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SIMPLIFIED MANAGEMENT GUIDELINES

LAWACHARA NATIONAL PARK



October 2006

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INTRODUCTION

The simplified management guidelines are based on the five year management plan prepared for Lawachara National Park under Nishorgo Support Project (NSP). The Project is supporting a broad Nishorgo Program of Forest Department (FD) focusing on improved management of the country's protected areas (PAs). An effective implementation of the Nishorgo Program is necessary for in-situ biodiversity conservation through protection, development and capacity building, and gainful partnerships with key stakeholders. The Plan, providing for an overall five year framework for developing and managing the Lawachara National Park (NP), is based on a landscape approach comprising:

- Protection and conservation of all remaining ecosystems including natural forests and constituent biodiversity in the Park.
- Conversion of monocultures of exotic tree species into natural and man made regeneration of indigenous species by gradually opening the canopy.
- Identification of interface landscape and development of co-management agreements (and linking Park conservation with benefit sharing arrangements) with key stakeholders to reduce ongoing habitat damage by helping them achieve sustainable livelihoods.
- Provision of support to better administration and management of the Park including capacity development, infrastructure, training, and wider extension and communication.

ASSESSING THE PRESENT SITUATION

Lawachara NP (in Kamalganj Upzila of Maulvibazar District) is located nearly 160 km northeast of Dhaka and approximately 60 km south of Sylhet city (nearly eight km east of Srimongal, on way to Kamalganj). The NP was notified in 1996 with a total forest area of 1250 ha. The NP and proposed extension comprise forests of southern and eastern parts of West Bhanugach Reserve Forest (RF) within Lawachara, Chautali and Kalachara Beats of Maulvibazar Range. Lawachara NP, representing the accessible hill forests of Sylhet forest division, is well connected by good roads, which also provide easy access to the nearest national/international airport at Sylhet. The Park is crossed by a paved road and a railway line linking the towns of Sreemongal (nearly 8 km to the west of the south-western Park boundary) and Kamalganj (nearly 2 km to the east of the eastern Park boundary). Six broad habitat types in Lawachara Park and its interface landscape are identified as:

- High forests represented by the remaining patches of natural forests,
- Plantations including the monoculture of exotics,
- Grasslands and bamboos,
- Wetlands,
- Tea estates and,

- Cultivated fields and fruit orchards/gardens.

The first three ecosystems being the largest in extent and also important from the Park management point of view. The cultivated fields (mainly of paddies) and grasslands, which harbor some mammals, ground birds and reptiles, get inundated during monsoon rains. The water bodies harbor important fish species, water birds and amphibians that are food to not only local communities but also wildlife. Lawachara NP lies between the Dholai River on the east, the Manu River on the north, and the road from Maulvibazar to Srimongal on the west. A number of sandy-bedded streams and cheras pass through the Park and so aquatic habitats associated with forest cover and riparian (streamside) vegetation and animal species are important part of overall habitat composition. The Park forms the catchments of a number of small rivers and streams, locally known as cheras.

The forests of Lawachara Park are biologically rich, located as they are on the high rainfall bio-geographic zone with evergreen and semi-evergreen forests. The natural forests of West Bhanugach RF, now part of Lawachara NP, were converted by raising long rotation plantations (of teak, mahogany, garjan, karoi, sal, gamari, shisoo, toon, pynkado, agar, jarul, cham, jam, etc). Most of the original forests have been removed and the conservation value of the Park currently stems mainly from old plantations, which have developed a tall, multi-storied structure. The conservation of biodiversity within the Park is very important as the forests form important catchments of rivers and streams. Socio-economic values of the Park are important because a number of communities including ethnic minorities reside within and around the forests on which they depend for their livelihood opportunities. Biological values include providing shelter to biodiversity comprising important flora and fauna, habitat connectivity, presence of threatened and endemic species, and improving degrading habitat. Main ecological functions are watershed conservation for local rivers and water bodies (haors, ponds, etc.), control of soil erosion, ecological security, irrigation and agricultural production, carbon sink and environmental amelioration. The Park provides significant scope for wildlife education and research, nature interpretation and conservation awareness. The Park also is a potential source of eco-tourism, aesthetic values, dense high forests, historical and cultural values, scenic beauty and ethnic diversity.

As a result of forest land encroachment, the habitat has fragmented, adversely affecting the wildlife by restricting their movements through a barrier effect. Lawachara represents a fragile landscape with rich biodiversity, which if not timely conserved, may be lost for future generations. However, at places good natural re-growth, particularly of ground flora and middle storey, has come up due to favorable climatic and edaphic conditions, thereby enhancing the Park's in-situ conservation values. Old plantations raised in the Park area have grown up with re-growth of ground flora and a middle storey of naturally occurring species. Consequently, the vegetation in many areas of Lawachara has approached towards natural structure and species.

A number of animal species (mammals, birds, reptiles and amphibians), both forest-dwelling and wetland-associated species, of different genera and families are found in the forests of Sylhet forest division. Lawachara NP and adjoining West Bhanugach RF are home to avifauna of 237 species (representing nearly one-third of the country's known bird species) dependent on good forest undergrowth and cover. Viable populations of many small and medium-sized mammal species that can survive in limited forest areas and/or disturbed or secondary habitats (e.g., jackals, small cats, barking deer, wild pigs, etc.) are found in the remaining disturbed and fragmented

habitat of the Park. A rich diversity of other faunal groups such as reptiles, vertebrates, gibbons, langurs, hanumans, fishes and amphibians is present. Aquatic species including turtles and frogs are found in water bodies. Hoolock gibbon is used as a key species for the development and implementation of forest management and conservation measures in Lawachara.

The Park is intimately surrounded by a number of villages, towns, cultivated fields and tea estates (Figure 1). It is bordered on the north, west, south and south-east largely by tea estates whereas a part of the eastern boundary (nearly 1 km.) is bordered by FD lands (mainly grasslands) under long-term lease to HEED Bangladesh (a health and participatory development NGO). Most of the north-eastern boundary of the Park and proposed extension are bordered by FD lands under Kalachara Beat. Most of the local population including ethnic minorities depends on agriculture, and nearby forests for meeting their consumption needs for forest produce. The name of Lawachara NP is derived from one of the two Forest Villages (Lawachara and Magurchara), which are inhabited by Khasia ethnic minority. These villages were established by FD in 1940s mainly to ensure a regular supply of labor for raising plantations. The villagers of both Magurchara (nearly 40 households) and Lawachara (nearly 23 households) grow betel vines on forests earmarked for them by FD in lieu of the supply of labor for forest protection and plantation activities. They also meet their subsistence consumption needs for fuel wood and timber for constructions from these forests.

In addition to 2 Forest Villages, a total of 16 neighboring villages have been identified having varied stakes in the Park's forests. These villages lie within 5 km. of the Park boundary; 4 villages (Baligaon-300 households, Bagmara-300 households, Rashtila-171 households and Chatakchara-61 households) are just at the outskirts of the Park. Of the 18 villages, 6 villages (Bagmara, Magurchara, Lawachara, Baligaon, Dolubari-84 households and Biranpur-300 households) have been identified as having major stakes, another 6 villages (Botertol slum, Rashtila, Saraibari-190 households, Veerachara-118 households and Radhanagar-325 households) with moderate level of stakes and the remaining 6 villages (Langurpur-92 households, Ballarpur-61 households, Noagaon, Tilagaon, Bhasaniganj and Bongaon-47 households) with minor level of stakes in the forests covered under the Park. There are 4 Tea Estates (Fulbari, Khaichara, Jakchara and Gilachara) bordering the Park and 2 neighboring Tea Estates (Noorjahan and Bharaura), which have substantial impacts on the forests covered under the Park. A large number of labor employed by the Tea Estates and their family members depend on the forests for meeting livelihood consumption needs. This means joint efforts are required from FD staff and estate managers for controlling illicit felling.

RECOMMENDING STRATEGIC PROGRAMS

Main long-term management aim of the Plan is to retain the maximum possible area under forest cover, and to maintain this forest and its constituent biodiversity in the best possible condition with the following main objectives:

- To develop and implement long-term protection and conservation of biodiversity within the Park, while permitting sustainable use in designated zones by local people as key stakeholders.
- To conserve the biodiversity of the Park and encourage private tree growing by following a landscape approach based on building partnerships with all the stakeholders and sharing benefits with local communities and key stakeholders.

- To refine and strengthen the policy, operational, infrastructural and institutional capacity framework for Park management.
- To conserve and maintain viable wildlife population including endangered, threatened, endemic and rare species of plants and animals.
- To restore and maintain as far as possible the floral, faunal, physical attributes and productivity of the forest eco-systems.
- To encourage eco-tourism in suitable zones and develop visitor amenities.
- To implement income generation activities for sustainable livelihood development and enhance skills of local stakeholders for rural poverty alleviation.

The following strategic programs are recommended for implementation. A brief summary of the proposed activities to be annually taken for implementation will be presented to co-management committee for their review.

STRATEGIC PROGRAMS

HABITAT PROTECTION PROGRAMS

Main objective of this program is to provide adequate protection to the Park for the conservation of its constituent biodiversity. Main activities to be carried out to achieve this objective will include:

- Updating forest cover and interface landscape maps,
- Demarcating the Park boundary,
- Controlling illegal removals and,
- Checking encroachment of the Park's land.

New mapping carried out under the NSP has included a 5 km wide interface landscape zone outside of existing Park boundaries. This was done to provide a spatial context for coordination of interface landscape elements and neighboring forests.

The following specific activities will be taken in and around the Park for habitat protection:

- All the peripheral boundaries of the Park will be identified.
- Posts (e.g. concrete pillars) or other markers (wooden or iron pillars, mounds, etc.) will be put in place at all important and/or turning points and will be labeled.
- All the locations, where primary access routes cross the Park's outer boundaries, will be clearly marked with signs indicating the Park's name and summarizing key regulations in written text and symbols.
- Effective protection against illicit felling, forest fires, land encroachment and poaching will be taken up by FD field staff by associating local stakeholders. Community patrolling groups will be formed for providing protection to identified patches of forests facing severe threat. Co-management organizations (co-management councils and committees) will increasingly take the responsibility for overseeing community patrolling. The members of user groups formed in identified villages of interface landscape will be involved in forest protection efforts.
- An effective checking of organized smuggling of timber and poaching will require concerted efforts from FD field staff by using modern equipments and good transport facilities.
- Existing motorable roads will be maintained for easy movement for patrolling duties.
- Adequate rewards/incentives will be provided to those field staff and local people who perform exemplary protection duties.

MANAGEMENT PROGRAMS

Main objectives of the management programs are to:

- Maintain ecological succession in constituent forests by providing effective protection against biotic interference,
- Develop and maintain natural forests as good habitat favoring wildlife,
- Conserve the forest resources including the constituent biodiversity and,
- Establish co-management practices through stakeholders' consultations and active participation.

For achieving these management objectives the Park is divided into two broad zones (core zone and interface landscape zone) based on existing forests, landscape elements and management objectives. The total notified area of Lawachara NP having high conservation value is designated as the core zone, and a 5 km wide landscape zone is identified surrounding the core zone keeping in view the existing land-use and neighboring villages.

CORE ZONE MANAGEMENT

All the notified areas with forests and wildlife are covered under the core zone (sub-divided into eco-system management sub-zone, habitat management sub-zone, village use sub-zone, sustainable use sub-zone and intensive use sub-zone). The natural water bodies (e.g. streams/charas, ponds) present in the Park will be maintained for use of wildlife and also local people whose participation will be ensured in their restoration and maintenance. Unauthorized fishing, hunting, cattle grazing and contamination of water should be checked by involving local people as a part of co-management activities.

Main management aim in Ecosystem Management sub-zone (Fig. 2) is long-term protection of existing wildlife and vegetation including remaining natural forests and mixed plantations, and rehabilitation toward natural forest habitat. More than half (57%) of the notified Park area has been designated as Ecosystem Management Sub-Zone covering existing forest/plantations areas with good biodiversity value. Forests management in this sub-zone will focus on conserving the remaining natural forests and bringing back natural vegetation (composition and structure), wherever possible. This will be achieved by:

- Providing protection (against illicit removals of forest produce, encroachment, poaching, grazing and fire) as discussed above and,
- Encouraging natural processes for regeneration and rehabilitation of forests ecosystem.

Habitat Management sub-zone is constituted to manage/manipulate suitable habitat for wildlife management (particularly for hoolock gibbons and capped langurs as key species) and conserve forests and other critical habitats. The following activities will be carried out in this sub-zone:

- Main factors responsible for habitat degradation will be identified by holding stakeholders' consultations.

- Protection against the identified causal factors including illicit felling, forest fires and grazing, encroachment and poaching will be ensured by involving all the stakeholders.
- Salvage of dead, dying and diseased trees will be done after leaving some dead trees suitable for wildlife nesting, etc.
- Subsidiary silvicultural operations including cleaning, coppicing, stump dressing, stool thinning, bamboo clumps decongestion and canopy opening required for improving habitat for wildlife.
- Habitat improvement works including rehabilitation of degraded forest areas, enrichment planting of fruit bearing shrubs, trees and palatable grasses, thinning of existing plantations, maintenance of glades and waterholes, replacement of exotics by gradual canopy opening, eradication of weeds from glades and wetlands, soil and water conservation, watershed development, etc. will be taken up.
- Gradual opening of top canopy in exotic plantations will be taken up mainly to encourage natural regeneration to come up and get established.
- Enrichment plantations will be taken in those areas where natural regeneration is not coming up due to lack of rootstock and/or mother trees.

Village Use Sub-Zone includes the habitations and cultivation (with respect to Lawachara and Magurchara Forest Villages) that are included within the notified Park area. As important stakeholders, the villagers from these two villages will be engaged in co-management activities. They have been assigned forest area (1.2 ha of forest land for each family) in lieu of their regular labour supply for forestry works.

Sustainable use sub-zone comprises forests/plantations within the Park, the use of which can be allowed to local people on a sustainable basis. The first category of such forest areas are natural forest areas surrounding Lawachara and Magurchara Forest Villages, where the local ethnic communities grow betel leaf vines. Over a period the structure of natural forests has been modified to suit betel leaf cultivation (by removal of lower tree limbs to provide additional trunk substrate for betel vines and by removal of under-storey). This type of traditional forest use, continued since these Forest Villages were set up, will be allowed to continue but will be formalized by signing co-management agreements with clear roles and responsibilities. As these forests still retain their biodiversity value the betel leaf growing activity will be made biodiversity friendly by reducing cleaning and pruning. The second category of areas under this sub-zone comprise short-rotation and recent long-rotation plantations, which may be assigned to local communities for meeting their bonafide consumption needs for fuel wood and NTFPs.

Intensive Use Sub-zone incorporates the relatively small areas required for administrative buildings and staff quarters, visitor accommodations and other facilities. Administrative buildings (Park Hqs, Lawachara Beat Office, BFRI facilities, etc.), Park staff quarters, visitor facilities (e.g. Natural Information Education Centre) and other infrastructure facilities are included in this sub-zone.

ENRICHMENT PLANTATIONS GUIDELINES

Only enrichment plantations can be taken up in identified areas of the core zone as discussed below:

- Identification of suitable areas for enrichment planting.

- Advance closure (suitable protection measures against hacking, grazing and forest fires) of identified areas.
- Collection and treatment of seeds, development and maintenance of nursery.
- Cutting of unwanted bushes (say around 1 m radius of the pits in which seedlings are to be planted in identified gaps), climbers and tall weeds (bushes not hindering natural regeneration will be retained as biodiversity but also for creating moist conditions locally).
- Cutting back of old, high and malformed stumps, and faulty coppice shoots. On an average 360 seedlings per ha mainly of indigenous species (multi-species plantations to optimize species and habitat heterogeneity) will be planted in the identified gaps (of more than 0.5 ha).
- In the pits of size 45m x 45m x 45m (dug in the month of Feb. – March) 1 kg of cowdung and/or fertilizer (application of fertilizer as 50 gms per seedling – 20 gms TSP, 20 gms MP and 10 gms Urea) will be applied.
- No burning and clear cutting of existing vegetation will be taken up. In case of weeds a circular area of 1 m radius around the pit can be cleared before taking up planting on the onset of monsoon rains (in the month of June-July).
- The dead and hollow trees suitable for wildlife will not be removed.
- Half-moon trenches around the planted seedlings are suggested in the slopes to conserve and trap soil, and retain soil moisture.
- Weeding, beating up and cleaning will be taken up as and when required. Normally 3 weeding are taken up in the 2nd financial year and 2 weeding in the 3rd financial year. Vacancy filling, if required, will be done along with weeding. Singling of coppice shoots leaving 2-3 shoots per stool will be taken during 2nd year for the regenerating coppice stumps dressed during the first year.
- Suitable species for enrichment plantations are mainly indigenous species that (in mixture) may include siris, sisoo, simul, chikrasi, jarul, gamar, garjan, telsur, koroï, champa, mahogany, kadam, arjun, haritoki, pitali, chapalish, boilam, agar, hargoja, padauk, jam, dhakijam, toon, bazna, jalpai, chalta, amla, bahera, ficus species, bamboo, etc. Monoculture will not be allowed and canes will be not be planted.
- Exotic species such as acacia, eucalyptus and mangium will not be planted inside the core zone.
- Palatable grasses for fodder plantations may include *Typha angustifolia*, *Alpimia nigra*, *Themeda arundinacea*, *Saccharum arundinaceum*, *Sacharum longisetosum*, *Sacharum narenga*, *Sacharum hookeri*, *Phragmites karka*, *Arundo donax*, *Impreta cylinder*, *Sacharum spontaneum*, *Cymbopogan flexuosus* and *Setaria palmafolia*. These grasses may also be used for gully plugging in case soil erosion takes place due to gradient and run off.
- Planting of fruit bearing and wide crown tree species such as chapalish and artocarpus will particularly be suitable for arboreal fauna such as hoolock.
- Plantation of shrubs and vegetables may be taken up around waterbodies (e.g. charas, ponds) by involving local stakeholders.

- Subsidiary silvicultural operations such as cleaning of weeds, climber cutting and freeing of natural regeneration from suppression will be taken up for encouraging natural regeneration. In coppicing species stump dressing and stool thinning (retaining 2-3 shoots per stool) will be carried out. Bamboo clumps will be decongested.

LANDSCAPE ZONE MANAGEMENT

Interface landscape zone will focus on the surrounding landscape helpful in protecting and conserving the core zone and creating congenial habitat for wildlife. As opportunities for receiving tangible benefits from the above-discussed conservation-oriented management of the core zone are less, suitable livelihood opportunities will be provided to the local stakeholders in the surrounding landscape. Interface landscape zone is further categorized into three specific sub-zones (support sub-zone, transportation corridors sub-zone and tea estate sub-zone) depending upon the uses to which different areas are managed.

Appropriate livelihood programs that will reduce biotic pressure on forests by providing alternative livelihood opportunities to poor stakeholders (e.g. members of community patrolling groups and user groups) living both within and outside the Park will be implemented in all the 18 villages as below:

- Up-scaling of skills will be taken up for generating value additions through capacity building of local people.
- Development funds (e.g. Landscape Development Fund) will be used to provide grant/finance for the members of user groups and co-management committees/councils, and their federations will be encouraged to set up micro-enterprises to generate value additions locally.
- The benefits from eco-tourism should be ploughed back for the development of local communities and the Park.
- Networking with relevant NGOs acting in the area will be established for rendering rural development services to user groups and other key stakeholders.
- Main production technologies to be implemented mainly in the interface landscape zone of the Park will include : i) Agricultural and Horticultural Crops, ii) Nursery Development and Private Tree Growing including Homestead Planting, iii) Poultry, iv) Fisheries.
- Primary sectors for small enterprise development around the Park include handicrafts (cane, bamboo), nursery development and private tree growing, food processing (pickle, jam, jelly), weaving and natural dye processing, and bee keeping.
- Secondary sectors include herbal tea (basak, chamomile, shefali) cultivation and processing, medicinal plantations and processing, essential oil processing, buffer plantations and homestead plantations, orchid cultivation and floriculture, eco-tourism and nature-based healing homes development.
- Priority sectors such as bamboo and canes, nursery and natural dye processing may initially be taken up for enterprise development. Bamboo and canes are used widely by local people in a variety of ways (making household articles, furniture, domestic utensils, house constructions, rafters, batons, binding material and handicrafts) and provide employment and livelihood to a large number of rural poor.

- Cane (rattan) is a climbing plant that produces flexible stems used for making handicrafts, furniture, domestic utensils, house constructions and binding material. Its products have export markets as fine quality finished products can be made with a variety of designs.
- Short-term production objectives of the management of non-timber forest products (NTFPs) will be linked with long-term biodiversity conservation objectives in order to create personal stakes among the members of user groups and co-management councils/committees. The collection, processing and marketing practices for NTFPs to be adopted by user groups need to be such as to enable them earn their subsistence living regularly.

The present subsistence harvest of wood (say from strip plantations) and NTFPs (grazing, fodder, bamboo, canes, etc.) by non-residents is expected to continue, particularly in peripheral areas. However, consumptive use by non-residents will be gradually shifted, to the extent possible, to support zones on FD lands outside of but adjacent to the Park boundary. All the plantations raised under earlier projects such as Forestry Sector Project will be managed by associating local people by sharing usufructs. Buffer plantations of fast growing species that are useful to local people will be established as per the following guidelines.

BUFFER PLANTATION GUIDELINES

The following guidelines will be adopted while raising buffer plantations in support sub-zone of interface landscape zone based on participatory conservation benefits sharing agreements:

- Block plantations of both indigenous (list as in case of enrichment plantations) and fast growing species such as acacia will be taken in mixture at 2m x 2m (2500 seedlings/ha) by associating local stakeholders (e.g. members of community patrolling groups and user groups).
- The rotation age for the fast growing species would be 10 years (two thinning at 4th and 7th year) and 30 years (two thinning at 10th and 20th year) for long rotation species. The fruit bearing trees suitable for wildlife will be planted and retained at the time of felling.
- The usufructuary benefits from 2nd thinning (the produce from 1st thinning will be given to local community) and final felling will be shared by following the FSP guidelines (45% of the total proceeds to FD, 45% to participants and 10% to Tree Farming Fund (as in FSP) that will be managed by a co-management committee.
- Other guidelines will be applicable as described above for enrichment plantations based on site specific characteristics.

STRIP PLANTATIONS GUIDELINES

By adopting FSP guidelines (see below), strip plantations will be raised along the following three linear corridors, traversing the Park (as part of the transportation corridor sub-zone):

- Union Parishad roads and other roads in landscape zone,
- A rail line constructed and managed by Bangladesh Railways and,

- An asphalt-surfaced highway constructed and maintained by the Roads and Highways Department.

Strip plantations will be raised along the above-mentioned linear space available in the interface landscape. On both sides of a 1 km strip 1,000 seedlings (at 2 m spacing – 500 seedlings/km on each side) of suitable species will be planted by associating local community formed into a user group. Depending on site conditions suitable mixture species may include akashmoni, sissoo, koroi, mahogany, kadam, babla and arjun as tree species, and jackfruit and mango as fruit bearing species. Fruit bearing species will make 10% of the total species and will be planted every 20m. About 1/3rd of the tree species will be of long rotation (sissoo, mahogany and fruit trees with 20-30 years rotation); so every 4th tree will be of long rotation. The remaining 2/3rd of the planted seedlings will be of fast growing species (10 years rotation with first thinning at year 4 and second thinning at year 7), both indigenous and exotic depending upon the preference of participants. A suitable live hedge will be established in advance by line sowing of Arhar (*Cajanus cajan*) and/or Dhaincha (*Sesbania sesban*) on either side of the strip. Each participating household may be assigned 100 m of a strip, which will be managed and protected by them. The produce of strip plantations will be shared as per the guidelines of FSP strip plantations.

FACILITIES DEVELOPMENT AND MAINTENANCE PROGRAMS

Main objective of this program is to develop necessary facilities including accommodation and procure field equipments for FD staff responsible for the Park management. The following guidelines are relevant:

- Existing FD and BFRI facilities will be fully utilized and incorporated in Park management where these can be renovated on a cost-effective basis.
- Built facilities (to be developed by following sound environmental standards) will be concentrated in four areas : i) Park Headquarters (near the eastern Park boundary, in front of HEED Office); ii) nature information centre area located at the Janakichara, on the main access road; iii) a Guard Camp located on the main access road, near the eastern Park boundary (current Bhagmara Camp); and, iv) Chautali Beat Office (assuming the Park is extended as proposed).
- Access to the Park Headquarters, rest stop/picnic area and Bhagmara Guard Camp is currently provided by all-weather access roads, which do not require upgrading.
- Access roads between sites at Park Headquarters (i.e., between the main office/accommodation complex, the Rest house and proposed Nature Information Centre) will require periodic manual maintenance, but are currently built to sufficient standards for anticipated traffic loads. Restoration of the existing trails would provide quick and easy vehicle access to the northern parts of the Park (and its proposed extension) for Park management staff.
- Vehicles, field equipment and office equipment will be needed to support the management and administration programs.
- Office equipment (telephone, computer), furniture (desks, filing cabinets, etc.) and supplies will be provided as required for use at Park Headquarters.

VISITOR USE PROGRAMS

As the potential of conservation tourism is high in Lawachara a number of facilities can be developed for visitors' use as described below:

- Adequate care will be taken to preserve the local traditions and culture of indigenous people by avoiding intrusive, exploitative and commercial behavior while implementing visitor program. Similarly a campaign will be mounted to make the visitors aware about their expected behavior particularly about litter disposal, movement of vehicles, respect for local people and their culture, and making noise while visiting the Park.
- A regular transport arrangement (e.g. Rickshaws) on payment basis may be put up, preferably by the co-management committee. Elephant ride may also be considered by FD as many tourists may be interested to have a close look of nature from elephant back.
- As the number of eco-tourists increase, local entrepreneurs will be encouraged to set up (in landscape zone) nature camps, eco-lodges, dormitories, huts and cottages for tourists.
- Eco-guides to be identified amongst local communities will be trained and employed for the guidance of eco-tourists.
- In addition to the identified 3 trails, a network of nature trails will be developed for visitors movement on foot (and bicycle) traversing key natural and cultural features of interest (e.g. patches of high forests, betel leaf gardens, cultural remnants, natural streams/cheras, wildlife sights, hills, etc.).
- The services of trained eco-guides (a number of local youths have been trained as eco-guides) will be made available to visitors.
- The Samoli FRH, Park HQ and Janakichara will be connected with nature trails as far as possible.
- Priority will be given to develop existing foot paths as far as possible in order to minimize creation of new paths and consequent vegetation clearances and soil erosion. The Nature Information Centre will be connected by one such trail for visitor access.
- The following three nature trails have initially been identified and mapped:
 - Short Trail (nearly 1 km with half an hour walk): The trail starts near the gate of Samoli FRH and ends at the same point after traversing a loop with part brick soling and part kacha track. The trail covers good forests of lohakat, chapalish, jarul, teak, kadam, etc. and one may encounter macaques, hollocks and birds appearing on these trees.
 - Medium Trail (nearly 2 km with one hour walk): The trail starts from the Lawachara Beat Office (near Samoli FRH) and ends at the same point after traversing a loop with kacha track. Tall trees of lohakat, jarul, chapalish, raktan and teak are worth seeing along the trail.
 - Long Trail (nearly 5 km with three hours walk): The trail starts at the entrance road of Baghmara Camp and ends at Samoli FRH after traversing a long loop

with katcha track. In addition to tall trees of chapalish, lohakat, jarul, kadam and teak the plantations of exotics such as eucalyptus, acacia and malakana are worth noticing. Macaques, hoolloks and birds (myna, ghungu, dhanesh) may be observed while walking along the trail.

- Basic facilities such as sheltered and outdoor tables, simple toilets and litter disposal buckets/boxes will be provided (for visitors in small groups) adjacent to the main access road through the Park.
- In view of the location of nature information centre, the present nursery at Janakichara will be re-located nearby and improved by leveling the seedling beds and small rest sheds, and will be open for visitors.
- The use of loudspeakers, amplifiers and other activities that could affect the use and enjoyment of the area by others will not be permitted inside the Park.
- Nature Information Centre will be established near Janakichara Nursery, where nature interpretation will, as an educational activity, focus on revealing meaning and relationships of complex ecosystems and landscapes. Landscape features of the Park will be depicted in pictorial forms including topographical and biodiversity patterns.
- Public awareness of the laws related to wildlife will be enhanced and prosecutions under the laws will be publicized as a deterrent to future offenders.
- The publicity of the Park management activities will be improved for propagating the biodiversity conservation, environment, and wildlife and the cause of its habitat. Electronic and print media (TV, Radio, Videos, newspaper, magazines, brochures, etc.) will be employed for this purpose.
- Schools and colleges will be targeted for conservation education and building an informed wildlife constituency. Similarly scouts will be involved in conservation events.
- Conducting talks, essays writing and competition will be included in neighboring schools as a part of publicity campaign. Sabuja Vahinis (Green Brigades) will be formed and trained in nearby schools and madarsas.
- Nishorgo Clubs will be formed and involved in biodiversity conservation activities.
- Professional publicity and communication personnel will be invited for such tasks. Communication strategy as developed under NSP will be implemented.
- Efforts will be undertaken to improve relations and communications between the FD field staff and the media.
- Appropriate signs will be used for the benefits of tourists in finding their ways without any enquiry. These signs may be
 - Directional signs showing the way to different places,
 - Caution signs indicating about prohibitory acts,
 - Orientation signs helping in tourists orientation and,
 - Interpretive signs kept at conspicuous places to help interpret strategic themes and issues.

PARTICIPATORY MONITORING PROGRAMS

A detailed methodology for establishing benchmark data and measuring the volume of timber loss (cubic meter/ha) during the Project period has been developed for assessing effectiveness of project interventions in controlling unauthorized logging in the sampled forest patches. A survey of natural regeneration (density of seedlings and saplings per ha) in the forests of Park will be taken regularly. This will be complemented by photo monitoring technique, focusing on changes in plant height as a visual evidence of success of NSP interventions. Forest dwelling bird species are being used for assessing biodiversity status. A simple procedure of sighting and counting (either population or nests) the indicator bird species using the forests as their habitat has been employed by associating local stakeholders in identified transect walks. Benchmark measurements will be taken to establish initial set of values which will act as reference for future comparison with subsequent measurements taken periodically for assessing socio-economic impacts of project interventions. Management score cards will be employed in making management assessments.

Figure 2: Management Zoning

