

Baseline Survey Report

Name of the project

Community based forest resource management
for sustainable development
in the Chittagong Hill Tracts (CFRM) Project

Implementing entity

TAHZINGDONG, Bandarban
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Introduction:

This report describes the baseline survey result designed to establish the initial conditions of the project “**Community based forest resource management for sustainable development in the Chittagong Hill Tracts**” implemented by **TAHZINGDONG**, Bandarban partner NGO of Arannayk Foundation. The survey was designed to observe the socio-economic conditions of the local indigenous people and current status of the biodiversity resources especially timber, fuel, medicinal plants, wildlife and their uses in Sadar para and Tulachari communities of Rowangchari upazilla. The areas around Sadar para and Tulachari are both rich in biodiversity and under extreme threat of loss due to illegal logging and fuel wood collection. The project initially assumed that food insecurity including declining access to land, forest products and income from agricultural products is the most important constraints for livelihood security in Chittagong Hill Tracts (CHTs). At present unavailability of forest products (Bamboo, Cane, Timber, and Non-timber et.) causes unyielding of the production of natural resources based production. This situation arises due to pressure of increasing population, over-use of land for cultivation, allotment of hill-lands at private ownership and improper management of the government sponsored plantation/forestation projects or through declaring reserved forests. The majority of the indigenous people in CHTs have low incomes and most of the trade and commerce are controlled by outsiders and political elites linked to national political parties. Once jhum or swidden (shifting) cultivation was highly productive and jhum technology had been helpful to sustain life and livelihood of the hill people. The indigenous people were once self sufficient to meet their demand for food, clothes and shelter. But now the situation has changed due to population pressure, over exploitation of natural resources, shortening of the fallow period from 15-20 years to 3-4 years for jhum, political unrest etc. and the indigenous people are facing food insecurity that in a sense destroying the biodiversity and the natural resource base of the CHTs. In this connection the proposed base line survey tried to gather information on the current status of the homesteads and owned or leased hilly lands to which the local people depend for their timber, fuel and medicinal products and income. The survey also tried to appraise the biodiversity of the homesteads and the hills.

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 hilly areas of the study area.
- To identify the lost/endangered biodiversity from homesteads and hilly areas.

Methodology of the baseline survey:

The baseline survey was conducted at the homesteads and hilly areas of the proposed project area of Tahzingdong in Rowangchari Upazilla of Bandarban Hill District, a hill forest zone with semi-evergreen and sub-tropical forest types, to assess the forest resources, households’ economic status, their dependence on forest resources and gender role in agro-forestry practices. The proposed project includes three community reserves of **Sadar para, Tulachari and Ronin para** in **1 No. Rowangchari Sadar Union of Rowangchari Upazilla**. Sadar para reserve

and Tulachari were surveyed and Ronin para reserve was not surveyed as it was inaccessible due to rain during the baseline survey. The baseline survey was conducted in two phases. First, a homestead survey was conducted with a pre-structured questionnaire in the study area. A total of 40 households were surveyed from two villages/paras, namely, **Sadar para (n= 20), and Tulachari (n= 20)** villages from where project participants will be selected by Tahzingdong. The head of each selected household was interviewed to gather required information. Focus Group Discussions (FGD) was also arranged in the study area to know the peoples' perception about biodiversity loss, conservation and alternative income generating activities. Then a forest survey was conducted by passing through the forest reserve of Tulachari and Sadar para with a group of experts to identify and list the plant species present in the forests. The collected data were analyzed and presented in the result section.

Description of the study area:

The project location includes three tribal communities or paras under 1 No. Rowangchari Sadar Union of Rowangchari Upazilla. The three tribal community reserves are Sadar para, Tulachari and Ronin para reserves. The **Sadar para** reserve is conserved since 1920 and total area of reserve is 250 acres (approx.). Geographical distribution of the community reserve shows Huyako Stream is situated to the East of the reserve; Pankhiyang road to the North of the reserve and Jhum land is situated to the East side of the reserve. There are 330 marma families living in the community and most of the community people are jhumia or day labourer. **Tulachari** reserve is a small forest patch of 20 acres and conserved by 35 marma families living closed to the reserve. Jhum is their major livelihood and very few are day labourer. The reserve is situated on the North side of the village; Raefa stream is situated in the East side and Fasaing stream is situated on to the west side of the reserve. The **Ronin para** reserve is conserved since 1960 and total area of the reserve is 300 acres (approx.). The reserve is managed by 48 Bawm families living in Ronin para. Most of the families are Jumias and very few are service holder and daily laborer. Geographically Liansun Bawm plantation site & Liantun Bawm land and lunglay river are situated to the North side of the reserve. Tumung stream, Lalkhan Bawm & Siambil Bawm land to the West of the Reserve. The village or para is situated on the North side of the reserve. The para reserves or village common forests of these three communities in Rowangchari Upazilla are very rich in biodiversity including both flora and fauna.

Village common forests (VCF) or para reserves are usually managed by the community people. Sadar para reserve is strictly maintained to its current status since 2003 when people last used the area for jhum and since then no cutting of trees and bamboos are going on. The community people do not have the right of ownership of the forests at the moment but they have applied for ownership which is now under process. The most dominant species found in the reserves are Garjon and Goda along with Gotguttiya, Koroi, Lali, Champa, Jam, Dumur etc. Any people living in the community for the last ten years or more have the right to the reserve. At present 250 families enjoy the use right to the Sadar para reserve. Usually one committee formed from these 250 families is responsible for the management of this reserve. The community people usually do not cut trees or bamboos from the reserve. But if some one cut or extract any resource without prior permission of such committee or steal any resource from the reserve

then he is fined for his action. The committee selects 30 people each month from the community to go into the reserve and clearing the jungle or weeds. Every week they go and guard or patrol the reserve to protect the reserve from any sort of theft or stealing. According to the community people they will decide after 20 years whether to cut trees or bamboos from the reserve. However poor people will be allowed to extract any resource from the reserve if they seek permission from the management committee. The community people usually live on jhum or day laborer. They also collect fuel wood from the nearby forest areas of their reserves.

Results:

Part I: Homesteads survey

Respondents' age, sex, occupation and education level

The result of the survey shows that the average age of the respondent is 46.7 years and they are most responsible person of the community. Among the respondents most of them are male (85%) and the rest are female (15%). It is found that almost all the families (95%) are engaged in jhum/ agriculture and tree farming and only a few (5%) are involved in other occupation including daily labourer as primary occupation (Table 1). However, some of them (35%) are also involved in secondary occupation that includes mainly daily labourer. Respondents of Tulachari (55%) are more involved in secondary occupation than that of Sadar para (15%). Educational status of the respondents' shows that most of the respondents are illiterate (72.5%) and only few (27.5%) of them are literate having primary education (17.5%), secondary education (7.5%) and graduate level education (2.5%). It is interesting to see that there is one graduate respondent having Master degree found in the study area (Table 1).

Table 1: Distribution of respondent households by respondents' age, sex, occupation and educational level (values in the parentheses denote percentages) (Note: PO= Primary occupation; SO= Secondary occupation; Farm.= Jhum/Agriculture and tree farming; Illi.= Illiterate, Pri.= Primary; Sec.= Secondary; Grad.= Graduate).

Para name	Age	Sex			PO		SO	Educational level			
		Male	Female	Total	Farm.	Others		Illi.	Pri.	Sec.	Grad.
Sadar para (n=20)	47.4	18 (90)	2 (10)	20 (100)	19 (95)	1 (5)	3 (15)	13 (65)	4 (20)	2 (10)	1 (5)
Tulachari (n=20)	46.0	16 (80)	4 (20)	20 (100)	19 (95)	1 (5)	11 (55)	16 (80)	3 (15)	1 (5)	-
Total (n=40)	46.7	34 (85)	6 (15)	40 (100)	38 (95)	2 (5)	14 (35)	29 (72.5)	7 (17.5)	3 (7.5)	1 (2.5)

Family size, sex and earning member

Average family size in the study area is 4.63 of which 2.60 (56%) are male and the rest 2.03 (44%) are female (Table 2). Among the family members half of them were found in the younger age category of 0-20 years (48%). On average each family has 2.1 (45% of the total family size) earning members of which 1.3 are male (28% of the total family size) and 0.08 are female (17% of the total family size) (Table 2). This result shows that both male and female are earning

members of the family meaning women are more or less equally involved in income generating or livelihood activities. But women are usually deprived of their labour compared to male. If women work as daily labourer they get Tk. 100 per day while male member of the society get Tk. 200 per day.

Table 2: Distribution of respondent households by family size, sex and total earning members (values in the parentheses denote percentages).

Para name	Sex	Family size							Earning Members (% of total)
		Age class							
		<10	10-20	20-30	30-40	40-50	>50	Total	
Sadar para (n=20)	Male	0.90 (30)	0.65 (22)	0.40 (13)	0.35 (12)	0.30 (10)	0.40 (13)	3.00 (58)	1.3 (25)
	Female	0.40 (18)	0.70 (32)	0.35 (16)	0.30 (14)	0.20 (9)	0.25 (11)	2.20 (42)	0.6 (12)
	Total	1.30 (25)	1.35 (26)	0.75 (14)	0.65 (13)	0.50 (10)	0.65 (13)	5.20 (100)	1.9 (37)
Tulachari (n=20)	Male	0.50 (23)	0.55 (25)	0.20 (9)	0.35 (16)	0.20 (9)	0.40 (18)	2.20 (54)	1.2 (29)
	Female	0.45 (24)	0.30 (16)	0.10 (5)	0.50 (27)	0.10 (5)	0.40 (22)	1.85 (46)	1.0 (25)
	Total	0.95 (23)	0.85 (21)	0.30 (7)	0.85 (21)	0.30 (7)	0.80 (20)	4.05 (100)	2.2 (54)
Total (n=40)	Male	0.70 (27)	0.60 (23)	0.30 (12)	0.35 (13)	0.25 (10)	0.40 (15)	2.60 (56)	1.3 (28)
	Female	0.43 (21)	0.50 (25)	0.23 (11)	0.40 (20)	0.15 (7)	0.33 (16)	2.03 (44)	0.8 (17)
	Total	1.13 (24)	1.10 (24)	0.53 (11)	0.75 (16)	0.40 (9)	0.73 (16)	4.63 (100)	2.1 (45)

Land resources

Land resources occupied by each family in the study area are 463 decimals of which most of the lands are hilly (92%) followed by agricultural land (5%) and homestead land (3%)(Table 3). Hilly lands are usually used for jhum or tree plantation. The situation in Tulachari is different from Sadar para in that in Tulachari almost all the lands are hilly having their homesteads at the foot hills and hill slopes. However, average land resources occupied by each family are higher in Sadar para (557 decimals) compared to Tulachari (370 decimals) (Table 3).

Table 3: Distribution of respondent households by land resources (in decimals) (values in the parentheses denote percentages).

Para name	Homestead					Agri-land	Hilly land	Total land
	Dwelling unit	Trees	Animal shed	Yard	Total			
Sadar para (n=20)	4.1 (0.73)	14.5 (2.59)	0.1 (0.02)	1.7 (0.31)	20.3 (3.64)	45.0 (8.08)	491.7 (88.28)	557 (100)
Tulachari (n=20)	3.5 (0.93)	2.0 (0.54)	-	1.3 (0.35)	6.8 (1.83)	0.0	363.0 (98.17)	369.8 (100)
Total (n=40)	3.8 (0.81)	8.2 (1.78)	0.1 (0.01)	1.5 (0.32)	13.5 (2.92)	22.5 (4.86)	427.3 (92.23)	463.4 (100)

Family income

Analysis of the family income by the respondent households' show that average family income in the study area is 51690 Taka/year of which maximum amount of the income (79%) comes from farming including 50% income from crops or jhum products (paddy, vegetables, spices etc.) and 29% income from tree products (fruits and timber) followed by other category (21%) including daily labourer. However, average family income was found highest in Sadar para (53455 Taka/year) compared to Tulachari (49925 Taka/year) (Table 4).

Table 4: Distribution of households' family income (Taka/year) in the study area (values in the parentheses denote percentage of total income)

Para name	Agricultural products				Tree products			Farm Total (h=d+g)	Other s (i)	Grand Total (j=h+i)
	Paddy (a)	Vegetables (b)	Spices (c)	Total (d=a+b+c)	Fruits (e)	Timber (f)	Total (g=e+f)			
Sadar para (n=20)	6360	11825	951 0	27695 (52)	1117 0	5150	16320 (30)	44015 (82)	9440 (18)	53455 (100)
Tulachari (n=20)	6250	9530	770 0	23480 (47)	8645	5300	13945 (28)	37425 (75)	12500 (25)	49925 (100)
Total (n=40)	6305	10678	860 5	25588 (50)	9908	5225	15133 (29)	40720 (79)	10970 (21)	51690 (100)

Plant diversity

Table 5 list the plant species and Table 6 shows the plant diversity measures present in the homesteads of the study area. A total of 34 different plant species were found in the homesteads and hills of the study area (Tables 5 & 6). Table 5 lists the plant species present in the study area with their local and scientific names. Usually the community people are more dependent on crops and tree products that are grown in and around the homesteads and hilly areas occupied or owned by them. Among plant diversity different timber, fruit and medicinal species are found growing. It is evident that **Segun** (90%), **Am** (90%), **Gamar** (75%), **Banana** (75%) and **Jam** (50%) were found dominating in the homesteads and hills of Sadar para and on the other hand **Segun** (85%), **Am** (85%), **Gamar** (70%), **Banana** (70%) and **Khantal** (60%) were found dominating in the homesteads and hills of Tulachari (Table 6). Species density was found excessively higher for **Segun** (1344) compared to other species followed by **Gamar** (311.5), **Banana** (295), **Am** (68.8) and **Khantal** (28) in Sadar para. The same result was also observed in Tulachari regarding the species density with excessively higher species density for **Segun** (964.5) compared to other species followed by **Gamar** (347.5), **Banana** (317.5), **Am** (15.65) and **Gutguttiya** (9.55) (Table 6). In total species density was found higher for Sadar para (2147) compared to Tulachari (1713.5). However both the measures are good from bio-diversity point of view. In case relative density highest percentage was also observed for **Segun** (62.61%) followed by **Gamar** (14.51%) and **Banana** (13.76%) in Sadar para and more or less similar result was observed in Tulachari with higher relative density for **Segun** (56.29%) followed by **Gamar** (20.28%) and **Banana** (18.53%) (Table 6). It is interesting to see that the species density and relative density is excessively higher for Segun (1344.25 & 62.61% in Sadar para and 964.5 & 56.29% in Tulachari) compared to other plant species in the study area (Table 6). This is because the local people are planting this species at greater numbers to get economic benefits in and around their homesteads and hills. Most of the households (80%) responded that the plant species are planted by themselves and only few (20%) responded that they are naturally occurring (Table 7). Most of the households (76%) have planted these species from their own source followed by nursery (18%) and others (6%) (Table 7). Among the agricultural crops the households responded that they also grow **vegetables** (80%), **paddy** (68%), **turmeric** (30%) and **zinger** (20%) (Table 8).

Table 5: List of plant species present in the study area.

Sl. No.	Species name/Local name	Scientific name
1	Achargula	<i>Microcos paniculata</i>
2	Am	<i>Mangifera indica</i>
3	Amra	<i>Spondius dulcis</i>
4	Ata	<i>Annona squamosa</i>
5	Bamboo	<i>Bambusa vulgaris</i>
6	Banana	<i>Musa sapientum</i>
7	Bel	<i>Aegle marmelos</i>
8	Bhadi	<i>Gariga pinnata</i>

9	Bohera	<i>Terminalia bellerica</i>
10	Boroi	<i>Zizyphus mauritiana</i>
11	Chalta	<i>Dillenia indica</i>
12	Gamar	<i>Gmelina arborea</i>
13	Garjon	<i>Dipterocarpus turbinatus</i>
14	Guava/Peara	<i>Psidium guajava</i>
15	Gutguttiya	<i>Bursera serrata</i>
16	Haritaki	<i>Terminalia chebula</i>
17	Itchri	<i>Anogeissus acuminata</i>
18	Jam	<i>Syzygium cumini</i>
19	Jambura	<i>Citrus grandis</i>
20	Jolpai	<i>Elaeocarpus robustus</i>
21	Kanthal	<i>Artocarpus heterophyllus</i>
22	Komola/orange	<i>Citrus sinensis</i>
23	Konak/bonak	<i>Schima wallichii</i>
24	Koroi	<i>Albizia procera</i>
25	Litchi	<i>Litchi chinensis</i>
26	Narikel	<i>Cocos nucifera</i>
27	Painna gula	<i>Flacourtia jangomas</i>
28	Papaya	<i>Carica papaya</i>
29	Rang gach	<i>Morinda angustifolia</i>
30	Sajna	<i>Moringa oleifare</i>
31	Segun	<i>Tectona grandis</i>
32	Supari	<i>Areca catechu</i>
33	Tentul	<i>Tamarindus indica</i>
34	Tetua Koroi	<i>Albizia odoratissima</i>

Table 6: Analysis of the plant diversity present in the study area

Sl. No.	Species name	Sadar para (n=20)				Tulachari (n=20)			
		Frequency		Species Density	RD (%)	Frequency		Species Density	RD (%)
		Nos.	HH (%)			Nos.	HH (%)		
1	Achargula	65	15	3.25	0.151	81	25	4.05	0.236
2	Am	1376	90	68.8	3.204	313	85	15.65	0.913
3	Amra	8	10	0.4	0.019	10	5	0.5	0.029
4	Ata	56	15	2.8	0.130	0	0	0	0.000
5	Bamboo	367	30	18.35	0.855	300	20	15	0.875
6	Banana	5907	75	295.35	13.755	6350	70	317.5	18.529
7	Bel	18	5	0.9	0.042	0	0	0	0.000
8	Bhadi	12	5	0.6	0.028	0	0	0	0.000
9	Bohera	3	5	0.15	0.007	8	15	0.4	0.023
10	Boroi	14	15	0.7	0.033	1	5	0.05	0.003

11	Chalta	2	5	0.1	0.005	0	0	0	0.000
12	Gamar	6230	75	311.5	14.508	6950	70	347.5	20.280
13	Garjon	27	20	1.35	0.063	15	10	0.75	0.044
14	Guava	86	20	4.3	0.200	0	0	0	0.000
15	Gutguttiya	114	25	5.7	0.265	191	70	9.55	0.557
16	Haritaki	6	10	0.3	0.014	3	5	0.15	0.009
17	Itchri	75	15	3.75	0.175	0	0	0	0.000
18	Jam	154	50	7.7	0.359	22	45	1.1	0.064
19	Jambura	27	20	1.35	0.063	20	15	1	0.058
20	Jolpai	30	5	1.5	0.070	0	0	0	0.000
21	Kanthal	563	45	28.15	1.311	97	60	4.85	0.283
22	Komola	77	15	3.85	0.179	145	20	7.25	0.423
23	Konak	0	0	0	0.000	1	5	0.05	0.003
24	Koroi	252	15	12.6	0.587	45	20	2.25	0.131
25	Litchi	346	45	17.3	0.806	326	50	16.3	0.951
26	Narikel	33	40	1.65	0.077	36	45	1.8	0.105
27	Painna gula	4	5	0.2	0.009	0	0	0	0.000
28	Papaya	10	5	0.5	0.023	26	20	1.3	0.076
29	Rong gach	8	5	0.4	0.019	25	10	1.25	0.073
30	Sajna	90	15	4.5	0.210	1	5	0.05	0.003
31	Segun	26885	90	1344.25	62.606	19290	85	964.5	56.288
32	Supari	55	20	2.75	0.128	5	10	0.25	0.015
33	Tentul	25	20	1.25	0.058	9	30	0.45	0.026
34	Tetua Koroi	18	15	0.9	0.042	0	0	0	0.000
Total		42943	-	2147.15	100	34270	-	1713.5	100

Table 7: Distribution of respondent households by mode of occurrence (%) and sources of seedlings (%).

Para name	Mode of occurrence (%)			Source of seedlings (%)			
	Planted	natural	Total	nursery	own	others	Total
Sadar para (n=20)	76	24	100	25	64	11	100
Tulachari (20)	84	16	100	11	88	1	100
Total (40)	80	20	100	18	76	6	100

Table 8: Distribution of respondent households (%) by agricultural crops planted.

Para name/ Crop name	Sadar para (n=20)	Tulachari (n=20)	Total (n=40)
Til	15	10	13
Tobacco	0	15	8
Pineapple	15	5	10
Paddy	75	60	68
Zinger	25	15	20
Turmeric	45	15	30
Olkachu	25	0	13
Vegetables	75	85	80

Income from farm products

The respondents in the study area were asked to know the costs and benefits from farm products grown by them annually. It is found that on average each family earns a net benefit of 10678 Taka/year from vegetables (31%) followed by 9908 Taka/year from fruits (29%), 8605 Taka/year from spices (25) and 5225 Taka/year from timbers (15%) that give them a total net benefit of 34415 Taka/year (Table 9). They also earn 6305 Taka/year from paddy that gives a total income of 40720 Taka/year from farm products which is 79% of the total family income of the respondent households (Table 5). This means that the respondent households are more dependent on their forests for their livelihood.

Table 9: Distribution of respondent households by income from crops and tree products (Taka/year/per household) grown by them (Note: Ct= Cost; Bt= Benefit; NB= Net benefit) (values in the parentheses denote percentage of total income).

Para name	Fruits			Timber			Vegetables			Spices			Total NB
	Ct	Bt	NB	Ct	Bt	NB	Ct	Bt	NB	Ct	Bt	NB	
Sadar para (n=20)	1560	12730	11170 (30)	300	5450	5150 (14)	2605	14430	11825 (31)	3490	13000	9510 (25)	37655 (100)
Tulachari (n=20)	1230	9875	8645 (28)	750	6050	5300 (17)	1100	10630	9530 (31)	1100	8800	7700 (25)	31175 (100)
Total (n=40)	1395	11303	9908 (29)	525	5750	5225 (15)	1853	12530	10678 (31)	2295	10900	8605 (25)	34415 (100)

Collection of forest resources

The respondent households were asked to know the type and quantity of forest resources they usually collect from the neighbouring forests. It is observed that respondent households usually collect fuel wood. Each family in the study area was found to collect 213 mounds of fuel wood per year travelling a distance of 1.79 kilometre and spending about 8 hours (150 minutes) a day on average (Table 10).

Table 10: Distribution of respondent households by the collection of forest resources.

Para name	Fuel wood (mound/family)	Distance (km)	Time spent per day (hour)
Sadar para (n=20)	214	2.21	7.15
Tulachari (n=20)	213	1.38	8.85
Total (n=40)	213	1.79	8.00

Lost Species

The homestead survey tried to find out the species that are lost from the homesteads and hilly regions of the study area. The respondent households were asked to identify the name(s) of the lost species from their homesteads and hilly lands. It is found that a total of 19 tree species were identified by the respondents of the study area that were lost from the locality. Among the lost species **Civit** (60%), **Darmara** (53%), **Jaganna gula** (43%), **Garjon** (40%), **Koroi** (38%) and **Telsur** (35%) are the mostly answered plant species that are lost from the study area (Table 11).

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 (72.5%) is identified as the major cause of biodiversity loss followed by population pressure (67.5%), jhum/shifting cultivation (62.5%), homesteads establishment (32.5%) and brick fields (25%) in the study area (Table 12). The respondent households were also identified a lot of problems they are facing due to biodiversity loss from the study area. All of them (100%) answered that they face problems due to biodiversity loss (Table 13). Some of the mentionable problems identified by majority of the respondents are production decreases (90%), less rainfall (72.5%) and reduced water in the streams (70%) (Table 13).

Table 11: Frequency distribution of respondents' perception about lost species in the study area (Note: HH= Number of households responded).

Sl. No.	Species name	Scientific name	Para name				Total	
			Sadar para		Tulachari		HH	%
			HH	%	HH	%		
1	Achargula	<i>Microcos paniculata</i>	8	40	2	10	10	25
2	Bartha	<i>Artocarpus lacucha</i>	5	25	1	5	6	15
3	Bohera	<i>Terminalia bellerica</i>	9	45	2	10	11	28
4	Chundul	<i>Tetramelis nudiflora</i>	5	25	-	-	5	13
5	Civit	<i>Swintonia floribunda</i>	8	40	16	80	24	60
6	Dharmara	<i>Stereospermum personatum</i>	11	55	10	50	21	53
7	Dumur	<i>Ficus semicordata</i>	7	35	-	-	7	18
8	Garjon	<i>Dipterocarpus turbinatus</i>	7	35	9	45	16	40
9	Gilalata	<i>Derris trifoliata</i>	6	30	1	5	7	18
10	Goda	<i>Vitex peduncularia</i>	6	30	4	20	10	25
11	Gutguttiya	<i>Bursera serrata</i>	9	45	2	10	11	28
12	Haritaki	<i>Terminalia chebula</i>	-	-	5	25	5	13
13	Jaganna gula	<i>Ficus racemosa</i>	7	35	10	50	17	43
14	Kau Gula	<i>Garcinia cowa</i>	5	25	-	-	5	13
15	Koroi	<i>Albizia spp.</i>	9	45	6	30	15	38
16	Latkon		8	40	1	5	9	23
17	Meda	<i>Trewia pollicarpa</i>	5	25	-	-	5	13
18	Telsur	<i>Hopea odorata</i>	-	-	14	70	14	35
19	Tulshi	<i>Ocimum sanctum</i>	7	35	-	-	7	18

Table 12: Frequency distribution of respondent households by the causes for bio-diversity loss in the study area (values in the parentheses denote percentages).

Reasons for loss of biodiversity	Para name		Total (n=40)
	Sadar para (n=20)	Tulachari (n=20)	
Population pressure	14 (70)	13 (65)	27 (67.5)
Jhum/ shifting cultivation	7 (35)	18 (90)	25 (62.5)
Brick field	8 (40)	2 (10)	10 (25)
Fuel wood collection	18 (90)	11 (55)	29 (72.5)
Homesteads establishment	3 (15)	10 (50)	13 (32.5)

Table 13: Frequency distribution of respondent households by the problems faced due to biodiversity loss in the study area (values in the parentheses denote percentages).

Difficulty faced		Para name		Total
		Sadar para	Tulachari	
Do you face any difficulty	Yes	20 (100)	20 (100)	40 (100)
	NO	0	0	0
Types of difficulty	Less rain fall	15 (75)	14 (70)	29 (72.5)
	Reduced water in streams	14 (70)	14 (70)	28 (70)
	Production decreases	20 (100)	16 (80)	36 (90)
	Increased temperature	6 (30)	16 (80)	22 (55)
	Soil erosion increases	5 (25)	2 (10)	7 (17.5)

Recommendation for biodiversity conservation

The respondent households were asked to know their perception about how to overcome the loss of biodiversity from the study area. It is evident that most of the households responded to plant indigenous species (77.5%) followed by mixed plantation (70%) and tree plantation with jhum or shifting cultivation (62.5%) (Table 14). Most of the respondents (90%) will consider all types of species to plant in and around their homesteads and hills when they are asked to choose species to plant (Table 15). All the respondents (100%) opined that they do not face any problem of technical knowledge for planting trees (Table 15).

Table 14: Frequency distribution of respondent households by their recommendation for biodiversity conservation (values in the parentheses denote percentages).

Respondents' recommendation for biodiversity conservation	Para name		Total (n=40)
	Sadar para (n=20)	Tulachari (n=20)	
Tree plantation with jhum	8 (40)	17 (85)	25 (62.5)
Mixed plantation	19 (95)	9 (45)	28 (70)
Planting indigenous species	20 (100)	11 (55)	31 (77.5)
Protection of planted tree(s)	6 (30)	1 (5)	7 (17.5)
Stop felling tree(s)	0	3 (15)	3 (7.5)

Table 15: Frequency distribution of respondent households by their considerations and technical knowledge in planting tree species (values in the parentheses denote percentages).

What is consideration for planting trees in the homestead?			
Variables	Para name		Total (n=40)
	Sadar para (n=20)	Tulachari (n=20)	
All types of species	20 (100)	16 (80)	36 (90)
All indigenous species	0	1 (5)	1 (2.5)

Species which have more economic value	0	3 (15)	3 (7.5)
Total	20 (100)	20 (100)	40 (100)
Do you face any problem of technical knowledge for planting trees?			
Yes	0	0	0
No	20 (100)	20 (100)	40 (100)

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 16 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 more or less equally performing most of the activities where male performs 56% and female performs 44% of the total agro-forestry activities in the study area (Table 16).

Table 16: Distribution of labour (%) in homestead agro-forestry activities.

Para name	Sadar para (n=20)			Tulachari (n=20)			Total (n=40)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agro-forestry activities									
Planning	52	48	100	48	52	100	50	50	100
Choice of species	52	48	100	48	52	100	50	50	100
Seedling collection	52	48	100	48	52	100	50	50	100
Propagation	52	48	100	48	52	100	50	50	100
Planting	52	48	100	48	52	100	50	50	100
Nursing	52	48	100	48	52	100	50	50	100
Fertilizer	52	48	100	48	52	100	50	50	100
Weeding	52	48	100	48	52	100	50	50	100
Harvesting	52	48	100	49	51	100	51	49	100
Trees	52	48	100	50	50	100	51	49	100
Fruits	52	48	100	50	50	100	51	49	100
Vegetables	52	48	100	48	52	100	50	50	100
Spices	52	48	100	50	50	100	51	49	100
Processing	52	48	100	48	52	100	50	50	100
Selling	100	0	100	100	0	100	100	0	100
Total	58	42	100	54	46	100	56	44	100

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 at least 5 government approved nongovernmental organizations (NGOs) working in the study area for providing loans to the community people (Table 17). Only 47.5% households in the study area responded that they

became members of the NGOs listed to get loan. BRAC (15%), Krishi Bank (15%) and Grameen Bank (10%) are some of the NGOs working in the study area (Table 17).

Table 17: Distribution of NGOs activity in the study area.

NGOs	Para name		Total (n=40)	Activity
	Sadar para (n=20)	Tulachari (n=20)		
BRAC	3 (15)	3 (15)	6 (15)	Loan
CCDB	2 (10)		2 (5)	Loan
Grameen bank	-	4 (20)	4 (10)	Loan
Kaltak	-	1 (5)	1 (2.5)	Loan
Krishi bank	5 (25)	1 (5)	6 (15)	Loan
Total	10 (50)	9 (45)	19 (47.5)	-

Focus Group Discussion (FGD):

The baseline survey also attempted to find out the opinion of the community people through Focus Group Discussion. The objective of the FGD was to identify how the community people think about biodiversity conservation and social development in general. The result of the FGD shows that people of the study area are involved in different income generating activities, such as, daily labour, service, small business etc. (Table 18). FGD also suggest that the forest of the study area was once rich with biodiversity but now lost its richness due to lack of land ownership that led people to cut trees, jhum or shifting cultivation, lack of tree planting after harvesting and higher rate of harvesting than planting (Table 18). FGD concludes that Chapalish, Civit, Garjon, Goda and Haritaki are some of the important tree species and Tiger and Goyal/Bison are some of the important wildlife species that are lost from the reserve forest areas of Rowangchari reserves (Table 18). Reducing rate of harvesting, increasing rate of tree planting, providing land ownership/tenure to the villagers are some of the recommendations by the community people to conserve lost biodiversity. If the land ownership is vested upon Forest Department (FD) then tree will be more stolen (Table 18). Rapid growing species such as Gamar, Am, Jam, Chapalish, Chalta, Tentul, Pani Dumur (to hold water) etc. are some of the preferred species to plant. However, they have shown negative attitude to plant Segun as other tree species cannot grow/ survive on the land where Segun is planted. Latkon, Bandarhola, Jaganna gula, Chapalish, Champa, Garjan, Cane etc. are some of the species for wildlife conservation that provide food and shelter to the wildlife, provide oxygen and keep the forest floor wet. According to FGD the government can take initiative to give vocational training and establishing industry to the locality that will create more jobs and NGOs can provide fund and other facilities for hen and duck raring, handicrafts manufacturing, livestock raring (Table 18).

Table 18: Results of Focus Group Discussion (FGD)

Questions	Answers
Alternate income:	Daily labour, service, small business, (if industry will be establish then it is best local people)
Reasons for loss biodiversity:	<ul style="list-style-type: none"> • Lack of land ownership, so people cut the tree indiscriminately. • Jhum cultivation • Tree was not planted after harvesting. • The rate of harvesting is higher than rate of planting.
Lost plant species:	Haritaki, Garjon, Chapalish, Civit, Goda
Lost wildlife:	Tiger, Gayal
How to conserve biodiversity:	<ul style="list-style-type: none"> • Rate of harvesting should be reduced • Rate of planting should be increased • It will be better if ownership of the forestland is given to the villagers. • If the ownership of the forestland is under forest department then tree will be stolen.
Species preference to plant	Rapid growing species such as Gamar, Am, Jam, Chapalish, Chalta, Garjon, Pani Dumur, Tentul etc. They have negative attitude to plant Segun as other tree species cannot grow/ survive on the land where Segun is planted.
Species preference for wildlife conservation and any reason:	Latkon, Bandarhola, Jaganna gula, Chapalish, Champa, Garjan, Cane etc. which keep the forest evergreen.
Government initiative:	<ul style="list-style-type: none"> • Vocational education, • Establishment of industry
NGOs initiative:	Fund and facilities for hen and duck raring, handicrafts manufacturing, livestock raring.

Part II: Forest Survey

Forest survey was conducted in Sadar para and Tulachari reserves of Rowangchari Upazilla. It is done by walking through the forest reserves 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. The forests of the reserves seem very good with natural plantations as these are maintained as para reserves for long and biodiversity are occurring naturally in these reserves (Photos 1&2). The plant species present in the study area shows that muli bamboo is the most dominant species with 2750 culms per ha (83%) (Table 19). The regeneration status of the forests also very good with a total of 24850 seedlings per ha and dominated by muli bamboo with 16000 shoots per ha (64%) (Table 20).



Photo 1: Forests and small creeks in Tulachari of Rowangchari

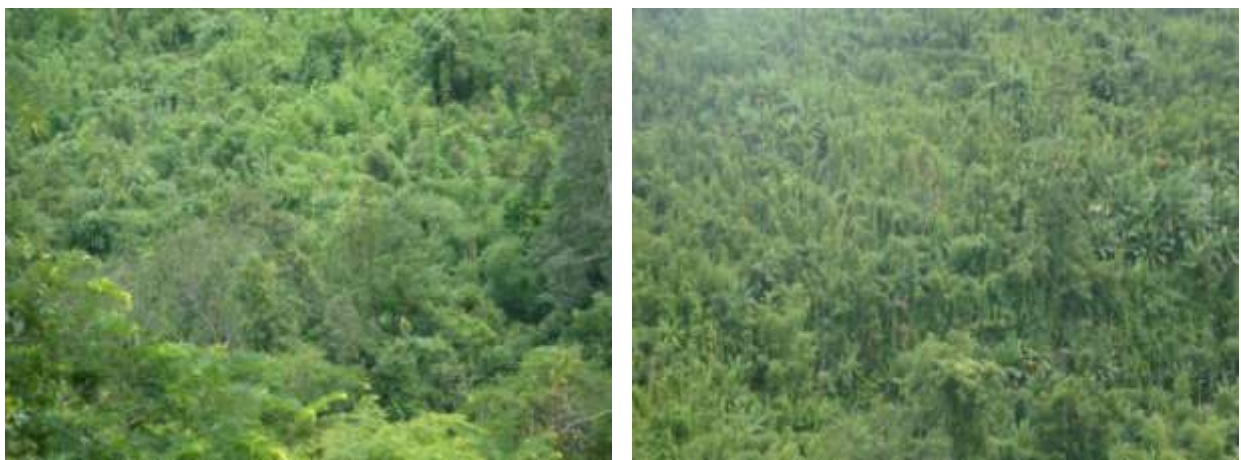


Photo 2: Forests of Sadar para reserves of Rowangchari

Table 19: Forest stockings in the study area.

Sl. No.	Species	No. of stems		Stems/ha
		Frequency	Percentage	
1	Dakrum	1	1.52	50
2	Dharmara	2	3.03	100
3	Chapalish	1	1.52	50
4	Bonmala	2	3.03	100
5	Bhadi	1	1.52	50
6	Kao gula	2	3.03	100
7	Toon	1	1.52	50
8	Muli bamboo	55	83.33	2750
9	Rang gach	1	1.52	50
Total		66	100.00	3300

Table 20: Regeneration status of the forests of the study area.

Sl. No.	Species	No. of seedlings		Seedlings per ha
		Frequency	Percentage	
1	Champa	5	1.01	250
2	Chapalish	5	1.01	250
3	Garjan	5	1.01	250
4	Bohera	4	0.80	200
5	Muli bamboo	320	64.39	16000
6	Dakrum	50	10.06	2500
7	Dharmara	1	0.20	50
8	Dumur	2	0.40	100
9	Bon alu	75	15.09	3750
10	Jam	4	0.80	200
11	Haritaki	4	0.80	200
12	Cane	20	4.02	1000
13	Goda	2	0.40	100
Total		497	100.00	24850

Conclusion:

Finally, it can be said that the people of the study area are mainly dependent on agro-forestry products they get from their homesteads and hilly areas (Tables 4, 8, 9 & 10). The people of Sadar para (with 82% of total family income) are more dependent on agro-forestry activities compared to Tulachari (with 75% of total family income) (Table 4). Civit (60%), Darmara (53%), Jaganna gula (43%), Garjon (40%), Koroi (38%) and Telsur (35%) are the mostly answered plant species that are lost from the study area (Table 11). Fuel wood collection (72.5%), jhum/shifting cultivation (67.5%) and population pressure (62.5%) are important causes of biodiversity loss identified by the respondent households in the study area (Table 12). Some of the mentionable problems faced due to biodiversity loss identified by majority of the respondents are production decreases (90%), and reduced water in the streams (70%) (Table 13). Most of the households responded to plant indigenous species (77.5%) followed by mixed plantation (70%) and tree plantation with jhum or shifting cultivation (62.5%) (Table 14). It is found that both male and female member(s) of the household are more or less equally performing most of the activities where male performs 56% and female performs 44% of the total agro-forestry activities in the study area (Table 16). Reducing rate of harvesting, increasing rate of tree planting, providing land ownership/tenure to the villagers are some of the recommendations by the community people to conserve lost biodiversity. If the land ownership is vested upon Forest Department (FD) then tree will be more stolen (Table 18). Rapid growing species such as Gamar, Am, Jam, Chapalish, Chalta, Tentul, Pani Dumur (to hold water) etc. are some of the preferred species to plant. However, they have shown negative attitude to plant Segun as other tree species cannot grow/ survive on the land where Segun is planted. Latkon, Bandarhola, Jaganna gula, Chapalish, Champa, Garjan, Cane etc. are some of the species for wildlife conservation that provide food and shelter to the wildlife, provide oxygen and keep the forest floor wet (Table 18). So they are now interested to plant and restore their homestead biodiversity with all those species specially the indigenous one which will enrich biodiversity and be useful for their family purposes and can earn extra income for the family (Table 15). The local people want to have some legal rights on the land they occupied in any form. If this project can successfully implement their activities in the study area it will bring a positive impact on the biodiversity of the region and help people earn extra money from producing plant resources that will enrich the biodiversity of the region and certainly improve the environmental quality of the locality.