



**Restoration of Degraded Forest Habitat:
Monitoring Report
Rema-Kalenga Wildlife Sanctuary
2005-06 & 2006-07**



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Executive Summary

1. About 181 ha of plantations raised by the Forest Department as buffer (2 plantations – 101.5 ha), enrichment (2 plantations – 40ha) and two coppice plantation (40ha) during the FY 2005-06 & 2006-07 in and around Rema-Kalenga Wildlife Sanctuary.
2. These plantations were surveyed during September-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. Survival percentage of seedlings in plantations raised during the FY 2006-07 is from 90% to 100%. The same for plantations established in the FY 2005-06 ranges from 85% to 100% from sample survey.
4. Height of the established seedlings/saplings for 2005-06 plantations ranges from 1.5 meter for enrichment, 5 meter for buffer, and 7 meter for coppice plantation. The same for 2006-07 plantations ranges from 0.7m, 1.5m and 7m for enrichment, buffer and coppice plantations respectively.
5. In adjacent Reserved Forest areas at Kalenga and Rashidpur Beat, buffer plantations were raised, main species being Acacia Hybrid. Although Plantation Journal of Telmachara Beat mentioned that species like Gamar, Chickrassi & Bohera were also was planted, but in our sample survey only Acacia hybrid was found.
6. Enrichment plantations or special fruit tree plantations for wildlife were raised with local forest species, with emphasis on fruit bearing species **inside of National Park and outside as well** in places dominated by scattered trees along with weeds and bush.
7. For some plantations, weed species was found to be suppressing the established seedlings despite regular operations due to high rain fall. In this context, CMC can and may provide support by deploying community members / beneficiaries if properly approached. Such initiative will not only save cost but also increase ownership of the community.
8. Forest Department was found to maintain plantation journal.
9. In all cases & in varying degrees, CMC members were informed, consulted and involved in 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 Rema-Kalenga Wildlife Sanctuary is based upon reports done by Gazi Sazzad Hossain, PMO northern region, and compiling, mapping and editing 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 NSP during FY 2005-06 is also 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 Rema-Kalenga Wildlife Sanctuary

| Sl | Year | Plantation Type | Forest Division | Range | Beat | Area (ha) |
|----|---------|-----------------|-----------------|------------|--------------|--------------|
| 1 | 2005-06 | Buffer Zone | Sylhet | Hobiganj-2 | Rashidpur | 26 |
| 2 | | Enrichment | Sylhet | Hobiganj-2 | Kalenga | 20 |
| 3 | | Teak Coppice | Sylhet | Hobiganj-2 | Rashidpur | 20 |
| 4 | 2006-07 | Buffer Zone | Sylhet | Hobiganj-2 | Rashidpur | 75.5 |
| 6 | | Enrichment | Sylhet | Hobiganj-2 | Kalenga | 20 |
| 7 | | Teak Coppice | Sylhet | Hobiganj-2 | Rashidpur | 20 |
| | | | | | Total | 181.5 |

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) or circular plots then subsequently measure number of seedlings found planted and survived. In both cases, number of seedlings planted for enrichment needs to be known.

At Rema-Kalenga Wildlife Sanctuary, for evaluating 40 ha enrichment plantations, 0.1 ha circular plots were established (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 Teak coppice plantation, sample plot of 0.1 ha 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.
2. Depending on the type of plantation spacing varied, however, 2m by 2m spacing was maintained for all buffer plantations (Table 2). For other plantations no spacing maintained, especially for enrichment plantation seedlings were planted were suitable place was found (Table 2).
3. Spot weeding of 1 meter dia around planting spot was done for enrichment plantation.

6.2 Number & Species Selection

4. For buffer plantation 2500 seedlings per ha, enrichment plantation 630 to 750 seedlings per hectare was planted, and for Teak coppice management, around 900 Teak saplings per hectare was retained (Table 2).
5. For buffer plantations main species was Acacia hybrid as per the Simplified Management Guidelines of Rema-Kalenga Wildlife Sanctuary (2006). Species like Mangium hybrid, Mahagoni and Bokain was also used as per Forest Departmen staff. However, sample survey found 93% Acacia & 7% Mangium hybird at 2005-06 plantation and only Acacia hybrid in 2006-07 plantations (Table 2).
6. Although general rule is to keep 300 saplings per hectare for Teak coppice management, but retention of higher number of saplings (Table 2) may be due to good growth of coppice.

Table 2: Summary of Plantation Activities in the Plantation Raised at Rema-Kalenga Wildlife Sanctuary

| 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 Zone | Rashidpur | 26 | Purchased & raised seedlings, age: 1year, height: 120 cm; Bush Cutting, alignment and stacking was done; 2mX2m spacing; Pit size: 45cm X 45cm X 45cm. | 93% Acacia & 7% Mangium hybrid, 65,000 nos | Gap felling & weeding done. | At SDFO office for approval. | 7,31,250 |
| 2 | 2005-06 | Enrichment | Kalenga | 20 | Raised and purchased; age: 1year, height: 120 cm; no spacing at suitable places; Pit:45cm/45cm/45cm; no soil treatment. | 15,000 nos native seedlings. | Weeding or gap filling done. | At SDFO office for approval. | 1,50,000 |
| 3 | 2005-06 | Teak Coppice | Rashidpur | 20 | Best saplings (1feet) kept, cutting down (1.5feet radius) others coppice, bush clearing done. | 890 saplings per hectare. | 1 st Weeding done, 2 nd on schedule. | At SDFO office for approval. | 1,00,000 |
| 4 | 2006-07 | Buffer Zone | Rashidpur | 75.5 | Seedlings raised and purchased, age: 1 yr, height: 120cm; Cutting was done; Alignment and stacking was done; 2mX2m spacing; Pit size: 45cmX45cmX45cm | 100% Acacia hybrid 1,88,750 nos; | Gap filling & weeding done. | At SDFO office for approval. | 21,23,437.5 |
| 5 | 2006-07 | Enrichment | Kalenga | 20 | Raised and purchased, age: 1yr. Ht: 60cm; clearing (1.0 m dia) at planting spot, no spacing, wherever suitable. | 12,600 nos seedlings of indigenous forest trees. | Gap filling & weeding done. | At SDFO office for approval. | 1,03,125 |
| 6 | 2006-07 | Teak Coppice | Rashidpur | 20 | Best saplings (1feet) kept, cutting down (1.5feet radius) others coppice, bush clearing done. | 910 nos saplings per hectare. | 1 st Weeding done, 2 nd on schedule. | At SDFO office for approval. | 1,00,000 |

Table 3: Summary of Performance of Plantations Raised at Rema-Kalenga Wildlife Sanctuary 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 | Rashidpur | 26 | 98 | 5m | Beneficiaries selected by CMC. | Less care as beneficiaries live far away from plantation. Weed grown again. | Participants should be selected from nearby villages so that they can take care of plantation regularly. Weeding should be done immediately (2 m radius spot weeding). |
| 2 | 2005-06 | Enrichment | Kalenga | 20 | 85.33 | 1.5m | CMC was informed after plantation work. | Weed grown again. | Weeding can be done again. Evidence of natural regeneration which can be assisted through proper weeding (spot clearing). |
| 3 | 2005-06 | Teak Coppice | Rashidpur | 20 | 100 | 7m | Beneficiaries selected by CMC. | same as below. | Participants should be selected from nearby places and need to involve them in weeding activities. |
| 4 | 2006-07 | Buffer Zone | Rashidpur | 75.5 | 98.8 | 1.5 | Beneficiaries selected by CMC. | Less care as beneficiaries live far away from plantation. | Participants should be selected from nearby villages so that they can take care of plantation regularly. |
| 5 | 2006-07 | Enrichment | Kalenga | 20 | 90 | 70cm | CMC was informed after plantation work. | Seedlings height is less. | Consultation with CMC should be done before for future plantations. |
| 6 | 2006-07 | Teak Coppice | Rashidpur | 20 | 100 | 7m | Beneficiaries selected by CMC. | Less care as beneficiaries live far away from plantation | Participants should be selected from nearby places. |

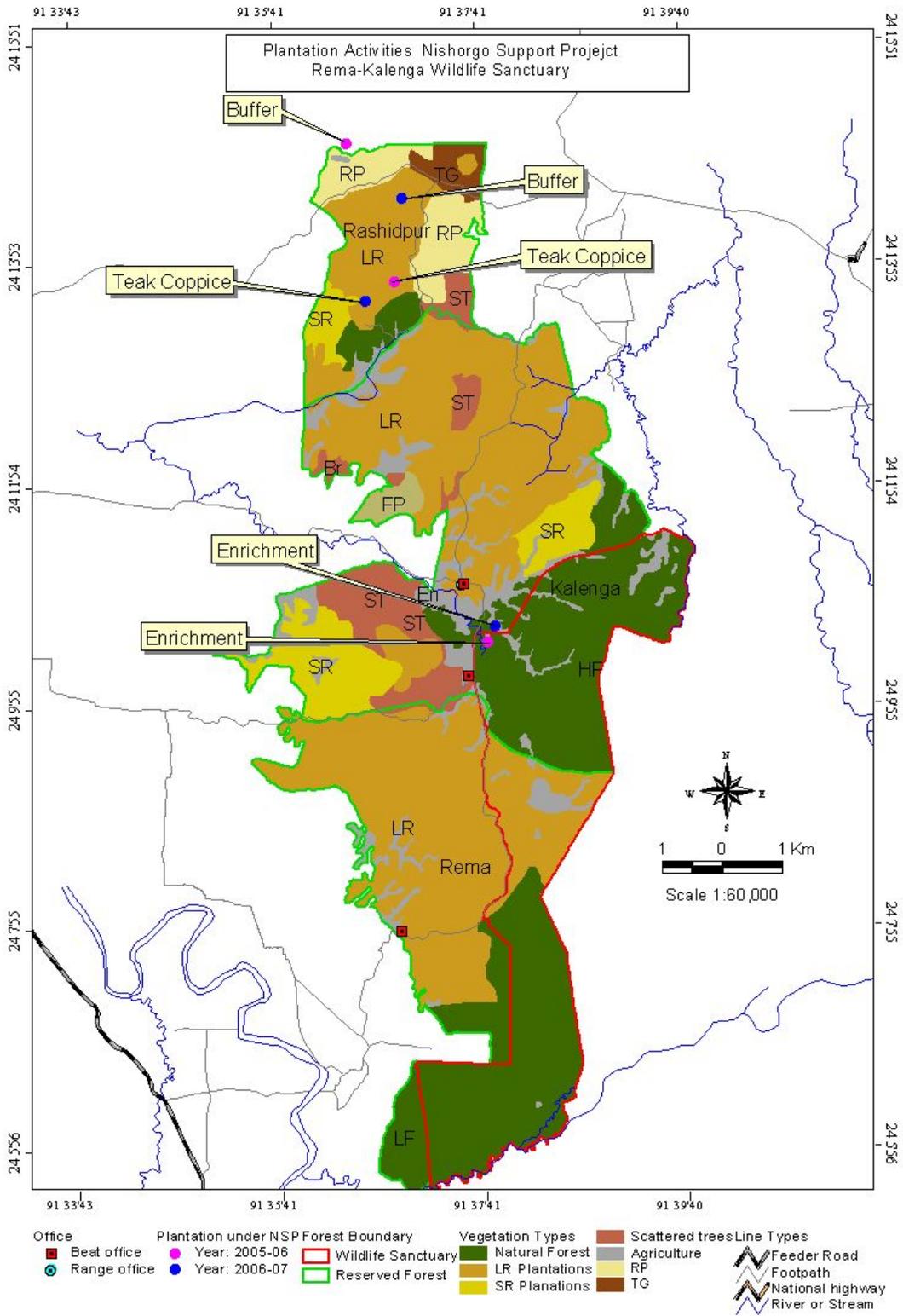


Figure 1: Location of Plantation Sites Raised under Nishorgo Support Project

7. Species wise number of seedlings planted for two enrichment plantations raised in 2005-06 & 2006-07 was not found in the plantation journal. However, the following Table (4) list the types of species used / found in the sample plot.

Table 4: Species used in enrichment plantation

| SI No | Species |
|-------|-----------|
| 1 | Chalta |
| 2 | Jam |
| 3 | Amloki |
| 4 | Bahera |
| 5 | Chapalish |
| 6 | Gamar |
| 7 | Dewa |
| 8 | Cham |
| 9 | Horitoki |
| 10 | Lotkon |

8. Choice of species found to be appropriate as per management guideline, giving preference to native forest tree species.

6.3 Maintenance & Refilling

9. Weeding and/or refilling have been done so far for plantations, although weed was found to grown again. Second weeding operations were scheduled to follow later while this survey was being conducted as per the Range Officer. This may reduce weeding problem to some extent.

6.4 Seedlings Establishment

10. Survival percentage of seedlings for all plantations was found to be very satisfactory and can be said to be successful due to more than 80% survival rate (Table 3).
 11. Growth of planted seedlings especially for Buffer Plantation raised in FY 2005-06 was very good (Table 3).
 12. Teak coppice where the average height is 7m is due to the fact that FD has been maintaining this for over 1 year (Table 3).

6.5 Site Selection

13. 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) (Figure 1).

6.6 Documentation

14. Plantation journal was prepared for all plantations (Table 2).
 15. In RKWS, participants of 2005-6 have got the MOU, and the MOU of 2006-7 plantations is under processing.

6.7 Consultations with CMC Members

16. Majority of the times (for 6 plantations), the FD staff consulted CMC members and beneficiaries were also selected by the CMC members. In some cases (for 2 plantations) members of CMC were informed after all activities were completed.
17. The problem the Forest Department staff is facing is that the beneficiaries selected by the CMC members live far away from plantations, who do not take care of the plantations.
18. This issue should be raised in the CMC meetings and solution be sorted out.