



**Restoration of Degraded Forest Habitat:
Monitoring Report
Lawachara National Park
2005-06 & 2006-07**



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Executive Summary

1. A total of 267 ha of plantations raised by the Forest Department as buffer, enrichment and coppice plantation during the FY 2005-06 & 2006-07 at Lawachara National Park.
2. These plantations were surveyed during October of 2007 by the monitoring team of Nishorgo Support Project. Subsequently for each plantation a separate report was send to Dhaka office for later compilation. This is the compiled report which summarized site preparation activities, species planted, spacing maintained, maintenance operations, survival percentage of planted seedlings and information on other related activities.
3. Overall, established plantations can be said to be successful, as survival percentage ranges from 85% to 100% based on samples or sample plots.
4. In adjacent Reserved Forest areas buffer plantations were raised, main species being Acacia Hybrid. In one plantation Bahera was mixed with Acacia.
5. Inside the area of the National Park, enrichment plantations were raised with local species, with emphase on fruit bearing species.
6. In all plantations, weed species was found to be suppressing the established plantations despite weeding operations were carried out.
7. Two plantation journals were found available at Beat Office were proper information was missing like maps of the plantation. We recommend that for future plantations and reference, proper documentation be followed especially map preparation.
8. In all cases, CMC members were consulted and/or informed about plantation activities.

1. Background of the Report

Forest Department under Nishorgo Support Project has been doing different habitat restoration activities since FY 2005-06 and 2006-07 in and around the five pilot Protected Areas under Component 2 of contract between USAID & IRG (stated as Objective 6 of approved PP). Major habitat restoration activities include raising enrichment, buffer, special fruit/fodder tree plantation, assisted natural regeneration, grass plantation etc. Operationally, raising of these plantation and subsequent monitoring activities are done by the Department itself. However, the Project Director recently in a letter has recently asked monitoring team members of Nishorgo to actively engage in the monitoring of these plantation activities with a view to help field level FD's officials to properly raise these plantation according to the guidelines specified in the respective management plans and also to amend error, if any, while doing such activity. Accordingly, methodology and format for data collection was developed in Dhaka and distributed to field level monitoring officials of NSP for data collection. Based on the format and methodology, brief reports on each type of plantations were sent back to Dhaka office for compilation. This compiled Plantation Monitoring Report of Lawachara National Park is based upon reports done by Gazi Sazzad Hossain, PMO northern region, and compilation, mapping and edited by Nasim Aziz (ESMS).

2. Objectives of the Report

The objectives of the report are:

- to show performance of the raised plantation and
- to identify any irregularities
- to suggest better species selection if needed
- to suggest better site selection if needed

3. Scope of the Report

It has to be noted that Nishorgo monitoring team was authorized only to monitor plantation raised under the FY 2006-07. The team however felt that it would be more helpful for the purpose of documentation if plantation raised under FY 2005-06 also been evaluated. Hence, plantation raised by the Department under Nishorgo Support Project for both FY 2005-06 & FY 2006-07 were monitored (Table 1).

The survey was limited only to **the performance** of the raised plantation (Table 1), **not the financial evaluation** of the related activities.

Table 1: Plantation raised under Nishorgo Support Project at Lawachara National Park

Sl	Year	Plantation Type	Forest Division	Range	Beat	Area (ha)
1	2005-06	Buffer Zone	Sylhet	Moulvibazaar	Kalachara	30
2		Enrichment	Sylhet	Moulvibazaar	Lawachara	100
3		Teak Coppice	Sylhet	Moulvibazaar	Lawachara	20
4	2006-07	Buffer Zone	Sylhet	Moulvibazaar	Chautali	12.1
5		Buffer Zone	Sylhet	Moulvibazaar	Kalachara	31
6		Enrichment	Sylhet	Moulvibazaar	Lawachara	25.6
7		Enrichment, fruit trees for WL.	Sylhet	Moulvibazaar	Lawachara	50.47

4. Methodology

There are different ways of monitoring plantations. We the monitoring team of NSP consulted Working Plan Division of Forest Department so that our methods are similar to that of FD's to avoid any confusion and to be consistent in the methodology. In the sections below, the traditional rules and the methods we followed are described below.

4.1 Buffer Plantation

Generally Forest Department has some thumb rules to raise different kinds of plantation. For block/woodlot plantation (i.e., buffer plantation) the rule is to plant 2500 seedlings in 1 ha area. Similarly for ease of monitoring couple of sample plots of 0.01 ha is taken where survival percentage is measured. For 100% successful plantation, 25 seedlings have to survive in the sampled 0.01 ha. Generally, if average survival percentage is equal or greater than 80, then it is considered a successful plantation and vice-versa. Such plots were laid out for evaluating performance of the buffer plantations mentioned above (Table 1).

Again, for evaluation, generally Forest Department lays out 0.01 ha plots per hectare. As total area of buffer plantation raised in 2005-06 and 2006-07 is 73 ha (Table 1), a total of 73 plots of 0.01 ha is required for evaluation. However, number of plots becomes too many for timely evaluation and hence 5 well spread out plots were established for each buffer plantation (in this case 3 buffer plantation X 5 plots = 15 plots of 0.01 ha).

4.2 Enrichment Plantation

Evaluating enrichment plantation is difficult as seedlings are planted sporadically over an open canopy area to enrich the existing trees. In such case, easy way to evaluate is to take some individual seedlings as a sample. Another method is to lay a transect (of workable width and length based on situation in the field) then subsequently measure number of seedlings found planted and survived. In both cases, number of seedlings planted for enrichment needs to be known.

At Lawachara National Park, for evaluating enrichment plantations of 176 ha, 15 individual seedlings per plantation were taken as sample (Table 1).

4.3 Coppice Plantation

Traditional method of raising coppice plantation is to retain 300 saplings per hectare provided that the existing plantation is monoculture. Depending on the type of plantation and existing situation in the field the number of retained coppice may vary. In any case, the number of saplings retained should be documented while raising such coppice plantation.

For monitoring 20 ha Teak coppice plantation, individual saplings were taken as sample, no plot was laid out.

4.4 Data Collected

Apart from data to measure survival percentage, additional data was collected (tried to collect) on:

- GPS location of each plantation,
- planting materials (age and height),
- species wise number of seedlings,
- site preparation activity, spacing,
- soil works and treatment,
- protection activity,
- weeding & refilling,
- if consultation with CMC was done while or before plantation activity and lastly
- if plantation journal was maintained properly.

5. Limitation of the collected data

1. The survey couldn't actually measure the area reported for various plantation to see actually if there is any discrepancy in the reported area and actual area in the field. It was planned that traversing the boundary of each plantation will be done using hand held GPS to map the raised plantation and subsequent area estimation. Due to heavy rainfall, and heavy undergrowth the attempt failed and later abandoned. Only the point location was taken and mapped.
2. Due to heavy rainfall and limitation of time, statistically adequate samples/ plots could not be taken for each type of plantation.

5. Observations

5.1 Site Preparation Activities

1. For all plantations of different kinds, site preparation works were taken before hand. These works includes bush clearing, alignment and stacking (spacing), pit digging & soil treatment.
2. Depending on the type of plantation spacing varied, for buffer plantation 2m X 2m spacing was maintained (2500 seedlings per ha) for all cases. For enrichment plantation the spacing varied depending on presence of existing tree.
3. Soil was mixed with natural and chemical fertilizer only for 100 ha enrichment plantation.

6.2 Number & Species Selection

4. For buffer plantations 2500 seedlings were planted per hectare. Main species was Acacia hybrid as per the Simplified Management Guidelines of Lawachara National Park (2006). Only Bahera (*Terminalia bellirica*) was mixed (12%) with Acacia hybrid in buffer plantation raised in 2006-07.
5. Coppice of Teak (20 ha) was retained in the previous Teak & Jarul plantation. However, number of saplings retained was not found. The best saplings were retained as per the general rules. The Simplified Management Guidelines of LNP (2006) however does not mention any procedure to maintain / enhance coppice plantation.

Table 2: Summary of Plantation Activities in the Plantation Raised at Lawachara National Park

Sl	Year	Plantation Type	Beat	Area (ha)	Site Preparation & soil works	Number of seedlings	Maintenance & Refilling	Plantation Journal	Cost in Taka
1	2005-06	Buffer Plantation	Kalachara	30	Raised seedlings, age: 1year, height: 90 cm; Bush Cutting was done; Alignment and stacking was done; 2mX2m spacing; Pit size: 45cmX45cmX45cm.	100% hybrid Acacia; 75,000 nos	3 Weeding done so far.	Send to DFO office for approval.	8,43,750
2	2005-06	Enrichment plantation	Lawachara	100	Raised and purchased; spacing minimum 15 feet depending on tree presence; Pit: 1/ 1/ 1 feet; the soil mixed with natural & chemical fertilizer.	36,000 seedlings of fruit bearing forest trees.	No weeding or gap filling done in the second year.	Yes; although no map of the area prepared	7,50,000
3	2005-06	Teak Coppice	Lawachara	20	Cut down others coppice keeping the best one, bamboo stick tied with that coppice and then soil is put on the lower portion of the stump.	Done under SFD. Not managed under WLMNCD	WLMNCD did not draw fund for such work.	Yes; although coppice number not found.	1,00,000
4	2006-07	Buffer Zone	Chautali	12.1	Seedlings raised, age: 3 months, height: 48.4cm; Cutting was done; Alignment and stacking was done; 2mX2m spacing; Pit size: 45cmX45cmX45cm	100% Acacia hybrid; 30,250 nos of seedlings	on schedule	Send to DFO office for approval.	3,49,250
5	2006-07	Buffer Zone	Kalachara	31	Raised, age: 3months. Height: 65cm; Cutting was done; Alignment and stacking was done; 2mX2m spacing; Pit size: 45cmX45cmX45cm	77,500 nos; 88% Acacia hybrid & 12% Bahera	on schedule	Send to DFO office for approval.	8,95,125
6	2006-07	Enrichment	Lawachara	25.6	Raised, age: 3 months, height: 57cm; Spot clearing around three feet was done. Seedlings were planted wherever suitable place found Pit: 45cm X45cmX45cm	16,000 nos seedlings of fruit bearing forest trees.	on schedule	Send to DFO office for approval.	1,32,000
7	2006-07	Enrichment, fruit trees for WL.	Lawachara	50.47	Same as above.	63,088 nos seedlings of fruit bearing forest trees.	on schedule	Send to DFO office for approval.	8,67,375

Table 3: Summary of Performance of Plantations Raised at Lawachara National Park under Nishorgo Support Project

Sl	Year	Plantation Type	Beat	Area (ha)	Survival (%)	Avg height (m or cm)	Consultation with CMC	Problems	Recommendations
1	2005-06	Buffer Zone	Kalachara	30	100	2.5m	Yes; site & species selection.	Weed infestation and grazing.	2 m radius spot weeding should be done immediately. MOU with the beneficiaries should be done before plantation work. In the low land Gamar & Kadam can be planted. Chapalish can be planted on the top of the hill for wildlife habitat. Why???
2	2005-06	Enrichment	Lawachara	100	85	1.15m	Yes	Weed infestation.	Weeding should be done immediately. There are other open spaces where further enrichment plantation can be done.
3	2005-06	Teak Coppice	Lawachara	20	100	4m	Yes	Illegal felling of exiting teak trees.	Weeding is needed. There are some other coppices which can be managed. Community patrolling should be intensified to protect illegal felling.
4	2006-07	Buffer Zone	Chautali	12.1	95	50cm	Yes	Weeds & cattle.	Weeding may be necessary. Buffer plantation should be protected.
5	2006-07	Buffer Zone	Kalachara	31	100	67.5cm	Yes	Some time seedlings are damaged by wild animals and local people	Patrolling be intensified.
6	2006-07	Enrichment	Lawachara	25.6	98	60cm	Yes	Weed infestation.	Weeding will be needed soon. There are some suitable vacant places for enrichment where further plantation can be done.
7	2006-07	Enrichment, fruit trees for WL.	Lawachara	50.47	98	60cm	Yes	Weed infestation.	Weeding will be required soon. Some suitable vacant places available for future plantation.

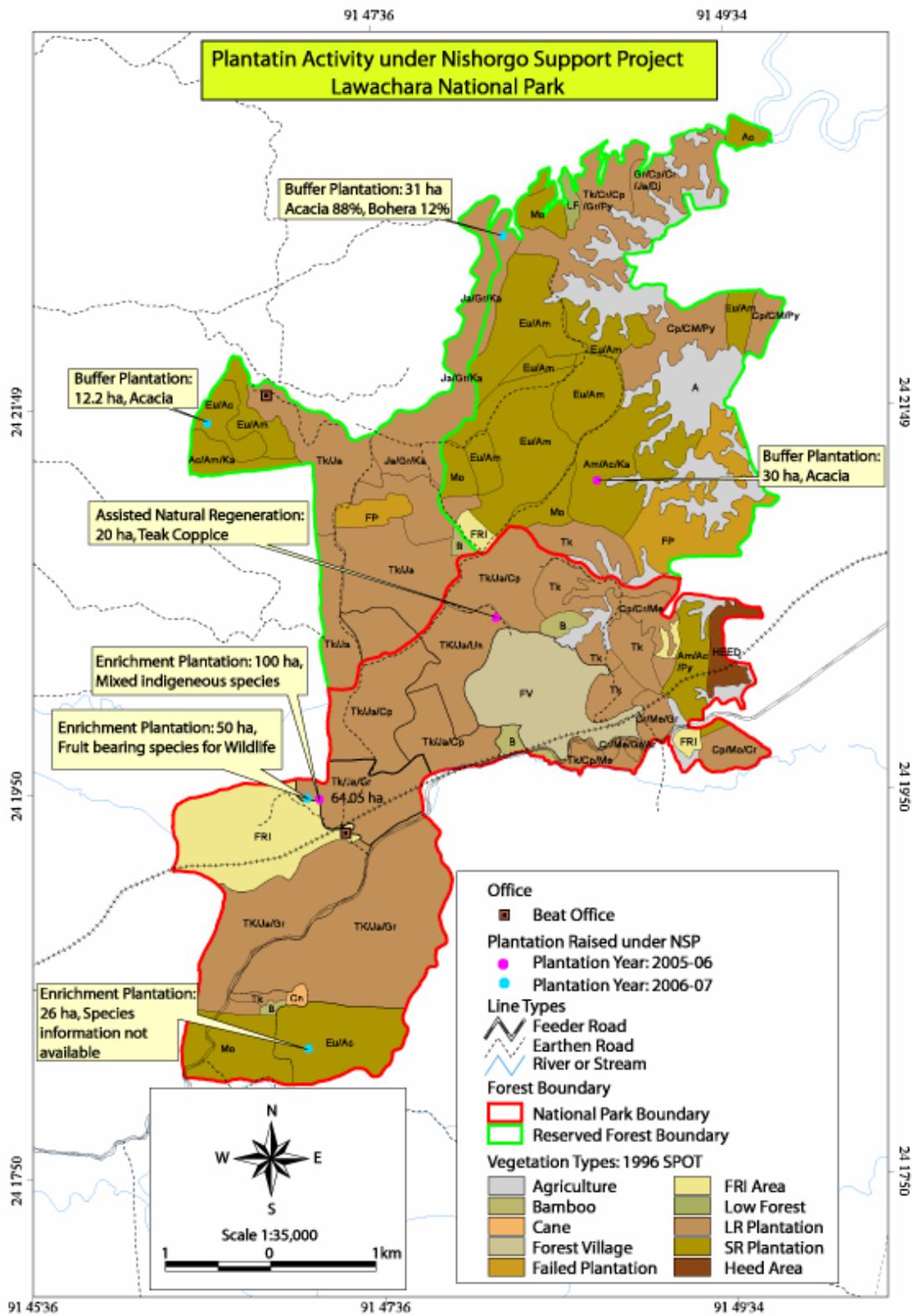


Figure 1: Location of Plantation Sites Raised under Nishorgo Support Project

6. Among three (3) enrichment plantations raised in 2005-06 & 2006-07, document on type & number of species planted was found only for 100 ha plantation raised in 2005-06 (Table 4).

Table 4: Species and subsequent number of seedlings used in 100 ha Enrichment Plantation

SI No	Species	Number	SI No	Species	Number
1	Kawfal	3377	21	Bel	22
2	Jam	5759	22	Arjun	2372
3	Dhakijam	381	23	Amloki	595
4	Bahera	629	24	Krishnachura	318
5	Chapalish	5666	25	Lukluki	261
6	Lotkan	413	26	Rata	517
7	Guava	512	27	Gamar	432
8	Jackfruit	1520	28	Kadam	182
9	Horitoki	924	29	Agar	175
10	Mango	315	30	Balach	70
11	Dumur (Red)	530	31	Lohakat	84
12	Dumur (Black)	413	32	Ulotkambol	40
13	Tetul	11	33	Hargoja	50
14	Amra	40	34	Chatian	40
15	Dafol	340	35	Kalomenda	25
16	Jarul	2990	36	Katbadam	88
17	Jolpai	255	37	Boilam	12
18	Neem	9	39	Dewa	140
19	Chalta	112	40	Others	696
20	Sonalu	323		Total	30638

7. However, the total number of species planted (36,000 nos) and total number of seedlings by species (30,638 nos) does not match as per plantation journal.
8. Choice of species found to be appropriate as per management guideline, giving preference to fruit bearing trees, which in future will ensure food supplies for wildlife therein.
9. For the rest two enrichment plantations, no information was found with regard to what kind & number of species was planted. We assume based on survey similar kinds of species was planted.

6.3 Maintenance & Refilling

10. Although weeding and/or refilling have been done as per schedule for plantations, but due to heavy rainfall and faster growth of weed species all plantations requires weeding once again (Table 2 & 3).
11. Although management guideline only prescribed weeding operations for enrichment plantation (3 weeding operations in 2nd year and 2 weeding operation in 3rd year) but similar activity should also be carried out for buffer plantations as well.

6.4 Seedlings Establishment

12. Survival percentage of plantations was found to be very satisfactory (Table 3) based on the samples taken. Except for 85% survival of 100 ha enrichment plantation, all other plantations have more than 95% survival rate.
13. As per the general rule, all plantations can be said to be successful due to more than 80% survival rate.
14. Comparatively lower survival percentage (85%) of the 100 ha enrichment plantation may be due to competitions from weed species. We therefore recommend taking weeding operation in all plantations provided that budget allows. We also recommend discussing this issue with CMC to involve community members/beneficiaries into weeding operations.
15. Growth of planted seedlings (particularly for plantations of 2005-06) was also found to be satisfactory. Teak coppices (20 ha, 2005-06) attained an average height of 4 meter, fast growing Acacia hybrid (30 ha plantation, 2005-06) attained an average height of 2.5 meter, and slow growing indigenous fruit bearing species (100 ha enrichment plantation, 2005-06) attained an average height of 1.15 meter (Table 3).
16. Average height of species planted in the FY 2006-07 is also found to be satisfactory (Table 3).

6.5 Site Selection

17. Overall site selection followed the general norms i.e., indigenous local species in core area and fast growing species in adjacent buffer area (Reserved Forest).

6.6 Documentation

18. Apart from two plantations i.e., Teak Coppice and Enrichment plantations raised in the 2005-06, all plantation journals were send to DFO office for approval (Table 2).
19. The two found plantation journals are not complete, the teak coppice plantation has map but number of coppice retained not mentioned. The 100 ha enrichment plantation journal do not have maps.

6.7 Consultations with CMC Members

20. Reported by local level FD staffs that for all plantations, CMC members were informed.