

STATUS REPORT ON RHINO CONSERVATION AND ACTION PLAN FOR WEST BENGAL

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1. INTRODUCTION

- 1.1. The Great Indian one-horned (*Rhinoceros unicornis*) was once upon a time distributed over large areas of gangetic flood plains of West Bengal. The Asiatic two-horned Sumatran rhino, which was smaller in size and inhabited dense forests in the foothills of North Bengal became extinct in the early twenties of this century. The Javan Rhino or *R. sondaicus* were also found in parts, of the then Bengal but this spp. also became extinct in late nineteenth century. the only surviving spp. of Asian Rhino in W. Bengal is *R. unicornis* which is at present confined only in two Protected Areas(P.A.) of the state, namely Gorumara National Park and Jaldapara Sanctuary.
- 1.2. Jaldapara was first notified as a sanctuary in 1940 under Indian Forest Act, 1927, which was subsequently notified as a wildlife sanctuary in 1976 (115 km²) under WL Protection Act 1972. The area of the sanctuary was further increased to 216 km² by a final notification In 1998. Similarly, Gorumara which was constituted as a wildlife sanctuary as early as 1940, was notified as Sanctuary over 8 km² during 1976 and later upgraded to the status of National Park during 1994 with a much larger forest area of 88 sq. km.
- 1.3. The distribution of rhino in North Bengal used to extend up to Buxa forests even up to 1950s. However, with the gradual loss of corridors between the grassland forests and conversion of the P.A.s into isolated, island habitats surrounded by the Tea gardens, habitations and agriculture, the species became restricted to these two P.A.s and survived because of extreme degree of protection it received over the last two decades.
- 1.4. The population of rhino in W. Bengal has seen a wide fluctuation during the last few decades, as will be evident from the following figure:

Year	Population
1964	72+
1975	23+
1978	19+
1980	32
1985	22
1989	39
1992	44
1996	57
1998	68

- 1.5. The reason for fast dwindling of population up to 1985 was the increased degree of poaching for rhino horn, lack of appropriate protection machinery, political unrest during transition phase and gradual loss of rhino habitat. From mid-eighties, when political stability showed up and there was

increased awareness at all levels towards environment conservation, did the decreasing trend of rhino population get reversed. Intensified protection efforts, coupled with devotion and sacrifices on the part of P.A. management and staff, saved the small population of 14 rhinos in Jaldapara and 8 in Gorumara from extinction.

2. PROBLEMS IN RHINO CONSERVATION

The problems can be identified as follows:-

- 2.1. Poaching of rhinos- Poaching was most intense in the sanctuary between 1960s and 1985 which had brought down the population to almost threshold level. The incidences of poaching was again far greater in Jaldapara as compared to Gorumara. The problem with Jaldapara is that it is having an international border with Bhutan as well as is situated very close to Buxa Tiger Reserve which is adjoining Assam. International and national-level mafia are very active in and around the boundaries. Till the eighties, poaching used to be carried out mostly using long-range rifles whereas the recent trend in Jaldapara appears to be poisoning using the pesticide "Thiaden" which finds extensive use in agriculture and tea gardens. Such attempts in poaching the rhinos through poisoning has been recorded at least once in Jaldapara during March 96.
- 2.2. The weaknesses faced by the Forest Department in controlling poaching can be identified as follows:
 - 1) Large interface between sanctuary and the revenue villages due to irregular shape of the sanctuary.
 - 2) Close proximity of the international borders with Bhutan and Bangladesh.
 - 3) Lack of sufficient trained and competent patrolling staff.
 - 4) Lack of sophisticated fire arms.
 - 5) Insufficiency of patrolling elephants.
 - 6) Lack of coordination amongst various enforcement agencies.
 - 7) Lack of intelligence gathering mechanism at departmental level.
 - 8) Terrorist activities in neighbouring regions.
 - 9) Easy availability of pesticides, used in adjoining agriculture and tea gardens, which is increasingly being used for poisoning.
 - 10) Lack of employment opportunities in fringe villages, making poor people succumb to mafia activities.
- 2.3. Grazing of cattle from fringe villages in the periphery of P.A.-It exposes the rhino population to epidemics of cattle-borne diseases.
- 2.4. Advancement of woody spp. into grassland through succession process- The pioneer spp. like Simul, Sissoo, Sidha, Siris etc spread into the grassland since most of the natural grassland do not get periodically flooded because of topography change and results into loss of forage base for rhino.
- 2.5. Extension of weeds like Lemon grasses, *Leea* spp etc., into drier grasslands is another serious problem in maintaining grassland habitat of rhino.
- 2.6. Uncontrolled fire, set in by the cattle-grazers and by the fringe villagers to facilitate collection of Simul floss, adversely affect the spatial distribution of rhino population sometimes forcing them towards the boundary and exposing them to risk of poaching.
- 2.7. The past forestry practises, in which some of the prime grasslands then considered as commercially low-value, had been raised with high-value tree spp which resulted in shrinkage of rhino habitat. This was particularly relevant in case of Gorumara.

- 2.9. The present population of 50 rhinos (approx.) in Jaldapara has been built up from a small population of around 14 in 1985. This may lead to genetic depression low fertility and disease epidemic due to repeated inbreeding in a small population.

3 STATUS OF RHINO PROTECTION

With the transfer of Jaldapara Sanctuary under the administrative control of Wildlife Wing and with increased political stability in the state, poaching incidences started coming down gradually. Installation of R.T. network, supply of .315 Rifles and intensification of protection efforts through a band of dedicated staff helped in increased population trend. Between Jan 94 and Jan 99, there has been only one instance of death of a female due to poisoning (horn was intact) and another instance where the horn of a young male was removed by local miscreants after the animal was found lying dead in the river bed and spotted first by the villagers. The missing horn could be ultimately recovered by the sanctuary staff. In Gorumara, there has been no incidence of poaching during last five years.

4. BUDGET

At the current level, an average of Rs 100 lakh is spent under Non-Plan for recurrent expenses and Rs 10 lakh under Plan fund of the State Govt. for Jaldapara. For Gorumara, these figures are Rs 25 lakh and Rs 5 lakh respectively. G.O.I. assistance in Plan sector for development activities are Rs 30 lakh for Jaldapara and Rs 20 lakh for Gorumara.

5. WILD ANIMAL HEALTH

West Bengal is one of the leading states in the country which has a commendable record in chemical capture of rhino for treatment of the injured animals.

6. ECO-DEVELOPMENT ACTIVITIES

Out of the two P.A.s having rhino population in the state, Jaldapara Sanctuary is having tremendous pressure from the adjoining fringe population. There are more than thirty revenue/forest villages, having a population around 75000. In case of Gorumara, the biotic pressure is much less. Since protection aspect in these habitats cannot be considered in isolation from the fringe people, the Park managers resorted to participatory management with active support from the fringe population. Eco-development activities were initiated in right earnest from 1990 onwards which aimed at not only reduction of pressure on P.A. through creation of employment opportunities, but also to strengthen information network to prevent poaching.

CURRENT STRATEGIES FOR CONSERVATION OF RHINO IN P.A.s

1 ZONATION AND ZONE PLANS

Before we discuss specific strategies, we adopt the broad strategy of creating 3 zones for dividing the entire sanctuary into 3 management zones. This is necessary in order to ensure that some of the strategies of management, which are mutually exclusive, are well separated in the spatial frame and other strategies which are mutually compatible may be implemented in the overlapping zones. Clear identification of such zones in the sanctuary help in simplifying operations by the field level staff and reducing possibility of skewed achievement of certain objectives at the cost of other. For this purpose, the National Park or Sanctuary should be delineated into following 3 zones.

- 1) **Wilderness Zone:-** The forest in this zone should be so managed as to retain them in their pristine status and the interference, for development in this zone should be minimum. The managerial interference, here would only be protection oriented and the habitat should be regularly monitored. This zone will primarily act as biodiversity conservation zone.
- 2) **Habitat Improvement Zone:-** Active managerial intervention, including habitat manipulation, will be carried out in this zone for development of the forest area as ideal rhino and other wildlife habitat.
- 3) **Eco-tourism Zone:-** This will be a zone which may be partly overlapping with both the above zones.

2. STRATEGY FOR CONSERVATION OF BIODIVERSITY AND CONTROL OF POACHING OF RHINO.

2.1 Conservation of biodiversity.

The wilderness zone, with no habitat manipulation activities and no outside interference, will be maintained primarily for the conservation of biodiversity, and to represent all the bio-geographic sub-zones of this sanctuary. Both the P.A.s lie in the bio-geographical zone (7b Lower Gangetic plain) as per classification of Rodgers and Panwar, 1988.

2.2 Control of poaching of rhino and other species and illicit felling of timber.

To achieve the above objective, the strategy will be mainly building up protection network, developing infrastructure for better implementation of the rules and regulations, building up information network and building other State Plan Schemes.

However, there is problem of procurement of cartridges as these are normally supplied from ammunition factory at Khadki, Pune and such supplies are not forthcoming.

In order to ensure security of the Range Officers, Asstt. Wildlife Warden and the DFO at the time of undercover operations for apprehending the smuggling gangs, it is proposed that small arms (revolvers) be provided to them for which there may be already provision under the existing Forest Manual. If, however, it needs special permission under the Arms Act, the same has to be processed and approval sought.

2.3 Strengthening wireless network.

The erstwhile Jaldapara Wildlife Sanctuary, comprising an area of 116 km². is having a well connected wireless network of frequency 71.65 MHz. which is different from VHF frequency of Northern Circle (159.90 MHz). All the Range Headquarters, Beats and most of the camps are provided with either fixed stations or mobile phones or Walkie-Talkies. The newly added area of the sanctuary, which was under the control of Divisional Forest Officer, Coochbehar Division earlier, but is at present under unified control is having a different RT frequency (belonging to Northern Circle). In case of Gorumara N.P., the R.T. Network, which has the frequency of 159.900 MHz is in the initial stage of expansion.

2.6 Establishment of intelligence network for collecting information and provision of secret fund.

The success of any protection job depends on the quality of information gathered by the management. At present the Asstt. Wildlife Warden, the Range Officers and Beat Officers collect information through their personal level networks and informers. Since there is no such mechanism in the Forest Deptt. for collection of information professionally, in most of the cases

the information collection system becomes highly personalised and its effectiveness depends upon the initiative taken by the official concerned.

The mechanism of information gathering can become effective only when there is a specific provision for the same under the rules and when there is provision to buy information. Like in the Police, Customs, BSF and other enforcement agencies, Forest Deptt. should also have provision for operating a secret fund by the Divisional Forest Officer to facilitate purchasing information regularly from the informers. The secret fund will be operated by the Divisional Forest Officer and vouchers for any payment made by the Divisional Forest Officer from this fund will not be sent to AG, West Bengal along with the accounts in normal course. Only an abstract voucher indicating the amount disbursed will accompany the accounts. This is required in order to maintain the secrecy of the source of information and to safeguard the lives of the persons supplying information. The power of Divisional Forest Officer to operate such secret fund may be kept restricted to Rs.50,000/- per year and the original vouchers will be retained by the Divisional Forest Officer confidentially which may be subject to audit verification on specific request.

Similarly, the system of paying rewards to informers for providing valuable information which has led to seizures/confiscation of illegal wildlife products and arrest of persons involved in such illegal activities, will facilitate the flow of valuable information from the fields/villages and other sources to the sanctuary managers.

2.7 Coordination amongst various law enforcement agencies.

Since poaching is always associated with the inter-state and/or international smuggling of the poached product, a regular coordination between various enforcement agencies like BSF, Railway Police, Customs, Director of Revenue, Intelligence, Police etc. is a must to control poaching and illegal trade of wildlife products. For this purpose a coordinating body comprising the Divisional Forest Officer, Asst. Wildlife Warden and representatives of various enforcement agencies should be constituted. The Divisional Forest Officer will be the convenor of such coordinating body and the coordination meetings will be held at least once in, every 6 month for sharing of vital information and to ensure further coordination amongst the field level staff working in the field level.

2.8 Incentive and rewards to staff.

At present, there is a provision for reward under the existing Forest Manual but the same is not sufficient to tackle the menace of poaching in the present day context.

A proposal had been submitted by the Chief Wildlife Warden, West Bengal for grant of rewards and the same is at present lying in the forest Dept., Govt. of West Bengal for approval. An immediate sanction of the scheme is required to ensure speedy flow of information on poaching/poachers and also to motivate the staff in taking risks while apprehending offenders.

2.9 Publicity, nature education and awareness generation.

Dissemination of information on the objectives of management of the sanctuary to the local people as well as to all others is extremely important towards the efforts of conservation of biodiversity and prevention of poaching. Such publicity and awareness generation can be achieved through the following means:-

- 1) Through three well equipped nature interpretation centers at Madarihat, Kunjanagar and Lataguri.
- 2) Installation of hoardings at strategic points on the National and State Highways.
- 3) Circulating, free of cost as well as at cost, leaflets and brochures to the visitors and local people, highlighting the importance and activities of the sanctuary.

- 4) Organising regular relevant film shows in the fringe villages.
- 5) Releasing advertisement on the sanctuary through audiovisual media like TV, radio, cinemas, newspapers and magazines.
- 6) Organising regular camps of school children and college students in the sanctuary from the urban as well as rural areas.
- 7) Setting up of Multi-Media System for interactive education in the Interpretation Center.

3 STRATEGY FOR CONSERVATION AND SUSTAINABLE GROWTH OF RHINO AND OTHER WILD LIFE POPULATION.

3.1 Habitat improvement.

Jaldapara Wildlife Sanctuary and Gorumara N.P. are the only two rhino habitats of the State and the great Indian one-horned rhinoceros is the key-stone species of these P.A.s. The other associated species of the P.A.s are elephants, gaur, tiger (only in Jaldapara), different species of deer, wild boar and a large number of species of birds, reptiles amphibians and insects. Hence any habitat development activity should primarily aim at developing the habitat of rhino while, at the same time, preserving the habitat and food-base of other species as well. Since the food chain in any ecosystem is highly complicated and any large scale manipulation of the ecosystem may set in an irreversible process of degradation, one has to be extremely careful while carrying out habitat manipulation activities for the purpose of development.

3.2 While undertaking habitat development works, the activities should remain confined within the following premises :-

- 1) Wherever habitat manipulation activities are being taken up, some control plots should be laid out for future monitoring of the effects, of such manipulations.
- 2) No exotic tree fodder species should be introduced.
- 3) The focus of habitat development should be aimed towards expanding the habitat and fodder base of rhino.
- 4) Take up habitat development works which will also help in improving the habitat of other species without generating interspecies contest.
- 5) Maintain special habitats like snag, den trees, caves, overhangs etc. for other species.

3.3 Overwood Removal and Fodder Plantation.

Since rhinos prefer riverine grassland and savannah grassland for food and shelter, controlling the invasion of grassland by the pioneer tree species is an important strategy for development of rhino habitat. Since the sanctuary has a comparatively small area as ideal rhino habitat and since the rhinos have to be kept restricted within the sanctuary areas, the process of overwood removal followed by artificial regeneration for maintaining grassland habitat is an extremely important component of management.

3.3.1 Overwood Removal

The following guidelines should be followed while taking up overwood removal and fodder plantation works

- 1) Overwood removal, followed by fodder plantation, should be carried out in grassland dominated areas in habitat improvement zones.
- 2) No tree over 90 cm. gbh should be removed. In case of Khair and Sissoo, no tree above 60 cm. gbh should be removed.
- 3) The process of overwood removal will be preferably girdling for the trees above 30 cm. gbh.

- 4) The tree species to be removed will be pioneer species like Khair, Sisoo, Simul, Tantari (*Dillenia indica*), Malata (*Macaranga denticulata*) Sidha (*Lagerstroemia speciosa*).
- 5) No fruit trees like Amlaki, Sindura, Bohera, Haritaki etc. should be removed. A few young tantari trees, which are liked by rhino, may also be retained.
- 6) Immediately after overwood removal the areas should be planted up with indigenous grasses like Dhadda. (*Saccharum* spp.). Planting should be at spacings of 1 mtr.x 1 mtr. of the stumps and would be taken up after controlled burning of the overwood removal area.
- 7) Every year a total of 60 hect. will be taken up under overwood removal operation in Jaldapara and 40 hect. in Gorumara.
- 8) No overwood removal area should be chosen which is close to the forest fringe/boundary. This is necessary to ensure that the rhinos and other animals are not attracted out of the sanctuary towards the fringes through creation of fodder plantations/grass regeneration.
- 9) Only those areas should be chosen for overwood removal where the process of succession and invasion of grassland by tree species have started.

3.3.2 Planting of indigenous grasses.

The following guidelines are prescribed

- 1) Such planting areas include the overwood removal areas as well as forest blanks/ degraded grassland.
- 2) Cleaning of weeds/climbers and control burning of the same should be done during December/January.
- 3) Another weeding and burning of the debris should be done immediately before starting of soil work in the month of May.
- 4) For eradication of weeds like *Leea* etc., ploughing may be necessary to uproot the weeds thoroughly.
- 5) After ploughing, planting lines will be aligned and stacking will be done at 1 mtr. interval. The entire procedure should be completed by the end of May.
- 6) Meanwhile, soil of the planting area may be tested in some soil testing laboratory for finding the pH, organic carbon content, percentage of organic matters, percentage of total nitrogen, C/N ratio etc.
- 7) Stump planting of the grasses should start with the onset of monsoon and preferably should be completed by June unless there is near-drought condition.
- 8) Local and indigenous fodder species like *Saccharum* species Dhadda, Chepti, Malsa, Madhua, Ekra, Nal (*Arundo donax*), Khagra (*Phragmites karka*), Bhuttagrass (*Coix lachrymajobi*), Banspati (*Setaria* spp.), etc. Purundi (*Alpinia* spp.) should be planted. No exotic grass species will be planted anywhere. Slips of grasses will be collected locally and planted. However, it must be ensured that local collection of grass species is not done intensively from any particular area and collection should preferably be done from well-stocked plantation/natural grassland.
- 9) Spacing of planting of grass slips: Fodder grass stumps will be 1 mtr. x 1 mtr. and the species mix should be such that Dhadda is not more than 60% of the planting stock.
- 10) In one line, only one species will be planted.
- 11) The planting will be maintained in future as follows:

1st year maintenance ...	Three cleanings in February/March, July and October; infilling vacancies in July.
2nd year maintenance ...	Two cleanings in February/March and October.

- 12) Infilling of vacancies will be done along with the weeding cleaning during the 1st year maintenance.
- 13) In low line areas having water logging problem species like Purundi (*Alpinia* spp.), Nal (*Arundo donax*), Khagra (*Phragmites karka*) etc. will be planted.
- 14) No fodder planting should be raised in forest areas which are close to the periphery/boundary of the sanctuary.
- 15) Such planting of fodder grasses are recommended only in JP2,3,4,5 compartments, Malangi-1,2,3 compartments, Torsa-1,2,3 compartments, CP-1,2 compartments of Jaldapara and Jaldhaka and Dhupjhora Blocks of Gorumara.
- 16) Every year 100 hect. of fodder grass planting would be taken up in overwood removal areas and 50 hect. of fodder grass planting would be taken up in blank areas as well as in predominantly thatch grass areas in the above mentioned compartments only.

3.4. Weed eradication and climber cutting.

3.4.1 Weeds and climbers are acute problems in Jaldapara Wildlife Sanctuary and Gorumara N.P. The most common and proliferating weeds are *Leea* spp., *Cassia tora*, *Mikania* spp., *Eupatorium* spp., *Lantana camara* and *Clerodendron bengalensis*. Prolific growth of fern is also a special feature in Jaldapara as it assumes the form of weed and sometimes surpasses the growth of grass. However, fern is not considered as weed since it plays an extremely important role in maintenance of swampy habitat. Among the fern, spp. like *Christella dentata*, *Diplazium esculentum* and *Amplopteris prolifera* are common. Removal of fern should not be taken up in the sanctuary under weed eradication programme.

3.4.2 For eradication of *Leea* spp., uprooting should be done at the time of flowering of the species to prevent further propagation of the species through its seeds. Normally flowering time for *Leea* is September. Similarly cutting of *Lantana camara* should be done in the month of October. All such weed eradication operation should be done manually and no weedicide should be used.

3.4.3 Restriction of thatch grass and *Cymbopogon* spp. Thatch grass and lemon grass (*Cymbopogon*), though eaten by the herbivores when young, are normally shunned by the wild herbivores as fodder.

Suppression of *Cymbopogon* will be possible through increase of soil-moisture regime. This is being dealt with separately under a separate paragraph on the measures for improvement of soil moisture.

For suppression of thatch grasses in large open areas, it is proposed to take up these areas under fodder grass planting for converting the thatch areas into grassland of palatable species.

3.5 Control burning of old grass planting for natural regeneration of grass land.

3.5.1 The fodder grass planting, which were earlier raised in Jaldapara Wildlife Sanctuary, as well as the coarse fodder grass areas also start losing their importance as foraging areas since the rhinos do not prefer coarse and old Dhadda grasses as fodder. All such older planting and natural grassland with good stem density should be gradually taken up for cut back operations to be followed by control burning to facilitate regeneration of young shoots.

Fodder grass plantations which are more than 3 years old should be brought under this operation. Every year of such old fodder grass areas should be taken up for cut back operations in the month of December-January, to be followed by control burning. The operations have to be completed by January. In order to create less disturbance to the rhinos and to provide them shelter and fodder while carrying out these operations, each patch should not be more than 5 hect. and there should not be more than 12 to 15 such patches of operation every year.

3.5.2 A few guidelines to be followed for use of fire as a management tool:

- 1) Burning should be done and completed during December and January, that is during the cool period.
- 2) Burning should not be done on windy days when there is a possibility of spreading of fire.
- 3) Burning should not be done extensively and simultaneously in all the areas since in that case the animals may be trapped by fire.
- 4) Burning should be done in small patches at a time.
- 5) The burnt area should be monitored to prevent spread of any fire from ignited material of the area.
- 6) Control burning will be restricted only in overwood removal areas, fodder planting areas and cut back operation areas.
- 7) Control burning will always be resorted to for maintaining the fire lines.

3.5.3 No other burning regime is prescribed for the sanctuary since the extent of natural grass land in the sanctuary is limited and extensive use of fire in the grassland may adversely affect other species including avifauna like Bengal Florican, Black partridges etc.

3.6 Control of wild fire.

Accidental and man-made wild fire is common in Jaldapara Sanctuary, as has been stated under Chapter 5. To control the man-made fire the following strategies are proposed:

- 1) Existing fire lines should be maintained and works completed by January, i.e. before the dry season sets in.
- 2) Patrolling paths, which also act as fire lines, should be similarly maintained.
- 3) During the dry period, extensive patrolling should be taken up specially around the fringe areas where fires are set in by the graziers.
- 4) Whenever any wild fire is detected, every effort should be taken to extinguish it. No negligence should be shown by the staff in this respect.
- 5) Whenever any patrolling staff detect any wild fire, the same should be noted in his diary or patrol record. Similarly entries will have to be made in the Beat Office and Range Office records.
- 6) Before the start of the dry season, Asstt. Wildlife Warden will hold meeting with the Range Officers and the Beat Officers and identify the man-made fire-prone areas and mount up vigil in those areas to prevent such fires.
- 7) Efforts should be made through the eco-development committees to impress upon the fringe villagers against creation of man-made fires.

4 CONTROL OF GRAZING BY LIVESTOCK OF FRINGE VILLAGES.

4.1.1 Grazing poses a great threat to the habitat. A total of 32 fringe villages and 4 forest villages around Jaldapara Sanctuary contain around 70,000 cattle. Moreover, nine tea gardens situated in the fringe area contain huge no. of cattle (112000-15000) belonging to laborers. Domestic livestock from the fringe villages not only compete with the wild herbivores for food, they also spread diseases like Anthrax and Foot and Mouth disease among wild animals which can cause death.

4.1.2 The strategy should be as follows:-

- 1) Extensive patrolling should be done by the staff, specially along the forest boundaries and the grazing-prone areas to stop illicit grazing.
- 2) Sending the cattle, seized for illicit grazing, to the cattle pounds.
- 3) Planting areas of fodder grasses should be raised on private and community lands in the fringe villages, initially at Govt. cost, and plantation areas should be managed as rotational grazing grounds. Initially, Animal Resource Development Dept. may be involved in creation of such cattle fodder plantation which should be located away from the forest fringe to prevent straying of wild animals. Species to be planted will be hybrid Napier, Anjan, Guinea, Paspalum, Maize, Dinanath etc. and legumes like stylo, rice bean etc. The local Eco-development Committees should be involved for raising such fodder planting areas on sustainable basis.
- 4) Reduction of low yielding variety cattle through castration of inferior bulls and artificial insemination for improvement of stock.
- 5) Regular immunization of domestic cattle against FIVID, Anthrax etc. in the fringe villages within 5 km. of sanctuary boundary.
- 6) Replacement of low yield varieties by high yield variety cow through cattle improvement programme with the help of Eco-development Committees.
- 7) Involvement of Eco-development Committees and seeking their cooperation to prevent illicit grazing of cattle in the sanctuary.
- 8) Formation of milk producers' cooperative in the fringe villages for the purpose of reduction of low yielding varieties, introduction of high yielding varieties and to facilitate marketing of milk.
- 9) Keeping of cattle by the staff inside the sanctuary will be banned.

5 CONSTRUCTION OF WATER HARVESTING/RECHARGING STRUCTURES.

Four concrete rectangular weir structures constructed on two perennial streams flowing through Harindangar Char under JP-5 comptt., during 1995-96, have yielded excellent result in creating shallow stretches of wetlands and perennially inundating appreciable quantum of dry lands of Harindangar Char. Such inundation has been effective in suppressing thatch and lemon grasses colonising in this areas and have facilitated regeneration of Typha, Dhadda and other palatable grass species.

Since such measures, are most cost effective method to improve soil-moisture regime in the drier uplands of Harindangar Char, 20 such structures should be constructed in series, after proper contour survey of Harindangar Char so as to create long stretches of shallow water pools along the existing perennial streams. Two such structures should be constructed per year and it should start from southern part of Harindangar Char and then proceed upstream towards northern part.

6 PROPOSAL TO REDUCE MAN-ANIMAL CONFLICT.**6.1** The following measures are suggested

- 1) The entire forest boundary having interface with the villages, in Jaldapara East, Jaldapara West and Jaldapara North range will be erected with power fencing and these should be regularly maintained. Such fencing is required for Gorumara also without blocking the elephant movement route.
- 2) The local EDCs should be involved in maintenance of the fencings.
- 3) The villagers in the other forest fringe areas may be encouraged to go for cultivation of non-edible cash crops.

- 4) Awareness generation program should be carried out with the help of EDCs for conservation of wild animals which occasionally stray out of the sanctuary.

7 STRATEGY TO TACKLE PROBLEMS DUE TO LARGE INTERFACE.

7.1 The following strategies are proposed to resolve the problems arising out of this:-

- 1) Erecting power fencing all along the exposed boundary of the sanctuary, barring the portion through which elephants move in and out of the sanctuary during their normal migration.
- 2) Encourage social fencing around the sanctuary through the Eco Development Committees.
- 3) Generate awareness amongst the fringe villagers with regard to wild life conservation and importance of the sanctuary.
- 4) Step up family welfare measures in the villages adjoining the sanctuary.
- 5) Take up literacy drive amongst the fringe villagers.

8 TRANS-BOUNDARY PROBLEM.

The problem is concentrated mostly in the Titi-1 and Joygaon-1,2 blocks of the sanctuary adjoining the Bhutan border. Strategies to overcome the problem will be as follows:

- 1) Initiate an intensive joint patrolling with the counterpart forest personnel of the Royal Government of Bhutan, all along the northern boundary of the sanctuary.
- 2) Development and strengthening the intelligence network of the sanctuary by the PA manager.
- 3) Periodic coordination meeting between the officials of the West Bengal Forest Department and the Royal Government of Bhutan for sharing and exchange of information on illegal trade and illicit activities in the forest.

Some relevant information about the State of West Bengal

Total Geographical Area of the State	88,752 km ²
Population of the State as per 1991 Census	67.88 Million
Percentage of total area under cultivation	60.3 %
Percentage of total area forest	13.4 %
Percentage of total area of land which is barren / unculturable	26.3 %
Total forest area in the State	11,879 km ²
Total protected area network in the State	3960 km ²
Percentage of protected area	
(a) To geographical area	4 %
(b) To forest area	13 %
Density of human population per km ²	764.82

CHECKLIST OF CONSERVATION AREAS OF WEST BENGAL

No.	Name	National Park	Sanctuary	Reserve Forest	Total area (km ²)
1.	Sunderban Biosphere Reserve				
a)	Sunderban Tiger Reserve	1330.10	-	892.60	-
	(I) Sajnakhali	-	362.40	-	2585.10
b)	24-Pargenas Division				
	(I) Holiday Island	-	5.95	-	-
	(II) Lothian Island	-	38.00	-	-
2.	Buxa Tiger Reserve	117.10	251.89	389.83	758.82
3.	Singalila	78.60	-	-	78.60
4.	Neora Valley	88.00	-	-	88.00
5.	Jaldapera	-	216.51	-	216.51
6.	Gorumara	-	8.52	-	8.52
7.	Chapramari	-	9.49	-	9.49
8.	Mahananda	-	127.22	-	127.22
9.	Senchal	-	36.88	-	38.88
10.	Jorepokri	-	00.04	-	00.04
11.	Raiganj	-	1.30	-	1.30
12.	Ballavpur	-	2.00	-	2.00
13.	Bethuadahari	-	0.67	-	0.67
14.	Ramnabegan	-	0.14	-	0.14
15.	Bibhutibhushan	-	0.64	-	0.64
16.	Marendrapur	-	0.10	-	0.10
	Total	1613.80	1063.75	1292.43	3959.96

FLUCTUATIONS IN RHINO POPULATION

Year	Jaldapara	Gorumara
1955-56	Not recorded	5
1956-57	65	8
1958	Not recorded	7
1958-59	Not recorded	4
1964 (May)	72	Not recorded
1965	Not recorded	14
1965-66	75	10 (including 2 calves)
1968-69	80 (including 5 calves)	12 (including 2 calves)
1971-72	Not recorded	13
1972-73	Not recorded	7
1975	23	Not recorded
1978	19	6-8
1980	22	Not recorded
1985.	14	8
1988 (April)	24	Not recorded
1989 (February)	27	13
1992 (April)	33	Not recorded

FINANCIAL STATEMENT OF JALDAPARA MANAGEMENT PLAN OVER A PERIOD OF 5 YEARS

(RS. IN LAKHS)

	Rate	Unit	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
A. CONSOLIDATION, INFRASTRUCTURE DEVELOPMENT PROTECTION AND COMMUNICATION												
Survey of demarcation & Boundary	0.05	Km	10	0.5	10	0.5	10	0.5	10	0.5	10	0.5
Construction of range office	2	No			1	2	1	2	1	2		
Construction of F.R.'s Qtrs.	3	No	1	3	1	3						
Construction of B.O. Qtrs.	1.5	No	1	1.5	2	3	2	3	2	3	1	1.5
Construction of Gr. 'D'. Qtrs.	1.25	No	2	2.5	4	5	4	5	4	5	6	7.5
Construction of staff Qtrs.	0.1	No	5	0.5	5	0.5	10	1	10	1	15	1.5
Construction of Camp sheds	1	No	3	3	5	5	5	5	5	5	2	2
Construction of Watch towers	0.75	No	1	0.75	1	0.75	1	0.75	1	0.75	1	0.75
Construction of Check post	1	No	1	1	1	1						
Renovation OF Hollong, Barodabri lodges & youth hostel	5	No			1	5	1	5	1	5		
Construction of Subordinate FRH	1	No			1	1						
Construction of Bridge/culvert	0.5	No	2	1	3	1.5	5	2.5	3	1.5	2	1
Reconstruction of Forest Roads	0.25	Km	10	2.5	10	2.5	15	3.75	15	3.75	20	5
Reconstruction of Patrolling path	0.02	Km	10	0.2	15	0.3	20	0.4	25	0.5	30	0.6
Purchase of vehicle	3.5	No			1	3.5	1	3.5	1	3.5		
Purchase of Patrolling Boat	0.5	No			1	0.5	1	0.5				
Purchase of Motor Cycle	0.5	No			1	0.5	2	1	2	1	3	1.5
Purchase of elephant	5	No			1	5	1	5	1	5	1	5
Purchase of R.T. sets	0.2	No	5	1	5	1	8	1.6	8	1.6	16	3.2
Purchase of arms & ammunition	0.3	No	5	1.5	5	1.5	5	1.5	10	3	15	4.5
Constr. of Boulder-Sausage structure for roads/embarkment prot'n	0.0025	Cu.m	400	1	400	1	400	1	600	1.5	600	1.5
Maintenance of fire lines	0.01	Km	60	0.6	60	0.6	60	0.6	60	0.6	60	0.6
Construction of cattle-proof trenches	0.5	Km	2	1	2	1	2	1	2	1	2	1
P.O.L. for Deptl. Vehicle	0.5	No	3	1.5	4	2	5	2.5	6	3	6	3
P.O.L. for Motorcycle	0.15	No			1	0.15	3	0.45	5	0.75	8	1.2
SUB TOTAL				23.05		47.8		47.55		48.95		41.85
B. HABITAT IMPROVEMENT												
Overwood removal in grassland	0.02	Ha	60	1.2	60	1.2	60	1.2	60	1.2	60	1.2
Plantation of fodder grass after overwood removal	0.08	Ha	60	4.8	60	4.8	60	4.8	60	4.8	60	4.8

(RS. IN LAKHS)

	Rate	Unit	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Canopy opening in Mono-culture plantation	0.025	Ha	20	0.5	20	0.5	20	0.5	20	0.5	20	0.5
Plantation of bamboo/fodder after canopy opening	0.08	Ha	20	1.6	20	1.6	20	1.6	20	1.6	20	1.6
Plantation of fodder grass in blanks/ thatch areas	0.08	Ha	50	4	50	4	50	4	50	4	50	4
RDF pltn. in Forest blanks	0.09	Ha	60	5.4	60	5.4	60	5.4	60	5.4	60	5.4
Infilling vacancies in 1st yr of pltn.	0.015	Ha	110	1.65	190	2.85	190	2.85	190	2.85	190	2.85
Infilling vacancies in 2nd yr of pltn.	0.01	Ha	110	1.1	110	1.1	130	1.3	130	1.3	130	1.3
Weed Eradication & Climber cutting	0.01	Ha	100	1	100	1	100	1	100	1	100	1
Cut back and controlled burning of old fodder grass areas.	0.015	Ha	60	0.9	60	0.9	60	0.9	60	0.9	60	0.9
Mechanical & Silvicultural thinning in older pltn.	0.025	Ha	40	1	401	10.03	40	1	40	1	40	1
Construction of water holes	0.50	Ha			1	0.5	1	0.5		0		
Construction of water conservation structure	1.00	Ha	1	1	1	1	1	1	1	1	1	1
SUB TOTAL				24.15		34.88		26.05		25.55		25.55

C. REDUCING MAN-ANIMAL CONFLICT

Erection of power fencing	0.2	Km	10	2	10	2	10	2	10	2	10	2
Purchase of search lights/crackers	0.01	Set	10	0.1	10	0.1	10	0.1	10	0.1	10	0.1
Introduce non-browseable cash-crops in forest fringes	0.08	Ha	10	0.8	15	1.2	20	1.6	25	2	30	2.4
Purchase of tranquilising guns & drugs/medicine	0.5	Set	1	0.5	2	1	2	1	2	1	3	1.5
Construction of winch-mounted trucks for transportation of wild animals	7	Set			1	7					1	7
Construction of sledges for dragging tranquilized animals	0.5	Set			1	0.5			1	0.5		
Construction of trap cages for straying animals	0.25	Set	1	0.25	1	0.25	1	0.25	1	0.25	1	0.25
Purchase of special nets for trapping wild animals	0.15	Set	2	0.3	2	0.3	2	0.3	2	0.3	2	0.3
Construction of anti-depredation voluntary squads in villages	0.1	Set	10	1	10	1	10	1	10	1	10	1
Hiring vehicles for anti-depredation squads	0.75	No	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5
SUB TOTAL				6.45		14.85		7.75		8.65		16.05

D. REDUCING GRAZING PRESSURE

Cultivate fodder on private land for rotational grazing	0.05	Ha	15	0.75	15	0.75	15	0.75	15	0.75	15	0.75
Cattle improvement programme in fringe EDC village	0.1	Camp	5	0.5	5	0.5	5	0.5	5	0.5	5	0.5
Purchase fodder for departmental elephants from Ramsai farm	0.1	No	5	0.5	10	1	15	1.5	20	2	25	2.5
Distribute tree fodder seedlings for F/F prog. In EDC village	0.025	Ha	10		15	0.375	20	0.5	25	0.625	30	0.75

(RS. IN LAKHS)

	Rate	Unit	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
SUB TOTAL				1.75		2.625		3.25		3.875		4.5
E. VETERINARY CARE FOR WILD ANIMALS, DEPARTMENTAL ELEPHANTS & FRINGE AREA CATTLE												
Immunisation programme for fringe cattle & domestic elephants	0.5	EDC	1	0.5	1	0.5	1	0.5	1	0.5	1	0.5
Relocation of Rescue Centre at Madarihat	3	LS			1	3						
Purch. of vet. Drugs for de-worming & treatment of injured animals	1	LS	1	1	1	1	1	1	1	1	1	1
Construction of squeeze cage for treatment of rescued animals	0.5	No					1	0.5			1	0.5
Establishment of veterinary testing centre at Madarihat	5	No					1	5				
Purchase of laboratory equipment & testing chemicals	1	LS					1	1				
Maintenance of rescue centre	1	LS	1	1	1	1	1	1	1	1	1	1
SUB TOTAL				2.5		5.5		9		2.5		3
F. TRAINING, MONITORING & RESEARCH												
In-house training of staff in wildlife mgmt/mahout training etc.	0.25	No	2	0.5	2	0.5	3	0.75	3	0.75	4	1
Training of Officers & Staff at training institute	0.5	No	1	0.5	2	1	2	1	2	1	3	1.5
In-house monitoring of achievements vis-a-vis targets & objectives	0.5	LS	1	0.5	1	0.5	1	0.5	1	0.5	1	0.5
Evaluation & achievements of goals vis-a-vis objectives of mgmt	1	LS									1	1
Carrying out Deptt. research on identified topics	1	No			2	2	2	2	2	2	2	2
Collaborative research on Jaldapara WL:S	5	No			1	5	1	5	1	5	1	5
SUB TOTAL				1.5		9		9.25		9.25		11
G. ECO-TOURISM, PUBLICITY, AWARENESS GENERATION												
Printing publicity materials/booklets	1	LS	1	1	1	1	1	1	1	1	1	1
Making badges/Poster/Souvenirs items for publicity	0.5	LS	1	0.5	1	0.5	1	0.5	1	0.5	1	0.5
Creation/Extension of N.I.C.	3	No			1	3			1	3		
Equipment for N.I.C.	1	No	1	1	1	1	1	1	1	1	1	1
Development of camping sites	1	No			1	1	1	1				
Procurement of equipment for camping facility	1	Set			1	1	1	1	1	1	2	2
Developing nature trails	1	No					1	1	1	1		
Construction of nature observatory	1	No	1	1	1	1	1	1				
SUB TOTAL				3.5		8.5		6.5		7.5		4.5

(RS. IN LAKHS)

	Rate	Unit	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
H. CAPTIVE BREEDING / REINTRODUCTION PROGRAMME												
Setting up reintroduction centres for:												
i) Barashingha	3	Set	1	3								
ii) Gharial	2	Set			1	2						
Cost of procurement of Barashingha & Gharial from Lucknow zoo/ Assam zoo	2	LS	1	2	1	2						
Improvement of deer reintroduction centre	1	LS	1	1	1	1	1	1	1	1	1	1
Programme for translocation of two female rhino from Jaldapara to Gorumara and 2 female rhino from Gorumara to Jaldapara to improve genetic stock	1		1	1								
Radio collaring & monitoring the male rhino migrates from Assam after releasing in the wild	1				1	1						
SUB TOTAL				7		6		1		1		1
I. ECO-DEVELOPMENT ACTIVITIES												
Input for EDCs @ Rs. 5 lakhs per year per EDC for various capability-building, income-generating activities and training of staff and EDC members including coordination establishment at various levels	5	No	20	100	26	130	32	160	32	160	32	160
SUB TOTAL				100		130		160		160		160
GRAND TOTAL				170		259		270		267		267

FINANCIAL STATEMENT OF GORUMARA MANAGEMENT PLAN OVER A PERIOD OF 5 YEARS

(RS. IN LAKHS)

	Rate	Unit	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
A. CONSOLIDATION, INFRASTRUCTURE DEVELOPMENT PROTECTION AND COMMUNICATION												
Survey of demarcation & Boundary	0.05	Km	5	0.25	5	0.25	5	0.25	5	0.25	5	0.25
Construction of range office	2	No			1	2	1	2	1	2		
Construction of F.R.'s Qtrs.	3	No			1	3	1	3				
Construction of B.O. Qtrs.	1.5	No			1	1.5	1	1.5	1	1.5	2	3
Construction of Gr. 'D'. Qtrs.	1.25	No	2	2.5	2	2.5	2	2.5	2	2.5	4	5
Construction of staff Qtrs.	0.1	No	4	0.4	4	0.4	4	0.4	4	0.4	4	0.4
Construction of Camp sheds	1	No	2	2	2	2	2	2	2	2	2	2
Construction of Watch towers	0.75	No			1	0.75			1			
Construction of Check post	1	No			1	1						
Renovation at Gorumara FRH	5	No			0.5	2.5	0.5	2.5				
Construction of DFO/ADFO's Qtrs.	10	No					1	10	1	10		
Construction of Bridge/culvert	0.5	No	2	1	4	2	4	2	4	2	4	2
Purchase of Patrolling Boat	0.5	No			1	0.5	1	0.5	1		1	0.5
Reconstruction of Forest Roads	0.25	Km	10	2.5	15	3.75	20	5	25	6.25	30	7.5
Purchase of vehicle	4	No			1	4	1	4				10
Purchase of Motor Cycle	0.5	No					2	1	2	1	2	1
Purchase of elephant	5	No					1	5	1	5	2	10
Purchase of R.T. sets	0.2	No	3	0.6	3	0.6	3	0.6	3	0.6	10	2
Purchase of arms & ammunition	0.3	No	3	0.9	3	0.9	3	0.9	3	0.9	3	0.9
Constr. of Boulder-Sausage structure for roads/embarkment prot'n	0.0025	Cu.m	400	1	600	1.5					1000	2.5
Maintenance of fire lines	0.01	Km	60	0.6	60	0.6	60	0.6	60	0.6	60	0.6
Construction of cattle-proof trenches	0.5	Km			5	2.5	5	2.5	5	2.5	5	2.5
P.O.L. for Deptl. Vehicle	0.5	No	3	1.5	4	2	5	2.5	5	2.5	5	2.5
P.O.L. for Motorcycle	0.15	No					2	0.3	4	0.6	6	0.9
SUB TOTAL				13.25		34.25		49.05		40.6		53.55
B. HABITAT IMPROVEMENT												
Overwood removal in grassland	0.02	Ha	40	0.8	40	0.8	40	0.8	40	0.8	40	0.8
Plantation of fodder grass after overwood removal	0.08	Ha	40	3.2	40	3.2	40	3.2	40	3.2	40	3.2
Canopy opening in Mono-culture plantation.	0.025	Ha	40	1	40	1	40	1	40	1	40	1

(RS. IN LAKHS)

	Rate	Unit	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Plantation of bamboo/fodder after canopy opening	0.08	Ha	40	3.2	40	3.2	40	3.2	40	3.2	40	3.2
Plantation of fodder grass in blanks/ thatch areas,	0.08	Ha	20	1.6	20	1.6	20	1.6	20	1.6	20	1.6
RDF pltn. in Forest blanks	0.09	Ha	5	0.45	5	0.45	5	0.45	5	0.45	5	0.45
Infilling vacancies in 1st yr of pltn.	0.015	Ha			80	1.2	80	1.2	80	1.2	80	1.2
Infilling vacancies in 2nd yr of pltn.	0.01	Ha					80	0.8	80	0.8	80	0.8
Weed Eradication & Climber cutting	0.01	Ha	50	0.5	50	0.5	50	0.5	50	0.5	50	0.5
Cut back and controlled burning of old fodder grass areas.	0.015	Ha	40	0.6	40	0.6	40	0.6	40	0.6	40	0.6
Mechanical & Silvicultural thinning in older pltn.	0.025	Ha	20	0.5	201	5.025	20	0.5	20	0.5	20	0.5
Construction of water holes	0.50	Ha			1	0.5	1	0.5	1	0.5	1	0.5
Construction of water conservation structure	1.00	Ha	1	1	1	1	1	1	1	1	1	1
SUB TOTAL				12.85		19.08		16.35		15.35		16.35
C. REDUCING MAN-ANIMAL CONFLICT												
Erection of power fencing	0.2	Km	5	1	5	1	5	1	5	1	5	1
Purchase of search lights/crackers	0.05	Set	2	0.1	2	0.1	2	0.1	2	0.1	2	0.1
Introduce non-browseable cash-crops in forest fringes	0.08	Ha	20	1.6	20	1.6	20	1.6	20	1.6	20	1.6
Purchase of tranquillising guns & drugs/medicine	0.5	Set			1	0.5			1	0.5		
Constr. of winch-mounted trucks for transportation of wild animals	7	Set					1	7				
Construction of sledges for dragging tranquillized animals	0.5	Set							1	0.5		
Construction of trap cages for straying animals	0.25	Set			2	0.5	2	0.5	2	0.5		
Purchase of special nets for trapping wild animals	0.15	Set	2	0.3	1	0.15	1	0.15	1	0.15	2	0.3
Construction of anti-depredation voluntary squads in villages	0.1	Set	5	0.5	5	0.5	5	0.5	5	0.5	5	0.5
Hiring vehicles for anti-depredation squads	0.75	No	1	0.75	1	0.75	1	0.75	1	0.75	1	0.75
SUB TOTAL				4.25		5.1		11.6		5.6		4.25
D. REDUCING GRAZING PRESSURE												
Cultivate fodder on private land for rotational grazing	0.05	Ha	5	0.25	5	0.25	5	0.25	5	0.25	5	0.25
Cattle improvement programme in fringe EDC village	0.1	Camp	5	0.5	5	0.5	5	0.5	5	0.5	5	0.5
Purchase fodder for departmental elephants from Ramsai farm	0.1	No	1	0.1	2	0.2	3	0.3	4	0.4	5	0.5
Distribute tree fodder seedlings for F/F prog. in EDC village	0.025	Ha			10	0.25	10	0.25	10	0.25	10	0.25
SUB TOTAL				0.85		1.2		1.3		1.4		1.5

(RS. IN LAKHS)

	Rate	Unit	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
E. VETERINARY CARE FOR WILD ANIMALS, DEPARTMENTAL ELEPHANTS & FRINGE AREA CATTLE												
Establishment of veterinary testing centre at Latagiri	2	No							1	2		
Purchase of laboratory equipment & testing chemicals	1	LS							1	1		
Immunisation programme for fringe cattle & domestic elephants	0.1	EDC	5	0.5	5	0.5	5	0.5	5	0.5	5	0.5
Creation of Rescue Centre at Gorumara/Lataguri	3	LS	0.5	1.5	1.5	4.5						
Purch. of vet. Drugs for de-worming & treatment of injured animals	0.5	LS			1	0.5	1	0.5	1	0.5	1	0.5
Construction of squeeze cage for treatment of rescued animals	0.5	No					1	0.5				
Maintenance of rescue centre	1	LS			1	1	1	1	1	1	1	1
SUB TOTAL				2		6.5		2.6		5		2
F. TRAINING, MONITORING & RESEARCH												
In-house training of staff in wildlife management/mahout training etc.	0.25	No	2	0.5	2	0.5	2	0.5	2	0.5	2	0.5
Training of Officers & Staff at training institute	0.5	No			1	0.5	1	0.5	1	0.5		
In-house monitoring of achievements vis-a-vis targets & objectives	0.5	LS			1	0.5	1	0.5	1	0.5	1	0.5
Evaluation & achievements of goals vis-a-vis objectives of mgmt	1	LS									1	1
Carrying out Deptt. research on identified topics	1	No			1	1	1	1	1	1	1	1
Collaborative research on Gorumara NP	2	No			1	2	1	2	1	2	1	2
SUB TOTAL				0.5		4.5		4.5		4.5		5
G. ECO-TOURISM, PUBLICITY, AWARENESS GENERATION												
Printing publicity materials/booklets	0.5	LS	1	0.5	1	0.5	1	0.5	1	0.5	1	0.5
Making badges/Poster/Souvenirs items for publicity	0.5	LS	1	0.5	1	0.5	1	0.5	1	0.5	1	0.5
Creation/Extension of N.I.C.	3	No	1	3			1	3			1	3
Equipment for N.I.C.	0.5	No	1	0.5	1	0.5	1	0.5	1	0.5	1	0.5
Development of camping sites	1	No			1	1			1	1		
Procurement of equipment for camping facility	1	Set			1	1			1	1		
Developing nature trails	1	No					1	1			1	1
Construction of nature observatory	1	No			1	1	1	1	1	1	1	1
SUB TOTAL				4.5		4.5		6.6		4.5		6.5

(RS. IN LAKHS)

	Rate	Unit	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
H. CAPTIVE BREEDING / REINTRODUCTION PROGRAMME												
Setting up reintroduction centres for:												
i) Gharial	2	Set			1	2						
ii) Spotted Deer	1	Set	1	1	1	1						
Cost of procurement from Lucknow zoo / Calcutta zoo	2	LS	1	2	1	2						
Improvement of deer reintroduction centre	1	LS					1	1	1	1	1	1
Programme for translocation of two female rhino from Jaldapara to Gorumara and 2 female rhino from Gorumara to Jaldapara to improve genetic stock	2						1	2	1	2	1	2
Radio collaring & monitoring the male rhino migrates from Assam after releasing in the wild	1						1	1	1	1	1	1
SUB TOTAL				3		5		4		4		4
I. ECO-DEVELOPMENT ACTIVITIES												
Input for EDCs @ Rs. 5 lakhs per year per EDC for various capability-building, income-generating activities and training of staff and EDC members including coordination establishment at various levels	5	No	2	10	4	20	6	30	10	50	14	70
SUB TOTAL				10		20		30		50		70
GRAND TOTAL				51.2		100		125		131		162

