

## Management Plans and Restoration of Protected Areas

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Co-Management plans for each pilot Protected Area (PA) supported by Nishorgo Support Project (NSP) were not originally planned to be developed. However, soon it became clear that the Forest Department (FD) was very keen to have detailed management plans for all five pilot PAs, and that there was a lack of experience in developing and implementing appropriate plans for PAs since the FD focused on plantations. None of these five PAs had an approved management plan, so it was agreed that preparing plans would form a good foundation for future management.

The PA Management Specialist's first task was to develop and apply a process for preparing comprehensive management plans in consultation with FD staff and local stakeholders. In the absence of any standard format of management plan for PAs in Bangladesh, an exhaustive review was made of management plans prepared for PAs elsewhere in South Asia. A format with possible contents required for a landscape approach to participatory management planning was developed, discussed, and finalized with FD senior staff. However, the process needed to be informed by and take account of the pressures and expectations within the FD generated through past decades of work and projects.

These biases can be summarized as a commonly held view of PA management in the FD that: "You need to give us some plantations, because this is what we do." The FD traditionally has seen its professional development and benefits come from managing plantations: felling and planting new plantations. Nishorgo has worked to extend this focus to include ecosystem and habitat management in the broader landscapes in which PAs are found. In the past five years, efforts have been made to extend this vision and ensure its practice throughout the Nishorgo sites.

Participatory plantations were undertaken by the FD, mainly under large donor-funded projects since 1981, when community forestry was taken up in Northern Bangladesh with financial assistance from the Asian Development Bank. Participatory Benefit Sharing Agreements (PBSAs) were signed with individual families who were locally selected by a committee chaired by the Upazilla Nirbahi Officer. Such plantations have since continued under different forestry projects both on forest land and other public (*khas*) land (e.g. Coastal Greenbelt Project, Forestry Sector Project). Although the FD has successfully raised participatory plantations on a large scale, the main focus of such efforts has been on unutilized *khas* lands (mainly strip plantations along roads and railway lines, and coastal plantations along sea coasts). Woodlots and agro-forestry were mainly concentrated on forest land devoid of tree growth that had been encroached by settlers although formally under FD jurisdiction; thus, participation was a way for the FD to regain an effective role in decision-making over this land and a way of restoring trees.

Following donor emphasis on social forestry on non-forest land, the natural forests suffered and continued to be degraded due mainly to lack of management and investment.

The Government of Bangladesh was required to contribute matching funds for using donor assistance, so significant funds were diverted to establish plantations on unutilized public land. This drastically reduced fund allocations for normal forest management functions, including raising seedlings of indigenous tree species, and the protection and management of existing natural forests including PAs.

Against the background of a forestry sector characterized by a misplaced emphasis on block plantations, NSP's goal was biodiversity conservation achieved through effective involvement of local stakeholders as partners. Of the six main objectives of the NSP, two focused on biophysical activities in and around PAs and led by FD field staff. A Reimbursable Project Aid (RPA) component, to be implemented by the FD, as detailed through a Development Project Proforma (DPP), was later added when funding from the US Department of Agriculture was provided. In addition to the development of facilities in PAs (Chapter 23), habitat restoration in the five pilot PAs was an important component of the PA development programs. The main activities for habitat restoration included in-situ forest regeneration, waterbody development, and aided regeneration (mainly by raising buffer and enrichment plantations).



*Exotic teak plantation inside the Chunar Wildlife Sanctuary, 2003. [Philip J. DeCosse]*

Creating plantations on vacant forest land was expected by FD. A missing element in the initial approach was habitat restoration to be achieved through natural regeneration (e.g. seeding from mother trees, recovering regenerative rootstock, protecting naturally occurring seedlings through joint community patrolling, and encouraging coppicing from existing trees in forest areas having tree species that can be coppiced (such as Teak and Sal). In view of the limited funds for plantations it was soon realized that less expensive natural regeneration technologies would be more appropriate under NSP.

## Starting Assumptions and Subsequent Adaptation

Participatory planning to develop management plans was undertaken in the five pilot PAs. Five management plans were finalized after consulting stakeholders. These were later approved by the Ministry of Environment and Forests (MoEF), and were a major improvement over the former management/working plans that emphasized restoring forests through extensive reforestation using block plantations (planting 2,500 seedlings/ha of fast growing tree species of commercial importance). In the new PA management plans, the focus was shifted from raising expensive and ecologically inappropriate large-scale plantations to the restoration of degraded habitats, mainly through low-cost natural regeneration technology wherever suitable, to be complemented in places by aided regeneration appropriate to site requirements.

The main long-term management aim agreed in the plans is restoration and maintenance of the landscape and the constituent biodiversity of the degraded forests in the PAs to the

best possible condition. Specifically, the following key objectives were agreed to be achieved during implementation of these five year plans:

- To protect and conserve the PA forest landscape by gainfully associating key stakeholders, including the members of the existing Co-Management Committees (CMCs), community patrol groups (CPGs), and Forest User Groups (FUGs).
- To restore degraded forests mainly by encouraging natural regeneration but supplemented by aided regeneration of indigenous species in identified gaps.

A new forest landscape restoration strategy was, therefore, developed in consultation with FD field staff and other stakeholders. Effective protection of each PA's forests and constituent biodiversity in the core zone (within boundaries of declared PA) and interface landscape zone (fixed distance immediately surrounding PA boundaries) against illicit felling, forest fires, and forest grazing was found necessary for forest landscape restoration. Restoration activities in the degraded forest areas were intended to complement the protection efforts by recreating suitable habitat for wildlife. The CMCs were tasked to protect these forests by gainfully associating key stakeholders including the members of CPGs and FUGs.

The PAs located in the country's hill forests are within one of the wettest regions in the country and humidity is high throughout the year. These forests benefit from heavy dew during winter when rainfall is low and condensation helps create a micro-climate that is relatively moist throughout the year compared with the rest of the country. High rainfall and rich forest soils provide the preconditions for rapid natural regeneration from existing rootstock, coppiced trees, and natural seeding from standing mother trees. This could be enhanced through joint community protection by FD field staff and CPGs. In identified gaps where adequate natural regeneration was not coming up well, aided regeneration of indigenous species was planned.

An appropriate forest landscape restoration strategy for the pilot PAs, therefore, comprised the following key elements:

- Protecting and conserving all the remaining forests and constituent biodiversity by co-managing the PAs
- Protecting and establishing natural regeneration by encouraging recovery of coppiced trees and seed dispersal from mother trees, and tending regeneration of saplings from existing rootstocks
- Restoring degraded forests by raising and protecting enrichment and buffer plantations of native forest trees in identified areas of the core and landscape zones
- Promoting tree growing in homesteads and on unutilized *khas* lands (e.g. strip plantations along Union Parishad roads) in the landscape zone
- Improving the lives of local poor stakeholders through participatory forest use, other land-based alternative income generation activities, and safe drinking water provisions as an incentive for reducing pressure on PA forests and actively protecting them

While it took some time for the MoEF to issue letters formally approving the management plans, preparatory steps were taken by FD in consultation with NSP for carrying out habitat restoration works based on the recommendations made in the respective management plans. For example, a new activity of Teak coppice regeneration was included for those forests where illicit felling of teak plantations had taken place. In contrast to earlier emphasis on raising block plantations by clear felling existing ground flora, enhanced targets for enrichment planting were included in order to address the degraded habitats that could be restored by planting in identified gaps. Similarly, water body development works were taken up by re-excavating existing ditches and ponds that had silted up, and with provisions for maintaining existing *charas* (streams) and ponds for the use of wildlife and local people.

## Lessons Learned

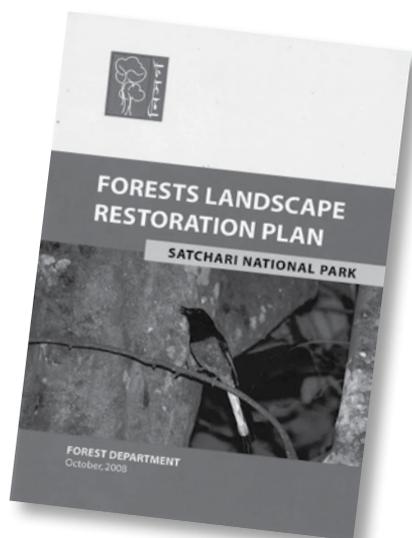
Important lessons have been learned from the process of developing management plans and three years of implementing habitat restoration activities. The following lessons are expected to inform the FD field staff and the CMCs who will continue to update and implement management plans and associated habitat restoration activities.

## Planning

*Linking annual development plans with management plans helps empower and develop skills of the Co-Management Committees.* Five-year management plans provide a framework, but resource management and fund allocation for FD field staff and practical relevance for other CMC members are greatly aided by the CMCs developing PA-specific annual development plans within the framework of approved management plans. This process has been successfully implemented for three years, whereby integrated annual development plans are developed by CMCs for planned activities that are undertaken (with NSP support) by FD, CMC, and project staff. This process has indeed empowered CMCs, particularly by giving them a role in works that have in the past been planned and implemented exclusively by FD.

*Advance site identification for plantations aids in proper regeneration of degraded forest areas.*

Depending upon biophysical and socio-economic attributes, suitable sites for establishing different types of plantations need to be identified in advance and in consultation with CMCs and other local stakeholders. Although such planting sites have been identified under NSP for the five pilot PAs for implementing forest restoration activities for five years, this exercise needs to be repeated in other forest areas in general and PAs in particular, but this will depend on establishing co-management bodies first for those areas.



*Forest habitat restoration plans were prepared for each of the five pilot PA.*

## PA forest management

*Clear felling and burning should not be allowed in PAs (or other remaining native forest areas).* The current practice of clear felling and burning of existing vegetation before raising plantations should be stopped herewith in view of biodiversity loss associated with such practices. In place of clear felling, limited “spot” cleaning of undergrowth where it would choke planted or naturally regenerating saplings within a radius of 1 m can be taken up, particularly in hill forest lands that have high rainfall resulting in the rapid growth of ground flora. Frequent weeding and cleaning operations are required to enable rapid establishment of free planted seedlings and naturally occurring regeneration.

*Joint community patrolling should be implemented for all PAs by the Forest Department.* Given the FD’s lack of resources and intense biotic pressure on forests that are surrounded by dense populations of both humans and cattle, effective protection against illicit felling, forest fires, and forest grazing has increasingly become the peoples’ function in Bangladesh. Joint community patrolling by involving the members of CPGs and FUGs under the supervision FD field staff, as demonstrated in the pilot PAs, should be mainstreamed through wider adoption of co-management in other forests and by following the community patrolling guidelines.



*Land cleared and burned in preparation for plantation, west side of Teknaf Wildlife Sanctuary, early 2004. [Joe Mellott]*

*Proper management is required for good and healthy natural regeneration of native trees.* Bangladesh’s climate and soils result in good natural regeneration. However, natural regrowth does not get established—due mainly to human pressure. Joint community patrolling would protect natural regeneration, but to improve growth requires suitable silvicultural measures, such as cleaning climbers from naturally occurring saplings (see above). To encourage coppice regeneration of species such as Teak and Sal into mature trees, old, high, and malformed stumps, and mis-shapen coppice shoots can be pruned once CPGs and FUGs are oriented in these practices to provide an income from the byproducts. For example, reducing coppice regeneration to 2-3 shoots per stool should be done during the second year for the regenerating coppice stumps. More importantly, there is a risk that large dead trees will be removed, resulting in loss of a vital component of forest habitat (supporting significant invertebrate and bird fauna including hornbills, which are key dispersal agents of forest tree seeds). Proper monitoring and protection is required to keep track of the number of dead and dying trees so that an adequate number are retained for wildlife.

*Management of bamboo clumps is required so that the natural regeneration of slow growing tree species is not hampered.* Bamboo as a primary species of plant succession comes up naturally in many PAs, particularly in degraded sites such as Chunati, which is affected by

illicit felling and forest fires. Given protection through existing CPGs, regenerating bamboo areas are expected to develop over a period of time. Stands of mature bamboo provide a valuable wildlife habitat in themselves, but may hamper and/or overtop natural regeneration of indigenous forest tree species that are generally slower growing. Where forest canopy cover is incomplete and management plans aim to restore canopy cover in an area, more intensive management of bamboo will be necessary. In such areas limited usufruct rights could be allocated to CPG and FUG members who would earn some income from selective harvesting of mature bamboo to permit forest regrowth. However, it is important that sufficient bamboo habitat is maintained rather than clearing an area, and that best practices are adopted, for example, old bamboo culms should be removed starting from the centre (not from the periphery) of a mature clump and working outward over three years.



*Sunkhola (grasses) in the landscape at Chumati Wildlife Sanctuary.*  
[Nishorgo Support Project]

*Management of sunkholas is important in order to prevent forest degradation. Sunkholas (sungrasses) are patches of grasslands, found in almost all the PAs where forest has been lost. These are still beneficial to local people who collect grasses mainly for thatching material; they also have some benefits for wildlife as they provide more edges, but this usually has limited benefit for forest-specialist species and more for generalist species. Over-exploitation of sunkholas is resulting in loss of grasslands and severe degradation of land due mainly to fires that are repeatedly lit by villagers for*

sprouting new grasses. Rotational cutting of grasses on a less frequent cycle that is regulated through CMCs and employs existing CPGs would help to regain the vitality of degraded *sunkholas*. In addition, plans can include converting more extensive areas of grass back to forest, and in other public lands within the landscape assisting communities to raise whichever grasses and herbs are agreed to have the highest value for those communities

## Plantations

*Before taking up tree planting to restore habitat, it is important that the main factors for forest degradation and past failures of plantations are ascertained and addressed in advance.* In order to ensure the success of forest restoration, the causes of past failures need to be removed by taking measures to prevent illicit felling, forest fires, and grazing. Where there are existing on-site seed sources and rootstocks, the protection of forest lands for at least one year is expected to result in natural regeneration – which needs to be retained as part of future growth. In degraded areas a quick visual estimate of natural regeneration status by FD field staff may identify areas that are not regenerating, and in these, full planting activities (at 2,500 seedlings/ha) are appropriate, while in other areas with partial forest recovery enrichment planting (625 or 1,250 seedlings/ha) is appropriate.

*For participatory plantations (e.g. buffer plantations and strip plantations), timely and*

*advance selection by CMCs of appropriate participants from neighboring villages is vital.* Preferably, the beneficiaries should be identified from the existing CPGs that are active in the protection of nearby forests.

*In view of the renewed focus on biodiversity conservation, the old concept of developing and maintaining central nurseries in each forest division should be revived.* This is necessary to ensure a regular supply of seedlings of indigenous tree species, because planting these slower growing tree species requires at least one year old seedlings.

*Planting needs to be done along contour lines in undulating terrain.* As most of the PAs are located on hilly terrain, it is important that the planting pits are dug during April-May along contour lines in order to retain moisture and check soil erosion. This should also improve moisture retention resulting in the recovery of existing rootstock.

## **Water bodies**

*Management of water bodies to meet the needs of biodiversity and local people.* Plantations have generally been raised and managed by FD field staff without consideration of existing water courses and water bodies that dot the landscape of many Pas, particularly in undulating terrain. Water bodies are important not only for the conservation of soil and water but also for meeting water needs of wildlife and local people. Plantations of riparian species along streams should not be harvested in view of their positive role in water and soil conservation arising as a result of strong water-tree linkages. A list of existing water bodies along with the details of nearby villages and the wildlife using them for drinking water should be maintained by the CMCs. Where water bodies are silted up, restoration and maintenance (e.g. desiltation, cleaning, bunding) should be taken up by involving local people. Stakeholders' participation may be ensured through rights over riparian trees and fish, and by raising vegetables and other economically valuable plants along and around existing water bodies.

## **Records and monitoring**

*Plantation journals need to be well maintained.* Planting details should be entered into a plantation journal to be maintained at the offices of the concerned Range and CMC. Traditionally, this has been the responsibility of the FD. However, the CMOs should also be held accountable as part of their direct role in conservation management. Community Patrol Group members, together with FD field staff, should regularly present the status, technical and financial details of replanting in their monthly meetings.

*There is a strong need for a robust monitoring mechanism to ensure success of plantations.* Each CMO has a Monitoring Sub-Committee that should exclusively be made responsible for plantation monitoring. The quality of seedlings should be ensured to begin with, followed by stacking and pitting along contour lines. For easy monitoring, planting should be done in blocks of about 4 ha each. Two months after planting, the survival and growth of seedlings should be assessed by the Monitoring Sub-Committee and recorded in the plantation journal. In case of mortality, soil preparation operations, done along with the first/second weeding, shall be monitored for ensuring quality seedlings and future survival.

*Monitoring should continue for several years, with adjustments in planting practice as required.* Based on sound field inventory methods, the survival of planted seedlings (along with upcoming natural regeneration) and plantation area details should be recorded annually for the first three years after planting. For instance, a few circular sample plots of 0.01 ha (equivalent to a circle with a 5.64 m radius) can be marked in each 4 ha planting block. Mid-course corrections will be made and responsibility fixed based on the results of monitoring. A final assessment will be done at the end of the third year when the plantations will be treated as established (against mortality factors such as grazing and water stress). However, as timber value increases over the years, joint patrolling will need to be further strengthened against illicit felling and forest fires.

## **Conclusion**

Despite socio-technological constraints that hinder restoration of native trees in forest PAs and optimal productivity, leading to a regular flow of socio-economic benefits to local communities in participatory landscape afforestation, edaphic and climatic conditions in forest lands and PAs of course favor tree growth. Forest can be restored by proper planning and implementation of technical and managerial measures identified through the pilot experience.

Nevertheless, the FD has not mainstreamed these forest regeneration and ecosystem approaches. This will require fundamental reorientation of its field staff, including changes to the curricula used in training staff of PAs. Nishorgo has introduced such programs on a small scale, but now this needs to be woven into the normal operational processes of the Department.

More generally, the implication and opportunity is to re-think the role of foresters, to go along with increased emphasis on service provision, extension/outreach, and public involvement. They should think of themselves as “Ecosystem Managers in the Public Interest” rather than people who grow trees to produce timber.

## Monitoring Changes and Impact

*Nasim Aziz*

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The Project aimed to develop a participatory monitoring and evaluation system that would continue beyond the Project period. If the stakeholders took ownership of this system by participating in identifying and developing a simple viable system generating reliable information then this was expected to sustain and to facilitate learning and collective action.

To achieve this goal, the following steps were planned:

- through consultation with stakeholders, generate a minimum number of cost-effective and reliable indicators;
- with participation of stakeholders develop a system to evaluate the performance of the project; and
- institutionalize the system.

### Starting Assumptions and Subsequent Adaptation

Analysis of secondary data all five PAs (Bari, A. and Dutta 2003 and 2004; Mollah and Nath 2003; NACOM 2003a and b) identified the following major threats that might be monitored by communities: illegal felling, collection of fuel wood, and plantation of fast growing exotic species. These three can be considered process indicators, so an outcome or output level indicator was proposed – one that would show impact on wildlife since the cumulative effects of these three activities is damage of wildlife habitat and subsequent declining wildlife populations. To guide this a literature survey was made for a range of mammal, bird, amphibian, and reptile species. Indicators to measure change in socio-economic condition and participation were also proposed, including: increase in income of poor stakeholders, level and scale of participation, and legal base for participation.

To expedite the process, a set of potential indicators was presented to the Forest Department (being a key stakeholder) during early 2004. Forest Department participants were asked to give their views on the practicability of indicators based on relevance, responsiveness, linkage, ease of data collection, ease of assessment and cost, but there was hardly any response. This was most likely because effective monitoring of biodiversity and forest health were new concepts for the Forest Department which did not expect that such monitoring would work due to lack of manpower, capacity and budget. Moreover, illegal felling is a sensitive issue and fuelwood extraction is very widespread. There was less expertise in managing natural forest relevant to PAs than in managing plantations (often of exotic species), and monitoring of participation had not been adopted before.

The project team made field visits to evaluate the feasibility of potential indicators and revised them to: illegal felling, basal area estimation, photo-monitoring (to capture illegal felling and increase in natural regeneration and to use photographs as a communication tool), selected bird species populations, and a community scorecard to measure socio-economic improvements and participation.

## Illegal Logging Data

The project decided to use the “Offence Registers” of Forest Department (FD) as the source for illegal felling data in order to strengthen the already established system and avoid introducing a new system. Under the Bangladesh Forest Manual (part 2), each management unit must register the number of offence cases and number of trees felled. The Chief Conservator of Forests then sends regular reports, including illegal felling data, to the relevant ministry. It would also bring transparency and accountability, and make such information more available to the public.

However, the field level Nishorgo staff raised questions about the reliability of this data as in some cases the project staff found tree stumps covered with soil by FD staff. Bureaucratic barriers were overcome to access such data. To overcome the reliability question, a basal area survey was planned (the method of data collection is comparatively easy and less time consuming).

The Project monitoring team members collected illegal logging data from the Offence Registers spending hours with FD officers to develop relationships, as well as in the field. Data were cross-checked by finding in the field the serial numbers that FD is required to hammer into tree stumps, and the FD was informed of the location of stumps which they had missed and later it was crosschecked if those were registered. The Project worked hard to improve the reliability of the data, but once the Project ends, will it remain at the level it is now? Most likely no, except where there are interested and well motivated Assistant Conservator of Forests and Range Beat Officers.

In practice some FD officials were found to have little interest in generating and acting upon reliable data on tree felling and habitat change in Protected Areas. For example, in Lawachara NP the Project team summarized illegal felling data for the financial year 2003-04 (baseline data) and the official record totaled 1,192 trees felled,. A loss of about 100 trees per month is clearly substantial, and the official figures showed 709 trees felled in 2002-03, yet the DFO stated that illegal felling had declined and was not a concern.



*Timber processing structure in Teknaf Wildlife Sanctuary*  
[Nishorgo Support Staff]

However, in some PAs, the FD attitude is still that only FD staff can go inside the forests. For example, in Teknaf Wildlife Sanctuary in April 2005 Project staff and some Forest Guards visited deep inside the PA and found a log processing site (see photo below). In order to ensure transparency it would be better if local stakeholders including members of Co-Management Councils and Community Patrol Groups are involved in field inspections and patrolling.

Since 2007, the FD staff holding the positions of Member-Secretary in the Co-