

Baseline Survey Report

Name of the project

Restoration and conservation of biodiversity
in Singra Sal Forest, Dinajpur

Implementing entity

RDRS Bangladesh
Partner NGO of Arannayk Foundation

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Introduction:

This report describes the baseline survey result designed to establish the initial conditions of the project “**Restoration and conservation of biodiversity in Singra Sal Forest, Dinajpur**” implemented by **RDRS Bangladesh**, partner NGO of Arannayk Foundation. The survey was designed to observe the current status of the biodiversity resources in homesteads of the project participants and as well as in the neighbouring reserve forests. Singra Sal forests were the richest areas of biodiversity resources which have been destroyed by logging and fuel wood or other non-wood forest resource collection by the local people. The project initially assumed that homesteads are getting divided due to vast population growth. At the same time people are setting up new habitations by destroying natural forests and local kinds of trees. Most of the inhabitants live beside the forest areas and a good number of people are directly and indirectly dependent on the forest resources. They use forest fuel woods, collect fallen leaves, cultivate forest land and use other forest resources in many ways. As a result biodiversity of the homesteads and the forests are decreasing day by day. In this connection the proposed baseline survey tried to gather information on the current status of the homestead and neighbouring forests to which rural people depend for their timber, fuel and income. The survey also tried to appraise the biodiversity of both the forests. Current stock of the forests and peoples’ dependence on forests was also assessed.

Objectives of the baseline survey:

- To assess the socioeconomic conditions of the people living in the study area.
- To identify the biodiversity available in the homesteads and forests of the study area.
- To identify the lost/endangered biodiversity from homesteads and forests.

Methodology of the baseline survey:

The baseline survey was conducted at the homesteads and neighbouring Sal forest areas of the proposed project area of RDRS at Singra Beat (Birganj, Dinajpur) and Thungnia Beat (Pirganj, Thakurgaon) of Thakurgaon Range under Dinajpur Forest Division (Map 1) to assess the forest resources, households’ economic status, their dependence on forest resources & agricultural products and gender role in agro-forestry practices. The area of Singra forest is 170 ha and that of Thungnia is 205 ha. The baseline survey was conducted in two phases. First, a homestead survey was conducted with a pre-structured questionnaire in the study area (Photo 1). A total of 46 households were surveyed from three upzilas neighbouring Singra beat and Thungnia beat namely, **Birganj (n=28)** [Dalagram (n=5), Prannagar (n=7), Chawlia (n=10) and Nondogram (n=6) villages], **Bochaganj (n=5)** [Putkibari (n=2) and Jabarpur (n=3) villages] and **Pirganj (n=13)** [Vobanipur (n=13) village] from where project participants will be selected by RDRS, Dinajpur. The head of each selected household was interviewed to gather required information. Then a forest survey was conducted by passing through the neighbouring forest areas of Singra Sal Forest with a group of experts to identify and list the plant species present in the forests. A total of 10 sample plots of 10mX10m were also taken randomly in the forests to measure the growing stock of the forest and in each sample plot 4 subplots of 2mX2m were taken to identify

the regeneration status of the forests. The collected data were analyzed and presented in the result section.



Map 1: Map showing the study area in Birganj and Pirganj Upazilas.

Results:

Part I: Homesteads survey

Respondents' age, sex and education level

The result of the household survey (Photo 1) shows that the average age of the respondent is 41 years and they are most responsible person of the community. Among the respondents most of them are male (85%) (Table 1). Educational status of the respondents' show that half of the respondents are illiterate (50%) and the rest (50%) are literate having mainly primary (24%) and secondary (15%) level education. Only few respondents (4%) were found having graduate level education. It shows the poor level of education in the study area. However, literacy rate was found higher in Birganj upazila (61%) and lower in Pirganj upazila (33%) (Table 1). Analysis of the respondents' occupation shows that most of the families are engaged in other category of occupation including daily labour, carpenter, rickshaw puller and housewife (54%) followed by agriculture (30%), business (9%) and service (7%) as primary occupation. Some respondents

(37%) are also found involved in secondary occupation that includes agriculture (20%) followed by other category (13%) and business (4%) (Table 2). However, all of the respondent households are found to collect mainly fallen leaves from the forest floor (Photos 2, 3a and 3b) and sometimes fuel wood including dead branches and twigs to use as fuel or sell in the market. This really shows the severity of dependency of the local people on the forests.



Photo 1: Homestead surveys in the study area [(a) Typical homestead with trees and houses and (b) Questionnaire survey].



Photo 2: Collection of fallen leaves from the forest floor by (a) a young boy in Thungnia beat and (b) a housewife in Singra beat.

Table 1: Distribution of respondent households by respondents' age, sex and educational level (Note: M= Male; F= Female; Illit= Illiterate; Pri.= Primary; Sec.= Secondary; H.Sec.= Higher Secondary; Grad.= Graduate) (values in the parentheses denote percentages).

Upazila	Age	Sex			Education					
		M	F	Total	Illit.	Pri.	Sec.	H.Sec.	Grad.	Total
Birganj (n=28)	38	23 (82)	5 (18)	28 (100)	10 (39)	8 (29)	6 (21)	3 (11)	1 (4)	28 (100)
Bochaganj (n=5)	46	5 (100)	-	5 (100)	3 (60)	1 (20)	-	-	1 (20)	5 (100)
Pirganj (n=13)	45	11 (85)	2 (15)	13 (100)	10 (77)	2 (15)	1 (8)	-	-	13 (100)
Total (n=46)	41	39 (85)	7 (15)	46 (100)	23 (50)	11 (24)	7 (15)	3 (7)	2 (4)	46 (100)

Table 2: Distribution of respondent households by occupation (Note: Agri.= Agriculture) (values in the parentheses denote percentages).

Upazila	Primary Occupation					Secondary Occupation			
	Agri.	Service	Business	Others	Total	Agri.	Business	Others	Total
Birganj (n=28)	7 (25)	2 (7)	4 (14)	15 (54)	28 (100)	7 (25)	-	2 (7)	9 (32)
Bochaganj (n=5)	1 (20)	1 (20)	-	3 (60)	5 (100)	2 (40)	-	-	2 (40)
Pirganj (n=13)	6 (46)	-	-	7 (54)	13 (100)	-	2 (15)	4 (31)	6 (46)
Total (n=46)	14 (30)	3 (7)	4 (9)	25 (54)	46 (100)	9 (20)	2 (4)	6 (13)	17 (37)

Family size, sex and earning member

Average family size in the study area is 4.37 of which majority of them are male (53%) and the rest (47%) are female (Table 3). Among the family members most of them were found in the younger age category of 0-30 years (68%). On average each family has 1.61 (37% of the total family size) earning members of which 1.43 are male (33% of the total family size) and 0.17 are female (4% of the total family size) (Table 3). This result shows that male members of the family are mostly the earning members. However, women and children are found to engage themselves in the collection of leaves and fuel wood from the neighbouring forests (Photos 2, 3a and 3b).

Table 3: Distribution of respondent households by family size, sex and total earning members (Note: M= Male; F= Female; T= Total) (values in the parentheses denote percentages).

Upazila name	<10		10-20		20-30		30-40		40-50		>50		Total			Earning members		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	T	M	F	T
Birganj (n=28)	0.7 1 (16)	0.5 4 (12)	0.2 5 (6)	0.4 3 (10)	0.4 6 (10)	0.7 1 (16)	0.5 0 (11)	0.1 4 (3)	0.0 7 (2)	0.1 4 (3)	0.3 2 (7)	0.1 4 (3)	2.3 2 (52)	2.1 1 (48)	4.43 (100)	1.3 2 (30)	0.2 1 (5)	1.5 4 (35)
Bochaganj (n=5)	1.2 0 (26)	0.8 0 (17)	- - (4)	0.2 0 (4)	- - (17)	0.8 0 (17)	0.6 0 (13)	0.2 0 (4)	0.4 0 (9)	- - (4)	0.2 0 (4)	0.2 0 (4)	2.4 0 (52)	2.2 0 (48)	4.60 (100)	1.2 0 (26)	0.2 0 (4)	1.4 0 (30)
Pirganj (n=13)	0.3 1 (7)	0.3 8 (9)	0.3 8 (9)	0.6 2 (15)	0.6 9 (17)	0.3 1 (7)	0.2 3 (6)	0.0 8 (2)	0.1 5 (4)	0.4 6 (11)	0.4 6 (11)	0.0 8 (2)	2.2 3 (54)	1.9 2 (46)	4.15 (100)	1.7 7 (43)	0.0 8 (2)	1.8 5 (44)
Total (n=46)	0.6 5 (15)	0.5 2 (12)	0.2 6 (6)	0.4 6 (10)	0.4 8 (11)	0.6 1 (14)	0.4 3 (10)	0.1 3 (3)	0.1 3 (3)	0.2 2 (5)	0.3 5 (8)	0.1 3 (3)	2.3 0 (53)	2.0 7 (47)	4.37 (100)	1.4 3 (33)	0.1 7 (4)	1.6 1 (37)

Land resources

Land resources occupied by each family in the study area is 219.30 decimals of which most of the lands are agricultural (86%) followed by homestead land (11%) and bamboo or tree areas (3%) (Table 4). Each household in Pirganj upazila was found to have more land resources (411.15 decimals) of which most of the land are used for agricultural purposes (94%). On the other hand each household in Bochaganj upzila was found to have less land resources (130.80 decimals) (Table 4).

Table 4: Distribution of respondent households by land resources (in decimals) (Note: DU= Dwelling unit; AS= Animal shed; Agri.= Agricultural land; Bam.= Bamboo areas) (values in the parentheses denote percentages).

Upazila	Homestead							Agri.	Bam.	Trees	Total
	DU	Trees	AS	Yard	Pond	Other	Total				
Birganj (n=28)	4.82 (3)	6.68 (5)	1.18 (1)	3.29 (2)	7.32 (5)	3.07 (2)	26.36 (18)	113.82 (78)	1.04 (1)	4.82 (3)	146.04 (100)
Bochaganj (n=5)	5.20 (4)	9.80 (7)	1.40 (1)	4.00 (3)	3.20 (2)	-	23.60 (18)	104.40 (80)	2.80 (2)	-	130.80 (100)
Pirganj (n=13)	5.38 (1)	7.38 (2)	0.69 (0.2)	3.69 (1)	-	0.38 (0.1)	17.54 (4)	385.77 (94)	2.46 (1)	5.38 (1)	411.15 (100)
Total (46)	5.02 (2)	7.22 (3)	1.07 (0.5)	3.48 (2)	4.80 (2)	1.98 (1)	23.57 (11)	189.65 (86)	1.63 (1)	4.46 (2)	219.30 (100)

Family income

Analysis of the family income of the respondent households' shows that average family income in the study area is 94833 Taka/year of which higher amount of income (37%) comes from agricultural products followed by labour or forest resource collection (22%) and business (10%) (Table 5). However, average family income was found much higher in Birganj upazila (102489 Taka/year) which is mainly due to their involvement in business and other occupation compared to other upzilas. The households of Bochaganj upzila were found to earn most of the family income from agriculture (57%) and the households of Birganj (65%) and Pirganj (64%) were found to earn most of their income from occupations other than agriculture (Table 5).

Table 5: Distribution of households' family income (Taka/year) in the study area (Note: AP= Agricultural products; TP= Tree products; FRC= Forest resource collection; Ser.= Services; Busi.= Business) (values in the parentheses denote percentage of total income)

Upazila	AP	TP	Fishes	Poultry/ Dairy	Labour/ FRC	Ser.	Busi.	Others	Total
Birganj (n=28)	35536 (35)	8225 (8)	1071 (1)	2250 (2)	21750 (21)	9514 (9)	13357 (13)	10786 (11)	102489 (100)
Bochaganj (n=5)	52400 (57)	400 (0.4)	-	2360 (3)	27600 (30)	9600 (10)	-	-	92360 (100)

Pirganj (n=13)	28185 (36)	7692 (10)	4431 (6)	6154 (8)	17446 (22)	2769 (3)	6462 (8)	6154 (8)	79292 (100)
Total (n=46)	35291 (37)	7224 (8)	1904 (2)	3365 (4)	21170 (22)	7617 (8)	9957 (10)	8304 (9)	94833 (100)

Plant diversity

Table 6: Analysis of the plant diversity present in the study area (Note: Nos.= Number of trees/culms; HH%= Percentage households)

Sl. No.	Local name	Scientific name	Frequency		Species Density	Relative Density (%)
			Nos.	HH%		
1	Akashmoni	<i>Accacia auriculiformis</i>	21	9	5.25	2.30
2	Am	<i>Mangifera indica</i>	338	96	7.68	3.37
3	Ata	<i>Spondias pinnata</i>	12	4	6.00	2.63
4	Bamboo	<i>Bambusa spp.</i>	1710	54	68.40	30.01
5	Banana	<i>Musa sapientum</i>	193	30	13.79	6.05
6	Bon kat	Unknown	2	2	2.00	0.88
7	Boroi	<i>Zizyphus mauritiana</i>	7	7	2.33	1.02
8	Bot	<i>Ficus benghalensis</i>	1	2	1.00	0.44
9	Chalta	<i>Dillenia indica</i>	1	2	1.00	0.44
10	Dalim	<i>Punica grantum</i>	2	4	1.00	0.44
11	Eucalyptus	<i>Eucalyptus camaldulensis</i>	246	39	13.67	6.00
12	Guava	<i>Psidium guajava</i>	25	24	2.27	1.00
13	Ipil-ipil	<i>Leucaena leucocephala</i>	3	2	3.00	1.32
14	Jam	<i>Syzygium cumini</i>	8	11	1.60	0.70
15	Jambura	<i>Citrus grandis</i>	2	4	1.00	0.44
16	Jarul	<i>Lagerstroemia speciosa</i>	5	2	5.00	2.19
17	Jolpai	<i>Elaeocarpus floribundus</i>	4	9	1.00	0.44
18	Kadam	<i>Anthocephalus chinensis</i>	17	13	2.83	1.24
19	Kamranga	<i>Averrhoa carambola</i>	1	2	1.00	0.44
20	Kanthal	<i>Artocarpus heterophyllus</i>	172	76	4.91	2.16
21	Kapasias	Unknown	4	4	2.00	0.88
22	Kat Badam	<i>Terminalia catappa</i>	2	4	1.00	0.44
23	Komala	<i>Citrus sinensis</i>	1	2	1.00	0.44
24	Rain tree	<i>Albizia saman</i>	8	4	4.00	1.76
25	Lebu	<i>Citrus spp.</i>	24	26	2.00	0.88
26	Litchi	<i>Litchi chinensis</i>	58	48	2.64	1.16
27	Mahagoni	<i>Swietenia mahagoni</i>	71	22	7.10	3.12
28	Narikel	<i>Cocos nucifera</i>	63	39	3.50	1.54
29	Neem	<i>Azadirachta indica</i>	124	54	4.96	2.18

30	Papaya	<i>Carica papaya</i>	41	28	3.15	1.38
31	Shimul	<i>Bombax ceiba</i>	3	7	1.00	0.44
32	Sissoo	<i>Dalbergia sissoo</i>	11	7	3.67	1.61
33	Supari	<i>Areca catechu</i>	262	28	20.15	8.84
34	Tentul	<i>Tamarindus indica</i>	2	2	2.00	0.88
35	Verenda	<i>Ricinus communis</i>	75	7	25.00	10.97
Total			3519		227.91	100.00

Table 6 list the plant species and the plant diversity measures present in the homesteads of the study area. A total of 35 different plant species were found in the homesteads of the study area (Tables 6). Among plant diversity different timber, fruit and medicinal species are found growing. It is evident that **Am** (96%), **Kantal** (76%), **Neem** (54%), **Bamboo** (54%), **Litchi** (48%), **Eucalyptus** (39%) and **Banana** (30%) were found dominating in the homesteads of the study area (Table 6). Species density was found higher for **Bamboo** (68.40) followed by **Verenda** (25.00), **Banana** (13.79) and **Eucalyptus** (13.67) in the study area (Table 6). Total species density was found 227.91 in the study area which is a matter of great concern from biodiversity conservation point of view. In case relative density highest percentage was also observed for **Bamboo** (30.01) followed by **Verenda** (10.97), **Banana** (6.05) and **Eucalyptus** (6.00) in the study area (Table 6).

Income from tree and agricultural products

The respondents in the study area were asked to know the cost and benefit from plant products grown by them annually. The respondent households earn some money from fruits and timber selling and also grow some crops and vegetables for their own use and to get some extra income in their homesteads and agricultural lands. It is found that on average each family earns a total net benefit of 8511 Taka/year from plant and agricultural products including fruits (1543 Taka/year), timber (3185 Taka/year), vegetables (3652 Taka/year) and spices (130 Taka/year) (Table 7).

Table 7: Distribution of respondent households by income from plant products (Taka/year/household) grown by them (Note: Ct= Cost; Bt= Benefit; NB= Net benefit).

Upazila	Fruit			Timber			Vegetable			Spice		
	Ct	Bt	NB	Ct	Bt	NB	Ct	Bt	NB	Ct	Bt	NB
Birganj (n=28)	-	36	36	554	5786	5232	2463	5695	3232	71	286	214
Bochaganj (n=5)	-	-	-	-	-	-	100	3000	2900	-	-	-
Pirganj (n=13)	269	5654	5385	-	-	-	2192	7038	4846	-	-	-
Total (46)	76	1620	1543	337	3522	3185	2129	5782	3652	43	174	130

Collection of forest resources

The respondent households were asked to know the type of forest resources they usually collect from the neighbouring forests. It is observed that respondent households usually collect fallen leaves from the forest floor and sometimes dead trees, branches or twigs. Most of the respondent households (72%) in the study area were found to collect fallen leaves from the forest floor and only some of the respondents (22%) collect fuel wood (dead trees, branches and fallen twigs) travelling a distance of 0.41 kilometres. They usually spend about 1.89 hours a day on average in collecting forest resources. However, the people of Bochaganj upazila don't collect fuel wood or fallen leaves from the neighbouring forests (Table 8).

Table 8: Distribution of respondent households by the collection of forest resources (values in the parentheses represent percentage households responded).

Upazila	Fuel wood (Maund)	Leaves (Maund)	Distance (km)	Time spent/day (Hour)
Birganj (n=28)	5.36 (11)	47.68 (79)	0.47	1.82
Bochaganj (n=5)	-	-	-	-
Pirganj (n=13)	43.85 (54)	50.00 (85)	0.42	2.77
Total (46)	15.65 (22)	43.15 (72)	0.41	1.89

Lost Species

The homestead survey tried to find out the species that are lost from the homesteads and forest areas of the study area. The respondent households were asked to identify the name(s) of the lost species from their homesteads and forests. It is found that a total of 17 tree species were identified by the respondents of the study area that were lost from the locality. Among the lost species **Bot** (30.43%), **Torul** (23.91%), **Sonalu** (15.22%), **Bohera** (13.04%) and **Shimul** (10.87%) are the mostly answered plant species that are lost from the study area (Table 9).

Table 9: Frequency distribution of respondents' perception about lost species in the study area (Note: HH= Number of households responded).

Sl. No.	Species name	Scientific name	HH	%
1	Amloki	<i>Phyllanthus embelica</i>	2	4.35
2	Badam	<i>Terminalia catappa</i>	2	4.35
3	Bohera	<i>Terminalia belerica</i>	6	13.04
4	Bot	<i>Ficus benghalensis</i>	14	30.43
5	Desi neem	<i>Azadirachta indica</i>	3	6.52
6	Dumur	<i>Ficus semicordata</i>	1	2.17
7	Haritaki	<i>Terminalia chebula</i>	1	2.17
8	Kadam	<i>Anthocephalus chinensis</i>	2	4.35
9	Kata	Unknown	3	6.52
10	Khair	<i>Acacia catechu</i>	3	6.52
11	Krishnochura	<i>Delonix regia</i>	1	2.17

12	Mohua	<i>Maduca indica</i>	2	4.35
13	Monohor kata	Unknown	1	2.17
14	Pakur	<i>Ficus benjamina</i>	3	6.52
15	Setar	Unknown	1	2.17
16	Shimul	<i>Bombax ceiba</i>	5	10.87
17	Sonalu	<i>Cassia fistula</i>	7	15.22
18	Torul	Unknown	11	23.91
19	Valar	Unknown	1	2.17

Causes of and problems faced due to loss of species

The respondents were also asked to identify the causes of and problems faced due to loss of plant species from the study area. It is found that fuel wood collection (46%), cut for building houses (43%) and felling for money (24%) are some of the noticeable causes of biodiversity loss in the study area (Table 10). The respondent households were also identified a lot of problems they are facing due to biodiversity loss from the study area. Most of them (70%) answered that they face problems due to biodiversity loss (Table 10). Some of the mentionable problems identified by the respondents of the study area are less rain fall (26%) and draught (24%) (Table 10).

Table 10: Frequency distribution of respondent households by the reason (s) and difficulty faced for biodiversity loss and recommendation for biodiversity conservation in the study area (Note: HH= households responded).

Reasons, difficulties and recommendations	Respondents' opinion	HH (n=46)	
		HH	%
Reasons for biodiversity loss/lost species from the homesteads or forests	Population pressure	8	17
	Tree felling by corrupted forest officers	12	26
	Fuel wood collection	21	46
	Cut for building houses	20	43
	Felling for money	11	24
	Dead or over maturity	4	9
Difficulty occurred due to Biodiversity loss	Yes	32	70
	NO	14	30
Types of difficulties occurred due to biodiversity loss	Less rain fall	12	26
	Flood	10	22
	Scarcity of fuel wood	10	22
	Draught	11	24
	Strom/cyclone	10	22
	Scarcity of housing materials	5	11
	Increasing temperature	9	20
Recommendation for biodiversity conservation	Monetary help	2	4
	Mixed plantation	26	57

	Planting indigenous species	6	13
	Protection of forest & planted trees	7	15
	Stop cutting trees	17	37
Consideration for planting trees	All types of species	32	70
	Species needed for family use	8	17
	All indigenous species	1	2
	Species having economic value	6	13

Recommendation for biodiversity conservation

The respondent households were also asked to know their perception about how to overcome the loss of biodiversity from the study area. It is evident that mixed plantation (57%) and stop cutting trees (37%) are some of the important recommendation by the respondent households to conserve biodiversity in the study area (Table 10). Most of the respondents answered that they will consider all types of species (70%) and some of them will consider those species needed for family use (17%) and species having more economic value (13%) when they were asked to mention their consideration for planting trees (Table 10).

Social/Development organizations working in the study area

The study also tried to find out the organisations working in the study area for social and/or other development. It is found that there are 5 government approved nongovernmental organizations (NGOs) working in the study area for providing loans to the community people (Table 11). A total of 61% respondent households in the study area responded that they became members of the NGOs listed to get loan. BRAC (20%) is the important NGOs working in the study area. Some of mentionable NGOs are Grameen Bank, ASA, RDRS and NCDB (Table 11).

Table 11: Distribution of NGOs activity in the study area.

NGOs	Total (n=46)	
	Household involved	Percentage (%)
BRAC	9	20
Grameen Bank	6	13
ASA	6	13
RDRS	6	13
NCDB	1	2
Total	28	61

Distribution of labour in homestead agro-forestry activities

The household survey also tried to identify the labour involvement in homestead agro-forestry activities especially on women involvement. Table 12 shows the different agro-forestry activities in the homesteads with the labour involvement based on sex. It is found that both male and female member(s) of the household are performing most of the activities where male (74%), and female (23%) perform the total agro-forestry activities in the study area (Table 12).

It is observed that female members of the family usually do less work in agro-forestry activities (Table 12).

Table 12: Distribution of labour (%) in homestead agro-forestry activities.

Activities	Sex	Upazila			
		Birganj (n=28)	Bochaganj (n=5)	Pirganj (n=13)	Total (46)
Planning	Male	64	62	72	66
	Hired (Male)	3	-	-	2
	Female	34	38	28	33
Choice of species	Male	65	62	78	68
	Hired (Male)	-	-	-	-
	Female	35	38	22	32
Seedling collection	Male	64	70	78	68
	Hired (Male)	3	0	0	2
	Female	33	30	22	30
Propagation	Male	63	54	78	67
	Hired (Male)	3	12	-	3
	Female	34	34	22	30
Planting	Male	62	54	80	66
	Hired (Male)	5	12	-	5
	Female	33	34	20	29
Nursing	Male	62	58	85	68
	Hired (Male)	5	10	-	4
	Female	33	32	15	28
Fertilizer application	Male	62	58	85	68
	Hired (Male)	5	8	-	4
	Female	33	34	15	28
Weeding	Male	62	58	85	68
	Hired (Male)	6	12	-	5
	Female	33	30	15	27
Harvesting	Male	60	52	73	67
	Hired (Male)	4	7	1	3

	Female	36	41	26	30
Trees	Male	94	80	96	93
	Hired (Male)	6	12	-	5
	Female	-	8	4	2
Fruits	Male	60	58	83	66
	Hired (Male)	5	8	-	4
	Female	35	34	17	30
Vegetables	Male	54	70	82	63
	Hired (Male)	7	8	4	6
	Female	39	22	14	30
Spices	Male	45	-	20	39
	Hired (Male)	-	-	-	-
	Female	55	100	80	61
Medicinal plants	Male	50	-	83	75
	Hired (Male)	-	-	-	-
	Female	50	0	17	25
Processing	Male	95	80	100	95
	Hired (Male)	5	12	-	4
	Female	0	8	-	1
Selling	Male	96	88	100	96
	Hired (Male)	3	12	-	3
	Female	1	-	-	1
Total	Male	70	65	83	74
	Hired (Male)	3	7	-	3
	Female	27	28	17	23

Part II- Forest Survey:

Forest survey was conducted in Singra Sal Forest areas of Singra beat and Thungnia beat. It was done by walking through the Sal forest areas with a group of experts and identifying and observing the species found in the forests and also identifying the regeneration status on the forest floor. Local people living in or around the Sal forests were found poor and very much dependent on forest resources. They are mostly agricultural labourer and forest resource collectors. They usually collect fuel wood and fallen leaves from the forest floor (Photos 2 & 3) of the neighbouring Sal forest areas which they use for their cooking purposes and also sell in

the market to earn extra income. A sac of leaves is sold at Tk. 15-20 in the market or locally to the neighbours or middlemen. People usually do not cut Sal trees in fear of forest officials who, if can be identified, put them in great troubles and harassment. The forest survey reveals that the remaining patches of Sal forests are in good condition but day by day the patches and the area are shrinking due to population pressure and illegal occupancy. Forest department are trying to occupy some patches where Sal trees are not growing naturally by planting some fast growing tree species like Eucalyptus, Akashmoni, Minjiri involving local people under participatory forestry activities and some matured plantations already have been harvested to earn money for both the forest department and the target beneficiaries. They also tried to protect the forest from local people by planting canes along the periphery of the forest. But this was not successful all over the area. However this is not enough to conserve the Sal forests and protect the forest lands from illegal occupancy. The random sampling procedure to know the growing stock of the forests reveals that there are on average 2370 Sal trees per hectare (Table 13). The distribution of Sal trees in the forest shows that most of them (82%) are in the lower dbh (diameter at breast height) classes (less than 20 cm). There are very few trees (18%) having dbh greater than 20 cm forming a very skewed distribution of individual trees in the forest (Table 13 and Figure 1). Very few Sal trees were found to have dbh more than 35 cm. Some giant trees (Torul having dbh over 130 cm, Shimul having dbh more than 50 cm and koroin having dbh more than 50 cm) were found still growing showing their very existence in the natural forests in the past. Although the forest stockings (stems/ha) is not too good for the natural forests but the regeneration status of the forests is not too bad having about 28938 seedlings per hectare of which Sal is the dominating one (45%) followed by Bhat (43%) (Table 14). The forest survey shows that Sal is the dominant species of the forests composing more than 99 percent species of the forests. However some associate plants were also seen to grow in the forests. Among the associate plants in the Sal forests Segun, Gora neem, Minjiri, Eucalyptus, Gamar, Akashmoni, Silkori, Torul and Shimul etc. were found growing. Some shrubs and herbs species including vines were also found growing in the forests (Photo 3) and regeneration of less important plant species like Bhat have been found in large quantities in the forests. Among wildlife common birds like Dove, Kechkechi, Mag pai, Mayna, Shalik, Pecha and some common snakes are usually seen by the local people in the Sal forests along with fox and rabbit which are decreasing in numbers gradually in and around the forests of the study area. However, it was home of Wild cock, Meso bag, Bon garu, Deer and Nilgai in the recent past (Table 15). So interventions from both the government and the non-government initiatives in this respect has become urgent to restore these important forest resources by keeping the forest undisturbed at least for some period of time, make the local people aware about the resource depletion and creating alternative income generating opportunities for the community people to help support their livelihood.

Table 13: Distribution of Sal trees according to diameter classes (cm) in Singra Sal forest

Diameter Class (cm)	Stems/ha (Nos.)	
	Frequency	Cumulative frequency
0-5	1030 (43)	1030 (43)
5-10	430 (18)	1460 (62)
10-15	250 (11)	1710 (72)
15-20	240 (10)	1950 (82)
20-25	130 (5)	2080 (88)
25-30	250 (11)	2330 (98)
30-35	10 (00.36)	2340 (99)
35-40	30 (1)	2370 (100)
Total	2370 (100)	-

Figure 1: Distribution of Sal trees in Singra Sal Forest (Stems/ha according to diameter classes)

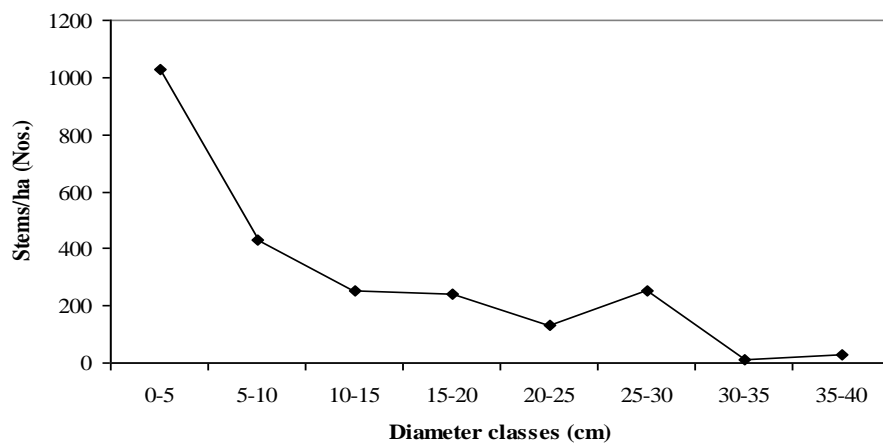


Table 14: Regeneration status of Singra Sal Forest

Species name	Seedlings/ha	Percentage (%)
Sal	12938	45
Bhat	12563	43
Bot boroi	1438	5
Climber	875	3
Unknown	938	3
Moyna	63	0.2
Bijol gata	63	0.2
Bel	63	0.2
Total	28938	100

Table 15: List of plants and wildlife in Singra Sal Forest.

Major species	Other plants	Lost species	Wildlife			
			Present	5 years	10 years	15 years
Sal	Segun	Gamar	Fox	Honuman	Wild cock	Deer
	Minjiri	Guti jam	Rabbit	Monkey	Meso bag	Bon garu
	Gora neem	Segun	Snakes	Porcupine		Nilgai
	Eucalyptus	Jarul		Mongoose		
	Gamar	Torul		Wild bore		
	Akashmoni	Shimul				
	Jarul					
	Silkoroi					
	Torul					
	Shimul					

(a)



(b)



(c)



(d)



(e)

(f)



Photo 3: Collection of forest resources by the local people [(a) Singra beat; (b) Thungnia beat] and present status of forests in Singra Sal Forests [(c & d) Thungnia beat; (e & f) Singra beat].

Conclusion:

Finally, it can be said that the people of the study area are mainly dependent on agriculture (with 37% of total family income) and forest resource collection (with more than 22% of total family income) from the neighbouring forests (Tables 5, 7 & 8). **Am** (96%), **Kantal** (76%), **Neem** (54%), **Bamboo** (54%), **Litchi** (48%), **Eucalyptus** (39%) and **Banana** (30%) were found dominating in the homesteads of the study area (Table 6). Species density was found higher for **Bamboo** (68.40) followed by **Verenda** (25.00), **Banana** (13.79) and **Eucalyptus** (13.67) in the study area (Table 6). Total species density was found 227.91 in the study area which is a matter of great concern from biodiversity conservation point of view. In case relative density highest percentage was also observed for **Bamboo** (30.01) followed by **Verenda** (10.97), **Banana** (6.05) and **Eucalyptus** (6.00) in the study area (Table 6). It is found that on average each family earns a total net benefit of 8511 Taka/year from plant and agricultural products including fruits (1543 Taka/year), timber (3185 Taka/year), vegetables (3652 Taka/year) and spices (130 Taka/year) (Table 7). Most of the respondent households (72%) in the study area were found to collect fallen leaves from the forest floor and only some of the respondents (22%) collect fuel wood (dead trees, branches and fallen twigs) travelling a distance of 0.41 kilometres. They usually spend about 1.89 hours a day on average in collecting forest resources. However, the people of Bochaganj upazila don't collect fuel wood or fallen leaves from the neighbouring forests (Table 8). A total of 17 tree species were identified by the respondents of the study area that were lost from the locality. Among the lost species **Bot** (30.43%), **Torul** (23.91%), **Sonalu** (15.22%), **Bohera** (13.04%) and **Shimul** (10.87%) are the mostly answered plant species that are lost from the study area (Table 9). fuel wood collection (46%), cut for building houses (43%) and felling for money (24%) are some of the noticeable causes of biodiversity loss in the study area (Table 10). The respondent households were also identified a lot of problems they are facing due to biodiversity loss from the study area. Most of them (70%) answered that they face problems due to biodiversity loss (Table 10). Some of the mentionable problems identified by the

respondents of the study area are less rain fall (26%) and draught (24%) (Table 10). mixed plantation (57%) and stop cutting trees (37%) are some of the important recommendation by the respondent households to conserve biodiversity in the study area (Table 10). Most of the respondents answered that they will consider all types of species (70%) and some of them will consider those species needed for family use (17%) and species having more economic value (13%) when they were asked to mention their consideration for planting trees (Table 10). A total of 61% respondent households in the study area responded that they became members of the NGOs listed to get loan. BRAC (20%) is the important NGOs working in the study area. Some of mentionable NGOs are Grameen Bank, ASA, RDRS and NCDB (Table 11). It is found that both male and female member(s) of the household are performing most of the activities where male (74%) and female (23%) members of the family perform the total agro-forestry activities in the study area (Table 12). The forest survey reveals that the remaining patches of Sal forests are in good condition but day by day the patches and the area are shrinking due to population pressure and illegal occupancy. Local people sometimes occupy forest lands illegally and establish homesteads which then become very difficult for the forest officials to evict them from the reserve forests. Forest department are trying to occupy some patches where Sal trees are not growing naturally by planting some fast growing tree species like Eucalyptus, Akashmoni, Minjiri etc. under participatory forestry activities. They also tried to protect the forest from local people by planting canes along the periphery of the forest. But this was not successful all over the area. However this is not enough to conserve the Sal forests and protect the forest lands from illegal occupancy. The random sampling procedure to know the growing stock of the forests reveals that there are on average 2370 Sal trees per hectare (Table 13). The distribution of Sal trees in the forest shows that most of them (82%) are in the lower dbh (diameter at breast height) classes (less than 20 cm). There are very few trees (18%) having dbh greater than 20 cm forming a much skewed distribution of individual trees in the forest (Table 13 and Figure 1). Some giant trees (Torul having dbh over 130 cm, Shimul having dbh more than 50 cm and koroin having dbh more than 50 cm) were found still growing showing there very existence in the natural forests in the past. Although the forest stockings (stems/ha) is not too good for the natural forests but the regeneration status of the forests is not too bad having about 28938 seedlings per hectare of which Sal is the dominating one (45%) followed by Bhat (43%) (Table 14). The forest survey shows that Sal is the dominant species of the forests composing more than 99 percent species of the forests. However some associate plants were also seen to grow in the forests. Among the associate plants in the Sal forests Segun, Gora neem, Minjiri, Eucalyptus, Gamar, Akashmoni, Silkori, Torul and Shimul etc. were found growing. Some shrubs and herbs species including vines were also found growing in the forests (Photo 3) and regeneration of less important plant species like Bhat have been found in large quantities in the forests. Among wildlife common birds like Dove, Kechkechi, Mag pai, Mayna, Shalik, Pecha and some common snakes are usually seen by the local people in the Sal forests along with fox and rabbit which are decreasing in numbers gradually in and around the forests of the study area. However, it was home of Wild cock, Meso bag, Bon garu, Deer and Nilgai in the recent past (Table 15). So interventions from both the government and the non-government initiatives in this respect has become urgent to restore these important forest resources by keeping the forest undisturbed at least for some period of time, make the local people aware about the resource depletion and creating alternative income generating

opportunities for the community people to help support their livelihood. If this project can successfully implement their planned activities in the study area including supported tree planting, providing training and supporting alternative income generating (AIG) activities it will bring a positive impact on the biodiversity of the region and help people earn extra income from producing plant resources and reducing dependency on forests which will enrich the biodiversity of the region and certainly improve the environmental quality of the study area.