strong training programme, a marketing organisation, a tourist facilitation organisation, visitor cum training centers, and the provision of start up loans and seed money, apart from other financial and material support.

The project would be implemented through village level committees, and there would be an agreement renouncing headloading and other prohibited activities. There would also be an agreement to regulate and restrict grazing activities according to the management requirements.

Adequate short term income generating activities have been identified and provided for in the project to tide over the transitional period.

Some support is also being provided from the project to improve the management of the Reserve and to provide better amenities to the Reserve staff.

VI. SUMMARISED PROJECT DESCRIPTION FOR EIGHT PROTECTED AREAS

Given below is the summary project description, separately for each of the eight PAs. These eight sites have been selected keeping in mind their global significance and their representativeness of the varied ecological zones of India. Six of them (Buxa, Periyar, Simlipal, Ranthambhore, Pench, and Palamau) are Tiger Reserves and represent between them the most valuable tiger habitat in all its variations. Nagarahole, though not formally a Tiger Reserve, is also an important habitat for the Tiger. It is also one of the most valuable Elephant habitats. The eighth area, Gir, has the last surviving population of the Asiatic Lion.

The proposed strategies described below are of three basic types. The first are those which require an investment from the project and are aimed at micro level planning, improved management, conservation and regeneration of the ecosystem, income generation, human resources development, research and development, education and awareness, monitoring, and village support.

The second type of strategy requires an investment from sources other than the project fund, and the project becomes a method of identifying and channelising these resources, especially from sectors like animal husbandry, agriculture, transport, irrigation, rural development and education, among others.

The third type of strategy requires better regulation and more effective enforcement of laws and policies, with the cooperation and involvement of the local communities. Here it must be remembered that first viable alternatives to the biomass and other needs of the local communities have to be established before they are required to accept restrictions. The spirit of ecodevelopment requires that the costs to be paid by the local communities for the conservation of the PA must be minimised and that they must willingly accept and, whenever possible, self impose the restrictions required for such conservation.

VI.1. BUXA TIGER RESERVE

Buxa Tiger Reserve comprises of intended national park (area of 117.1 sq. km) and sanctuary (area of 268 sq. km) and reserved forests (392 sq. km). The total area of the tiger reserve is 761 sq. km. The main management problems are the 37 forest settlement villages inside the sanctuary area of the PA, and the occurrence of devastating floods. These floods entail enormous maintenance operations by the forest department.

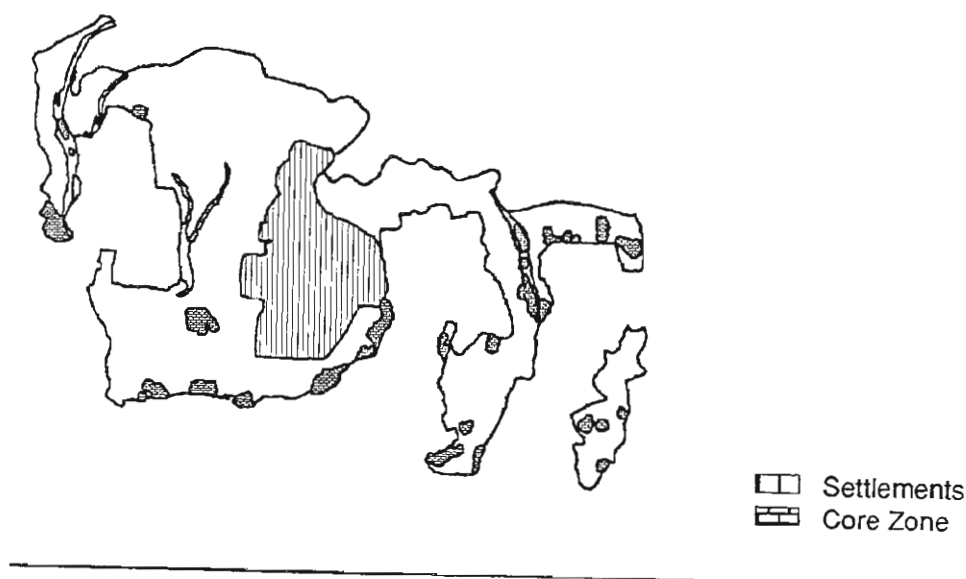
VI.1.1. Grazing within PA

Estimated number: 1,05,00 cattle; average annual consumption of fodder per family is 10.74 tons

Proposed Strategies:

1. Grow fodder on village wastelands outside the PA
2. Reduce the number of cattle
3. Improve cattle breed
4. Stall feeding

Map 3: The Buxa Tiger Reserve



VI.1.2. Fuelwood collection

The average consumption of fuelwood per family is 3.6 tons. Fuelwood is for domestic purposes

Proposed Strategies:

1. Develop fuelwood plantations outside PA
2. Establish non-conventional sources of energy (biogas and solar)
3. Introduce fuelwood saving devices such as the smokeless chullahs
4. Increase sustainable access to fuelwood through JFM activities in the reserved forests in the Project Area
5. Support fuelwood plantations on private land
6. Ensure that the tea estates adjacent to the PA have their own fuelwood plantations

VI.1.3. Low agricultural productivity in the Project Area

Marginal and small farmers raise one monsoon crop and leave the land fallow after the harvest, mainly due to lack of irrigation facility.

Proposed Strategies:

1. Increase irrigation facilities by:

- locating tubewells and establishing pipelines to take care of irrigation

- minor irrigation schemes like impounding water in small streams and carrying water to upstream areas by lift irrigation

2. Increase productivity by providing agricultural inputs like seeds and fertilizers, encouraging use of bio-fertilizer and compost.

VI.1.4. Poaching

Poachers, mainly poaching herbivores, are active in the PA.

Proposed Strategies:

1. Induction of local tribals in anti-poaching squads

2. Development of anti-poaching camp sites

3. Soliciting the co-operation of surrounding communities in anti-poaching programmes

VI.1.5. Lack of NGOs in the Project Area

There are no NGOs in the vicinity of BTR to take on the ecodevelopment activities

Proposed Strategies:

1. Involve and prepare local community groups to take on most of the NGO tasks.

2. Persuade a well established NGO at State level to take on planning and implementing ecodevelopment activities in this area

VI.1.6. Crop damage

Mainly by Elephants

Proposed Strategies:

1. Crop protection measures, mainly electric fencing

2. Participative patrolling of fields

3. Crop insurance

VI.1.7. Lack of employment opportunities

Forestry work provided each Forest Village family 100 days of employment in the past. In 1983 forestry operations generated 5,94,000 person days of work as against only 2,77,500 person days of work in 1991

Proposed Strategies:

1. Increasing involvement of the local people in management and environment regeneration activities within the PA

2. Employment of local people in biomass regeneration and land improvement schemes in the adjacent areas
3. Establishing environmentally sustainable income generation activities.

VI.1.8. Extraction of Timber

With a number of Veneer factories being established near the BTR, timber poaching has assumed alarming proportions

Proposed Strategies:

1. Discourage wood demanding industries in the vicinity of the BTR
2. Acquire boats and train anti-poaching squads, involving the local people, to guard stream banks and thereby prevent smuggling of timber

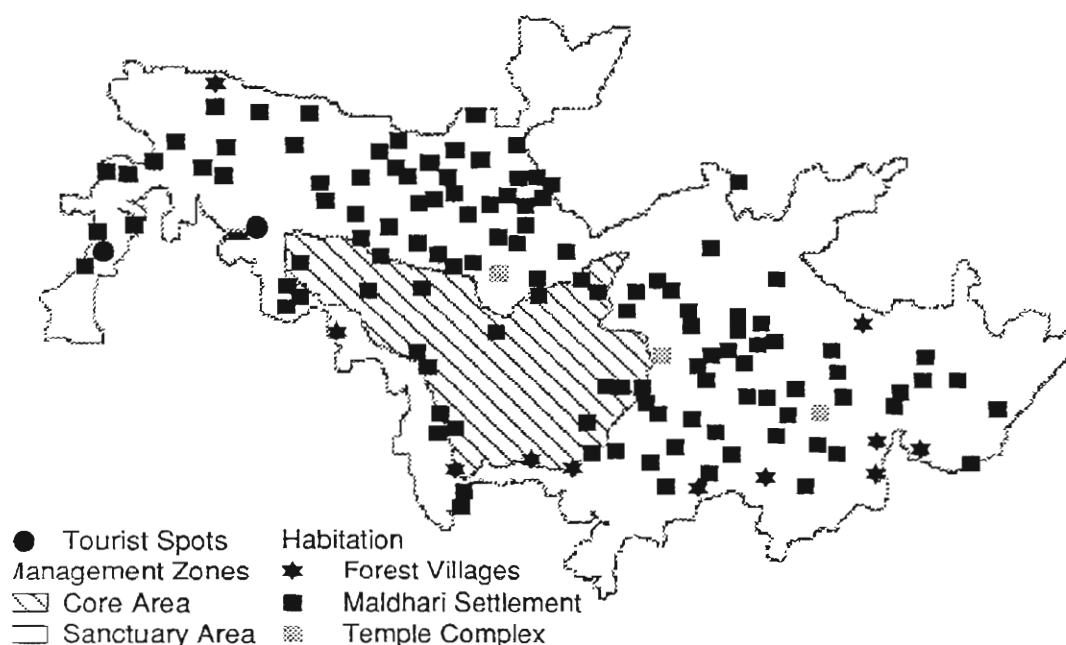
VI.1.9. Flooding

1. Floods needs to be properly studied to understand their ecology and the biotic interference which disturb the ecological balance
2. This study should be a joint venture of the West Bengal and Bhutan Governments

VI.2. GIR NATIONAL PARK

The entire area of Gir PA has now been declared a national park (7 July, 1993), though reportedly the legality of this is currently under judicial scrutiny. At present, there are 54 Maldhari nesses with 361 families, and 14 forest villages within the PA.

Map 4: The Gir Wildlife Sanctuary



There are also two temple complexes within the PA which have people living within. These complexes will either have to be excluded from the national park, by creating enclaves, or the people shifted out.

VI.2.1. Grazing

Grazing within PA: around 14,180 cattle from within PA and 94,582 cattle from the project area of 6 km

Proposed Strategies:

1. Grow fodder on village wastelands outside the PA
2. Supply grass from fireline to villagers
3. Improve cattle breed
4. Stall feeding
5. Alternate employment opportunities for the Maldharis

VI.2.2. Fuelwood collection

Fuelwood requirement in PA and project area: 1,54,050 kgs per day (56,228.25 metric tonnes annually)

Proposed Strategies:

1. Develop fuelwood plantations outside PA
2. Establish non-conventional sources of energy (biogas and solar)
3. Introduce fuelwood saving devices such as the smokeless chullahs
4. Provide alternate employment to headloaders
5. Support fuelwood plantations on private land

VI.2.3. Disturbance due to thoroughfares

Six roads, of approximately 100 km, passing through the PA and used by pilgrims, local inhabitants, and general buses

Proposed Strategies:

1. Restrict use by heavy vehicles
2. Divert bus routes outside PA
3. Restrict traffic at night
4. Provide shuttle service to local inhabitants and pilgrims (using battery vans if possible)

VI.2.4. Disturbance from the railway line

The noise and pollution from steam engines on the line disturb the animals and the habitat. The trains also, occasionally, run over animals

Proposed Strategies:

1. Alternate alignment for the railway line
2. In the interim, ban of steam engines and reduced speed within the park

VI.2.5. High Lion density

284 lions are living within 1412.13 sq km resulting in a density of one lion per five sq km (against a prescribed density of one Lion per 100 sq km)

Proposed Strategies:

Translocation to alternative habitats

VI.2.6. Livestock depredation by Lions

An estimated 800 heads of livestock killed within PA and 1700 in the adjacent area by Lions, annually (1979-1984 estimates). Currently 32% of Lion's prey is estimated to be livestock

Proposed Strategies:

1. Provision of adequate compensation for livestock kill or injury
2. Simplification of compensation procedures
3. Establish livestock protection measures in neighbouring villages.

VI.2.7. Declining ground water level

Proposed Strategies:

1. Soil and water conservation for enhancing recharge
2. Agricultural and other water use planning

VI.2.8. Water shortage in the adjacent areas

In the summer months, livestock from the neighboring areas to the PA come to the water holes within the PA

Proposed Strategy:

Development of water harvesting and conservation structures

VI.2.9. Crop damage

Mainly by Wild boar, Neelgai, Langur and Peafowl

Proposed Strategies:

1. Crop protection measures such as live fencing, trenches and other biological and mechanical devices
2. Participative patrolling of fields
3. Crop insurance

VI.2.10. Dependence on NTFP from within the PA for use and as a source of income

Especially Amla, Bor, Karamdi, Aritha, Honey, Bee's wax and many medicinal plants

Proposed Strategies:

1. Alternative income generation activities
2. Cultivation of NTFP species outside the PA

VI.2.11. Occurrence of fire

Summer fires occur, either accidentally ignited, often by the steam engine, or on purpose to facilitate the collection of NTFP

Proposed Strategies:

1. Banning steam engines
2. Alternate sites/sources for NTFP, or alternates to NTFP
3. Increased coverage of firelines
4. Construction of additional watchtowers
5. Involvement of local communities in fire prevention and combating

VI.2.12. Weed infestation

Lantana, *Neurocanthes spherostachys*

Proposed Strategies:

1. Weed eradication programmes
2. Manufacture of Lantana chipboard

VI.3. NAGARAHOLE NATIONAL PARK

The entire area of Nagarahole PA has now been declared a national park (May, 1992). At present, there are 54 tribal settlements with a total population of 6145 tribals within the PA. There is also a hotel complex within the PA.

VI.3.1. Grazing

Grazing within PA: estimated 27,000 cattle from the project area of 5 km

Proposed Strategies:

1. Grow fodder on village wastelands outside the PA
2. Supply grass from fireline to villagers
3. Improve cattle breed
4. Stall feeding
5. Alternate self-employment for cattle owners
6. Use of crop residue as fodder (straw of ragi and rice crops, cotton seed concentrate).

VI.3.2. Fuelwood collection

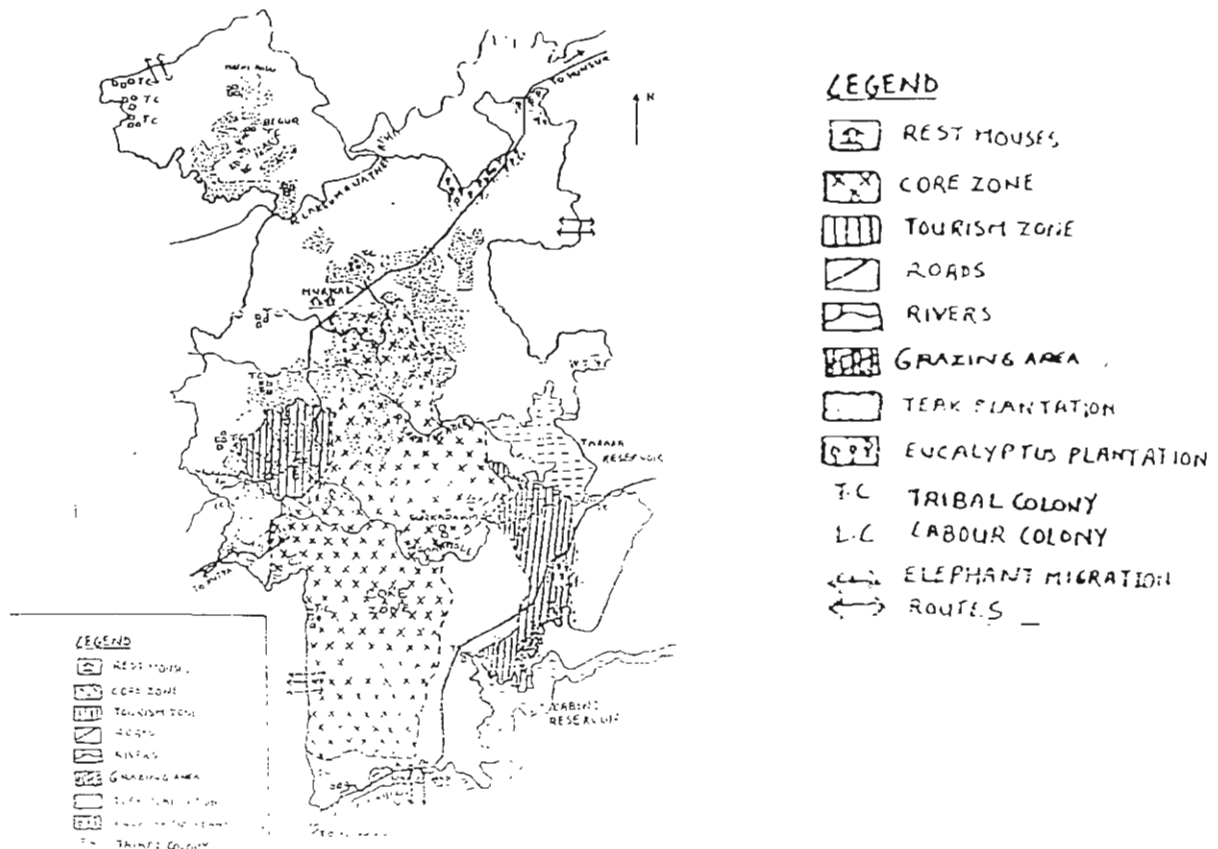
An estimated 500 people collect fuelwood from within the PA every day. The tobacco cultivators of adjacent areas encourage headloaders as they require firewood for curing the tobacco

Proposed Strategies:

1. Develop fuelwood plantations outside PA
2. Establish non-conventional sources of energy (biogas and solar)
3. Introduce fuelwood saving devices such as the smokeless chullahs

4. Provide alternate employment to headloaders
5. Support fuelwood plantations on private land
6. Insist that tobacco growers generate their own fuelwood
7. Restrict tobacco growing in the region
8. Supplement fuel supply by using crop residues like cotton and mulberry stalk

Map 5: The Nagarahole National Park



VI.3.2.3. Degradation of forests in the eastern fringe of the PA

Proposed Strategies:

1. Effective protection of the area by involving the local communities
2. Gap plantation, appropriate silvicultural practices, and soil and water conservation measures
3. Completion and maintenance of elephant proof trenches

VI.3.2.4. Poaching

Poachers, especially ivory poachers, are active in the PA.

Proposed Strategies:

1. Induction of local tribals in anti-poaching squads
2. Development of anti-poaching camp sites

3. Soliciting the co-operation of surrounding communities in anti-poaching programmes

VI.3.5. Disturbance due to additional tourist facilities

There is a hotel building complex within the PA which is reportedly being handed over to a private sector hotel group to run.

Proposed Strategies:

1. Banning of the takeover of the hotel building complex by hoteliers, and its conversion to an environmentally friendly tourist facility.
2. Prohibition on any new tourist building within the PA.

VI.3.6. Crop damage

Mainly by Elephants.

Proposed Strategies:

1. Crop protection measures, mainly Elephant proof trenches.
2. Where existing trenches are being filled in by villagers to allow their livestock to enter the PA, involvement of the local ecodevelopment committees in ensuring that this does not happen and suspension of compensation to defaulting villages.
3. Participative patrolling of fields/
4. Crop insurance/

VI.3.7. Lack of employment opportunities.

The closure of forestry operations within the forests of Nagarhole, after they became a national park, has significantly reduced the employment opportunities in the region. Also, the stopping of access to NWFP and fuelwood from the PA has reduced the livelihood opportunities of many of the landless and tribals.

Proposed Strategies:

1. Increasing involvement of the local people in management and environment regeneration activities within the PA.
2. Employment of local people in biomass regeneration and land improvement schemes in the adjacent areas.
3. Establishing environmentally sustainable income generation activities.

VI.3.8. Occurrence of fire

Summer fires occur, either accidentally ignited or on purpose to facilitate the collection of NTFP.

Proposed Strategies:

1. Alternate sites/sources for NTFP, or alternates to NTFP.
2. Increased coverage of firelines.
3. Construction of additional watchtowers.

4. Involvement of local communities in fire prevention and combating.

VI.4. PALAMAU TIGER RESERVE

An area of 1026 sq km comprising of Reserve forests, Khalsa Reserve forests, and Protected forests was declared as Palamau Tiger Reserve in 1974. 979.27 sq km out of 1026 sq km of the Reserve was declared as a Sanctuary in 1976. The Reserve has been divided into a core zone of 213 sq km and a buffer zone of 813 sq km. The buffer zone of the Reserve is divided into sanctuary and non sanctuary buffer. An area of 225.37 sq km covering the entire core zone and a part of the buffer zone has been included into the intended Betla National Park.

At present, there are 72 villages inside the Sanctuary, out of which 69 villages are geographically located within the Palamau Sanctuary, but are legally excluded. The remaining 3 villages are within the core zone/intended national park.

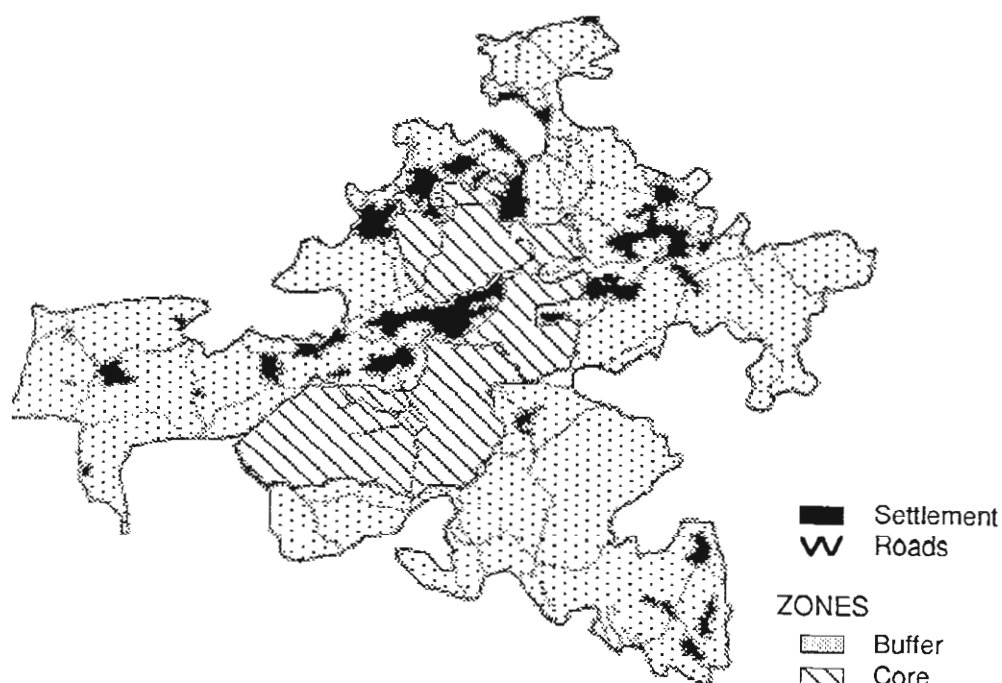
VI.4.1. Grazing

Grazing within PA: 43,000 cow units in the buffer zone; 30,000 cattle from in and around the reserve area graze in the buffer zone; 677 cattle from 3 villages in the core zone.

Proposed Strategies:

1. Controlled grazing in Sanctuary.
2. Replace cattle with other sources of income where ever possible.
3. Develop fodder plantations in villages with common lands.
4. Prohibit grazing in the core zone.

Map 6: The Palamau Tiger Reserve



VI.4.2. Fuelwood collection

Fuelwood requirement for each household is 60 quintals per annum. Hence, 53,500 tonnes of fuelwood is collected annually from within the buffer zone.

Proposed Strategies:

1. Planting of fuelwood species where wasteland land is available outside PA.
2. Establish non-conventional sources of energy (biogas and solar).
3. Introduce fuelwood saving devices such as the smokeless chullahs.
4. Joint Forest Management(JFM) in villages near the reserved forest outside the sanctuary.

VI.4.3. Regulation of Tourism

34,719 tourists visited the reserve in 1992 as number as 150-200 on peak days.

Proposed Strategies:

1. No increase in tourist facilities such as hotels, restaurants, etc.
2. No more than 5 vehicles at a time should enter the reserve.
3. Tourism to be handled by local people.

VI.4.4. Dual Control

Of 4 divisions, 3 are under the control of the territorial wing of the forest department.

Proposed Strategies:

Complete control over the entire reserve should be handed over to the wildlife wing of the forest department.

VI.4.5. Crop Damage

Main damage to crop is by elephants. Rs.4,368,00 was paid as crop compensation in 1990-91. Rs 100 per acre is paid as crop compensation.

Proposed Strategies:

1. Compensate crop damage adequately and, in the meantime reduce incidence by using measures listed below. Introduce crop insurance, if possible and necessary.
2. Provide crop protection measures such as elephant proof trenches/or fencing.
3. Increase number of crop watchers, especially local ones.

VI.4.6. Livestock Lifting

1991-92: 257 cattle killed, Rs 1,77,300 compensation paid.

1992-93: 287 cattle killed, Rs 2,27,325 compensation paid.

Compensation (80% of market price) paid only inside reserve.

Proposed Strategy:

Compensation for livestock killed outside the reserve.

VI.4.7. Illegal Activities

These include: poaching of ungulates in the periphery area, encroachment on reserve forests, illegal felling of timber.

Proposed Strategies:

1. Involve local people in management and protection of the reserve.
2. Training and motivation of the staff.

VI.4.8. Dependence on NTFP from within the PA for use and as a source of income

Collection of Kendu, Mahulam leaves and sal seeds. 100 tonnes of Mahulam leaves removed annually. 500 metric tonnes of sal seeds removed annually.

80,000 ha is exploited for NTFP collection.

Proposed Strategies:

1. Alternative income generation activities.
2. Cultivation of certain species, outside the PA.

VI.4.9. Occurrence of fire accidentally and intentionally caused

Intentional fires aimed at creating a demand for labour and for regeneration of grass for grazing.

1992: 11.82 sq. km of core, 5.48 sq. km of buffer

1993: 3.09 sq km of core, 6.04 sq.km of buffer

1.29% of reserve is affected annually.

Proposed Strategies:

1. Maintenance of firelines.
2. Provide alternative sources of wage labour.
3. Restrict grazing to the level that is sustainable without seasonal burning.

VI.4.10. Forest Working

Bamboo forests are exploited by a government agency. On an average an area of 250 sq km of the sanctuary is exploited for bamboo and 10,000 tonnes of bamboo are removed year.

Proposed Strategy:

The only option is to stop this practice, as it is in violation of the law.

VI.4.11. Weed infestation

Lantana camara and *Flemingia chapperi*.

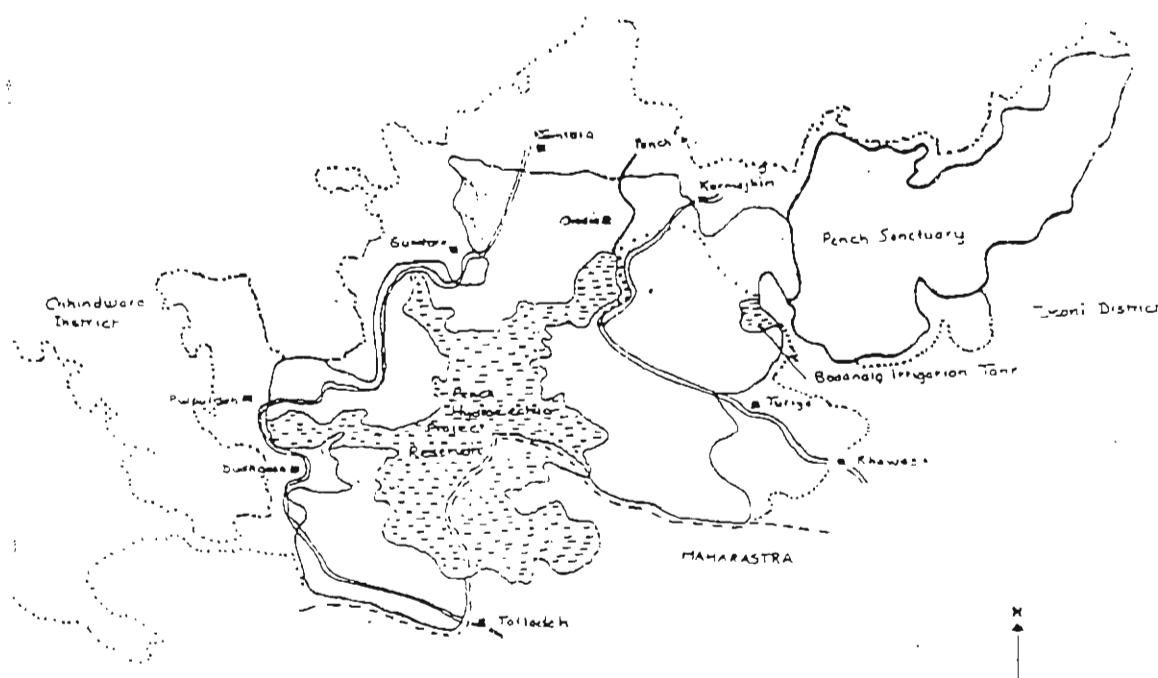
1. Uprooting of weeds, also providing local employment.
2. Manufacture of Lantana chipboard and baskets.

VI.5. PENCH TIGER RESERVE

The Pench Tiger Reserve comprises of intended national park (292.85 sq. km), sanctuary (156.542 sq. km), and 308.508 reserved and protected forests. The project area is calculated as the area falling within a ten kilometer radius of the sanctuary and intended national park component of the reserve, much of which is, therefore, within the reserve, especially in the western side.

The reserve contains, within its boundaries, 75% of the reservoir of the Pench Hydroelectric Project. The boundary of the reserve is contiguous with the boundary of the State of Maharashtra, along the south. Across the Maharashtra border is the Pandit Jawahar Lal Nehru National Park. The remaining part of the reservoir falls within this park in Maharashtra, and fishing is currently being allowed there. Also, there are villages in Maharashtra which impact on Pench Tiger Reserve and, consequently, need to be covered under the ecodevelopment project.

Map 7: The Pench Tiger Reserve



VI.5.1. Grazing

Grazing within PA: 8,000 cattle from the adjacent area of 5 km; 6250 ha in Chhindwara district and 1252.4 ha in Seoni district of the PA have been opened for grazing.

Proposed Strategies:

1. Grow fodder on village wastelands outside the PA.
2. Supply grass from fireline to villagers.
3. Improve cattle breed.
4. Stall feeding.

5. Alternate self-employment for cattle owners.
6. Allow sustainable grazing within the already opened compartments in the PA.

VI.5.2. Fuelwood collection

Majority of the people adjacent to the PA are dependent on the PA for fuelwood. Headloads and cartloads are removed.

Proposed Strategies:

1. Develop fuelwood plantations outside PA.
2. Establish non-conventional sources of energy (biogas and solar).
3. Introduce fuelwood saving devices such as the smokeless chullahs.
4. Provide alternate employment to headloaders.
5. Support fuelwood plantations on private land.

VI.5.3. Disturbance due to thoroughfares

The Totladoh to Guntara road which passes through the PA is used daily by the villagers resulting in disturbance to wildlife. Due to no alternative roads being available, forest roads are used in the Chhindwara district of the PA by villagers to get to markets.

Proposed Strategies:

1. Construction of an alternate road from Totladoh to Guntara.
2. Restrict traffic at night.

VI.5.4. Fishing within the Pench Hydroelectric Project (PHEP) reservoir

Fishing is carried out in the Maharashtra area of the reservoir. As there is no dividing line within the reservoir, fishermen often fish in the MP portion of the reservoir.

Proposed Strategies:

1. The dividing boundary between the states in the reservoir should be demarcated with buoys or pillars.
2. The reservoir should be policed, using local people and their institutional structures.

VI.5.5. Control of Bodanala Tank

The Bodanala tank is under the control of the irrigation department. People in the villages adjacent to this area fish in the tank illegally. As the forest department has no control over this area, it becomes difficult to control the illegal fishing.

Proposed Strategies:

1. The tank should be brought under the forest department control.
2. Alternate income generating activities for the people who are fishing in the area.

VI.5.6. Working of a Stone Quarry

A stone quarry of 1.62 ha was sanctioned by the Central Government in 1983 to be worked until March 1992. The PHEP has applied for renewal for working of the quarry.

Proposed Strategy:

As quarrying within national parks and sanctuaries is illegal, alternate sites need to be found outside the PA.

VI.5.7. Shortage of water for irrigation and drinking in areas adjacent to the PA

Proposed Strategies:

1. Harvesting of water for irrigation and drinking purposes within the sustainability of ground water resources.
2. Agricultural and other water use planning.

VI.5.8. Water shortage in the adjacent areas

In the summer months, livestock from the neighboring areas to the PA come to the water holes within the PA.

Proposed Strategy:

Development of water harvesting and conservation structures.

VI.5.9. Crop damage

Mainly by Wild boar, Neelgai, and Chital.

Proposed Strategies:

1. Crop protection measures such as live fencing and other biological and mechanical devices.
2. Participative patrolling of fields.

VI.5.10. Dependence on NTFP from within the PA for use and as a source of income

Especially Mahua, Mahul bel, Chironji, Tendu, Stercula gum, shed antlers, honey and Bee's wax.

Proposed Strategies:

1. Alternative income generation activities.
2. Cultivation of NTFP species outside the PA.
3. Initiate beekeeping to provide an alternate source of honey and bees wax.

VI.5.11. Occurrence of fire

500 ha are burnt annually. Summer fires occur, either accidentally ignited, or on purpose to facilitate the collection of NTFP, antlers and honey. Often the fisherfolk start the fires to divert the attention of the forest department.

Proposed Strategies:

1. Alternate sites for NTFP, or alternates to NTFP.
2. Provide alternate sources of income to people dependent on antler collection and to fisherfolk.
3. Increased coverage of firelines.
4. Construction of additional watchtowers.
5. Involvement of local communities in fire prevention and combating.

VI.5.12. Proposed new tourist entry point

A new entry point has been proposed at Totladoh. Totladoh is near the PHEP reservoir and entry of tourists at this point would cause disturbance to wildlife.

Proposed Strategy:

Develop a management plan which clearly outlines the tourist entry points, zones and activities for the PA, based on the ecological requirements.

VI.5.13. Antler collection within the PA.

Shed antlers are collected from within the PA and sold. Often fires are started to distract the attention of the forest department.

Proposed Strategy:

Provide alternative employment generation activities for the people dependent on antler collection for an income.

VI.5.14. Degradation of forest land

Proposed Strategies:

1. Initiate soil and water conservation projects for the regeneration of degraded areas.
2. Plantation of degraded areas.

VI.5.15. Inadequate employment opportunities

90% of the people in the project area are tribals who have small landholdings. They grow only one crop in a year and are underemployed for 4 to 8 months of the year.

Proposed Strategy:

Provide alternate employment generation activities.

VI.5.16. Weed infestation

Lantana, *Parthenium* and *Xanthium*

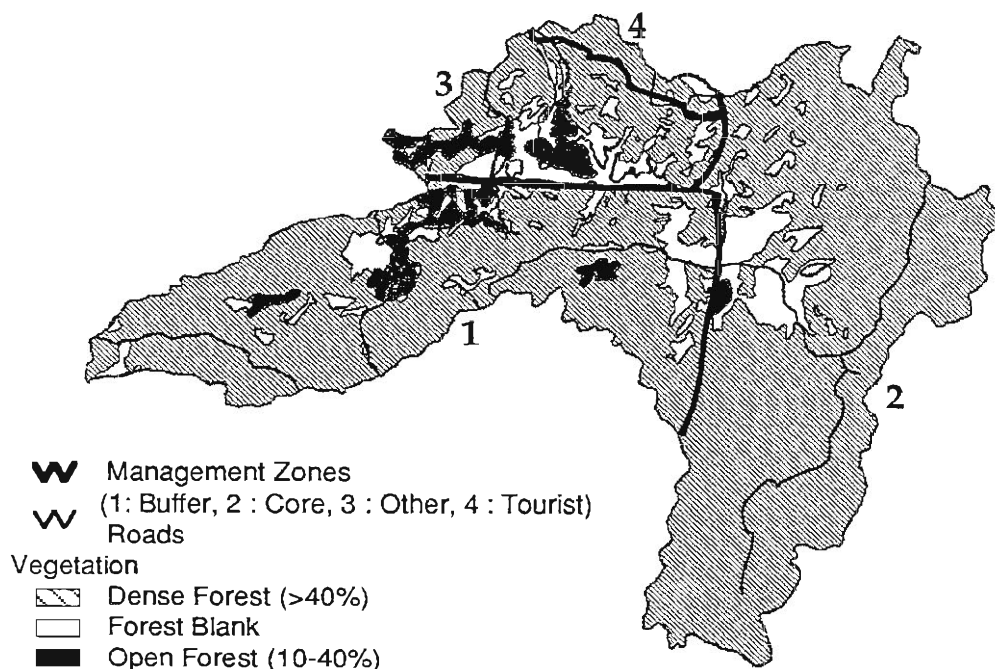
Proposed Strategies:

1. Weed eradication programmes.
2. Manufacture of Lantana chipboard.

VI.6. PERIYAR TIGER RESERVE

The Periyar Tiger Reserve (777 sq km) comprises of a core zone, which is an intended national park (350 sq km), a buffer zone (377 sq km) and a tourism zone (50 sq km), both of which are a part of the Periyar Sanctuary.

Map 8: The Periyar Tiger Reserve



VI.6.1. Grazing

2000 Cattle graze within the PA

Proposed Strategies:

1. Allow grazing in the buffer zone of the PTR.
2. Purchase land outside for fodder plantations.
3. Upgradation of local cattle breeds.

VI.6.2. Fuelwood collection

Collected by people living within the PTR and by people living in adjacent areas for own use and as a source of income.

Proposed Strategies:

1. Establish non-conventional sources of energy (biogas and solar).
2. Introduce fuelwood saving devices such as the smokeless chullahs.
3. Provide alternate income generation activities.
4. Consider buying land outside the PTR for fuelwood plantations.
5. Make cooking gas available to populations living in the periphery.

VI.6.3. Presence of Government Agencies

KTDC hotels and boats in the tourism zone. PWD rest houses in PTR. PA authorities have no control over them.

Proposed Strategy:

Control of the KTDC and PWD establishments should be handed over to the PA authorities.

VI.6.4. Management of Tourism

3,50,000 exert a direct pressure on the PTR.

Hotels use fuelwood for cooking.

Proposed Strategy:

Ensure a regular supply of LPG cylinders to hotels around PTR and ban the use of fuelwood in the restaurants.

VI.6.5. Ganja Cultivation

Plots are reportedly located in the remote parts of the core zone.

Proposed Strategies:

1. Stringent policing of the vulnerable areas, with the cooperation of the local people who must also be involved in the policing activities.
2. Aerial survey of core zone should be carried out along with infrared photography.

VI.6.6. Timber Extraction

Extraction of wood for Hindustan Newsprints Co. Ltd (HNCL).

Eucalyptus plantations, started in the 1960's are being harvested now.

Proposed Strategies:

1. Disallow extraction of timber for HNCL.
2. Remove all Eucalyptus trees from PTR and allow the natural grasslands to regenerate.

VI.6.7. Rationalisation of Boundaries

Proposed Strategy:

Boundaries of PTR should be rationalised so that as its status as an area of biodiversity is improved.

VI.6.8. Dependence on NTFP from within the PA for use and as a source of income

Cinnamon bark, Thelli powder (*Canarium strictum*), honey etc.

Proposed Strategies:

1. Alternative income generation activities.
2. Cultivation of certain species of NTFP outside the PA.

VI.6.9. Occurrence of fire

Caused by people who come into the park for NTFP collection.

Proposed Strategies:

1. Local people should be employed as fire watchers during the fire season.
2. NTFP collection should be minimised.

VI.6.10. Staff

Number of staff is inadequate, and the staff is inadequately trained.

Proposed Strategies:

1. Training of staff.
2. Additional posts should be sanctioned for the ecodevelopment work.

VI.6.11. Weed infestation

Lantana camara

Proposed Strategies:

1. Weed eradication programmes.
2. Manufacture of Lantana chipboard.

VI.7. RANTHAMBHORE TIGER RESERVE

The core area of Ranthambhore Tiger Reserve was declared a national park on 1/11/1980 and the area is 274.5 sq. km. It has a sanctuary area of 118 sq. km around it forming the buffer. Currently, the Kailadevi Sanctuary and Sawai Mansingh Sanctuary have been added to this area to form the Ranthambhore Tiger Reserve (RTR). There are 4 villages within the National Park area of the RTR.

VI.7.1. Grazing

Grazing within PA: approximately 1.5 lakh migratory sheep enter the reserve during the monsoon and winter. This is in addition to the regular grazing by the cattle of the project area.

Proposed Strategies:

1. Grow fodder on village wastelands outside the PA.
2. Supply grass from fireline to villagers.
3. Improve cattle breed.
4. Stall feeding.
5. Alternate self-employment for cattle owners.
6. Alternate closures in sanctuary area.
7. Fodder plantations in private lands.

VI.7.2. Fuelwood collection

A large amount of fuel wood collected by people living in and around the RTR.

Proposed Strategies:

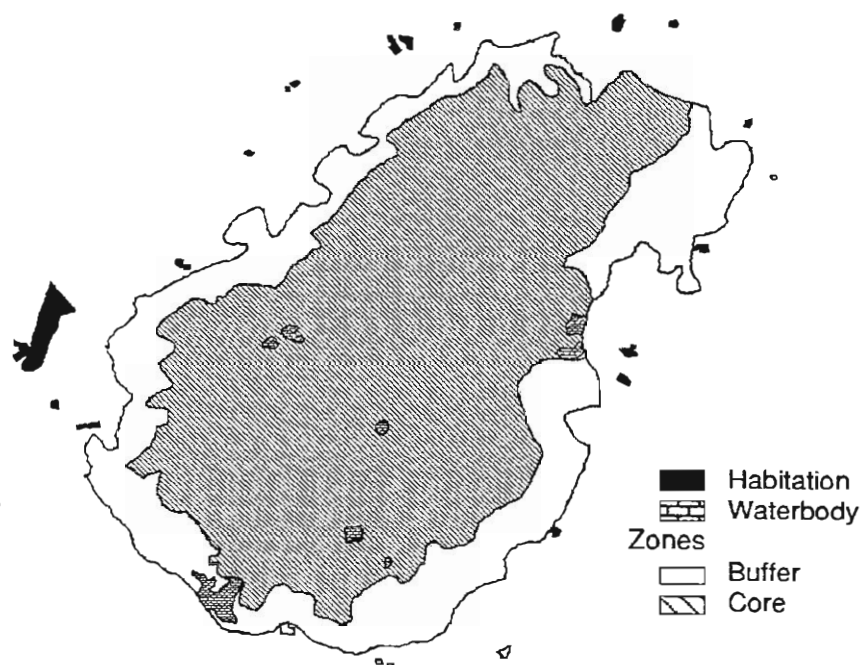
1. Develop fuelwood plantations outside PA.
2. Establish non-conventional sources of energy (biogas and solar).
3. Introduce fuelwood saving devices such as the smokeless chullahs.
4. Provide alternate employment to headloaders.
5. Support fuelwood plantations on private land.

VI.7.3. Degradation of forests in the eastern fringe of the PA

Proposed Strategies:

1. Effective protection of the area by involving the local communities.
2. Gap plantation and soil and water conservation measures.

Map 9: The Ranthambore Tiger Reserve



VI.7.4. Poaching

Poachers, especially the Moghyar, are active in the PA.

Proposed Strategies:

1. Induction of local tribals in anti-poaching squads.
2. Development of anti-poaching camp sites.
3. Soliciting the co-operation of surrounding communities in anti-poaching programmes.
4. Developing alternate employment opportunities for the Moghyar tribals.

VI.7.5. Disturbance due to tourism

There has been an enormous increase in tourist traffic. It is confined to the core area of the PA.

1. Make tourism activity eco-sensitive.
2. Develop suitable tourism spots in other areas of RTR to reduce tourist concentration in core area.

VI.7.6. Crop damage

Mainly by Wild boar and Nilgai.

Proposed Strategies:

1. Crop protection measures, such as electric fences, trenches, stone walls, live fencing, etc.
2. Participative patrolling of fields.

VI.7.7. Lack of employment opportunities

The stopping of access to NWFP and fuelwood from the PA has reduced earning opportunities of many of the landless and tribals. Because of the National Park large scale industries such as cement plants are not allowed to be set up in the area, also reducing local employment opportunities.

Proposed Strategies:

1. Increasing involvement of the local people in management and environment regeneration activities within the PA.
2. Employ local people in biomass regeneration and land improvement schemes in the adjacent areas.
3. Establish environmentally sustainable income generation activities (listed separately).

VI.7.8. Lowering of water table and land degradation

Proposed Strategies:

1. Run off to be stored for irrigation purposes.
2. Repair existing tanks and construct new ones.
3. Water and soil conservation techniques to be introduced.

VI.7.9. Lack of proper infrastructure for staff

Staff posted in remote areas need proper shelters and drinking water facilities. Their families require housing and other infrastructure at headquarters.

Proposed Strategy:

Provide staff shelters and drinking water facility.

VI.7.10. Disturbances due to pilgrims

Pilgrims visit the Ganesh temple within the national park, and the Kailadevi temple within Kailadevi sanctuary.

Proposed Strategy:

Awareness programmes to be introduced for pilgrims on the value of the forest.

VI.8. SIMILIPAL TIGER RESERVE

The Similipal Tiger Reserve (STR) comprises of the intended Similipal National Park 845.7 sq km, Similipal Sanctuary 1354.3 sq km, and revenue land 550 sq km.

There are 65 revenue villages with 8643 people (85 with 8574 people, according to the District Census Handbook, 1981) situated within STR, of which 4 are located in the intended national park. The majority of the population living inside STR is tribal.

VI.8.1. Akhand Shikar

Groups of tribals (upto 500 people), locals, as well as from Bihar and Bengal, carry out ritual hunting of animals in the month of April every year.

Proposed Strategy:

Based on a proper understanding of the reasons, especially the socio-economic basis, for 'Akhand shikar', involve the tribal communities in a dialogue with the purpose of discontinuing the practice.

VI.8.2. Stone Quarries

There are some soft stone quarries located near the northern boundary of STR, within the PA.

Proposed Strategy:

Alternate quarry sites should be found where there is no disturbance to the PA.

VI.8.3. Grazing

Grazing within the PA: Approximately 50,000 livestock graze in the Reserve. Cattle from upto a distance of 5-7 km from the Reserve boundary graze inside. Grazing takes place in the core as well as in the buffer zone.

Proposed Strategies:

1. Encourage stall feeding of cattle, along with raising of fodder plantations in village common lands, wastelands, or available forest lands. In addition, try and convince people to go in for better breeds of cattle.

2. Identify and develop alternate grazing grounds, outside the PA for cattle grazing inside the core zone.

3. In case the purpose for keeping cattle is to earn cash, then alternate income generating activities acceptable to the people can be identified.

VI.8.4. Fuelwood Collection

Hundred cycle loads of wood are removed daily from the Reserve. Fuelwood is collected for sale as well as for domestic use.

Proposed Strategies:

1. Provide alternate income generation activities for those people who are dependent on fuelwood collection as their livelihood.
2. Establish fuelwood plantations on available land outside the PA.
3. Provide alternate energy sources.

VI.8.5. Timber and NWFP Collection

Five hundred people are engaged in NWFP collection daily for their own use as well as for sale.

Proposed Strategies:

1. Provide alternate income generation activities.
2. Develop alternative small timber plantations.

VI.8.6. Forest Fires

Between 1991 to 1993, 91.20 sq km of forest was burnt.

Proposed Strategies:

1. Maintain firelines.
2. Employ local people as fire watchers.
3. Additional fire watch towers should be constructed.

VI.8.7. Encroachment of forest land

Forest land within STR is encroached by local people for agriculture.

Proposed Strategies:

1. Demarcate forest land/boundary of STR.
2. More effective patrolling.

VI.8.8. Inadequate Staff

There is a felt need for additional staff, especially women.

Proposed Strategy:

Employ additional people on daily wages and also women as Guards, Rangers, etc.

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