<u>**Draft Report**</u>
Site Level Field Appraisal
Of
Sundarbans West Wildlife Sanctuary

Prepared for:
Integrated Protected Area Co-Management (IPAC)

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1. INTRODUCTION

1.1 Project Background

In Bangladesh, natural forests are under constant pressure and have already been significantly degraded and fragmented. In an estimate, forest cover in the country has fallen by more than 50% since 1970. This situation is threatening the value of these forests as habitat for biodiversity and for provision of vital environmental services. If this trend continues, it will soon result in a serious ecological catastrophe and a declining spiral of production and productivity irreversibly detrimental to the livelihood of people living in and around the forest, historically dependent on them. Therefore, there is an urgent need to reduce or reverse the detrimental impact on forest biodiversity and maintain resource sustainability through improved management and creating alternate livelihood opportunities for people dependent on forest resources.

The concern for biodiversity assets in the country has a long history and Bangladesh has a strong commitment to the cause of biodiversity conservation from the national, regional and global perspective as reflected in its endorsement and ratification of many national, regional and international conventions, protocols etc. related to biodiversity conservation.

The alarming situation in forest degradation in the country and the government's commitment to national and international community, government effort to designate and establish a number of protected areas, (including National Park, Wildlife Sanctuary and Game Reserve) with biodiversity significance under the provision of Wildlife Preservation Act, 1973. But there has been a little change in the degrading situation of these PAs with regard to biodiversity and its environmental services. Poor governance and lack of appropriate and pragmatic management regimes for these PAs has been linked to the failure in PA management in the country.

Responding to the urgent need to address the forest and wetland conservation and related economic opportunity creation, the US government and Government of Bangladesh elaborated and signed a Strategic Objective Grant Agreement to improve management of open water and tropical forest resources. The project named Integrated Protected Area Co-Management (IPAC).

The Integrated Protected Area Co-Management (IPAC) will embark upon the strategic goal of scaling-up natural resource co-management at the policy and operational level by achieving recognition, acceptance and integration of this approach by the GOB into its management tactics. The overall IPAC objective is to promote and institutionalize an integrated protected area co-management system for sustainable natural resources management and biodiversity conservation that results in responsible, equitable economic growth and good environmental governance. IPAC will build upon and provide additional support to the successful co-management interventions launched under MACH and Nishorgo Support Project (NSP). Under IPAC, carefully crafted, integrated, activities will be implemented over significantly larger areas to: develop a protected area strategy that applies to ecologically and economically significant areas, build technical capacity within national and local level institutions for protected area co-management, and expand the geographic area of

Bangladesh under co-management to ensure the long term success of the models developed for freshwater and forest ecosystems. Institutionalization and successful implementation of IPAC will also address a series of short, medium and long term climate change mitigation and adaptation issues.

1.2 Purpose of the Report

The main purpose of the report is to synthesis of all findings from PRA and RRA exercises conducted in Sundarbans West Wildlife Sanctuary (WS) during June-July, 2009. The report also details the methodology and tools used and highlight the issues in Sundarbans forest management and conservation and identify the challenges for the IPAC and identify concerned stakeholders and their strength. Finally, the report puts forward set recommendations for the improved management of the Sundarbans West WS.

2.   THE RESOURCE BASE

2.1. Description of the Site

The Sundarbans is the largest single block of tidal halophytic mangrove forest in the world. The forest lies at the feet of the Ganges and is spread across areas of Bangladesh and West Bengal, India, forming the seaward fringe of the delta. The total area of Sundarbans forest is 10,000 sq. km of which 6,017 sq. km (almost 60%) is in Bangladesh managed by the Forest Department (FD).

Systematic management of this forest tract started in the 1860s. The Sundarbans forests were declared as reserved forests (SRF) in 1875-76. Sundarbans Forest Division at Khulna was created in 1879 for the management of this forest. Sundarbans was designated as Ramsar Wetland Site in May 1992. Three wildlife sanctuaries (WS), namely Sundarbans East WS (31226.94 ha), Sundarbans South WS (36970.45 ha) and Sundarbans West WS (71502.10 ha), were Gazetted in 1996, covering an area of 139,700 ha of SRF. Sundarbans WSs are managed by Sundarbans Wildlife Division of Forest Department. These three WSs have been declared as World Heritage Sites by the UNESCO in 1997.

Particulars of Sundarbans WSs are placed in Table 1

Table 1: Sundarbans Wildlife Sanctuaries

SL No.	Particulars	Area in hectare	Year of Establishment
01	Sundarbans (East) Wildlife Sanctuary	31226.94	1996
02	Sundarbans (South) Wildlife Sanctuary	36970.45	1996
03	Sundarbans (West) Wildlife Sanctuary	71502.10	1996

Sundarbans West WS is consisting of the compartments 53, 54, 55 and part of 49. The WS is bounded by Jamuna River in the east, Harinbhanga River in the west, Burigang River in the north and Bay of Bengal & South Talpatti Island in the south.

2.2 Resources of Sundarbans

Sundarbans Reserve Forest (SRF) is a main source of livelihood for thousands of people (whether rich or poor) living next to the SRF including those living in adjoining & distant places. Thousands of people are involved in harvesting /collecting various resources form SRF for their livelihoods. Major resources that are officially allowed to collect/harvest include varieties of non-timber forest products (NTFP) and fishes.

There are varieties of plant-based minor forest resources called non-timber forest products (NTFP) in the SRF collected by the local community. Golpata is one of the important plant resource on which large number of people depend for their livelihood. Goran is another important resource mostly used as fuel wood, making housing structures and boundary fences.

There are various other plant-based resources like reeds, catkin grass, hental, helipata or mailla (mat making materials). Honey and Wax is another SRF resource for which *Mouali* (honey/ wax collector) occupational community involved.

Among the fisheries resources, varieties of fin & cat fishes, shrimps, crabs and shrimp PL (Post larvae) are the major harvestable resources from within and adjacent to the SRF.

There are also wild life, birds, mammals, reptiles etc. in the Sundarbans.

2.3. The Landscape Zone of Sundarbans West Wildlife Sanctuary

The Landscape Zone consists of 55 villages of Munshigonj, Burigoalini, Gabura, RamjanNagar and Koikhal Unions of Shyamnagar Upazila.
Villages of Landscape Zone are placed in Table 2.

Table 2: Landscape Zone Villages of Sundarbans West WS

Sl No.	Village	No of HH	Total Population	Distance from SRF (KM)	Dependency on SRF
A. Munshigonj Union of Shyamnagar Upazila					
01	North Kodomtola	394	2096	1 Km	Medium
02	South Kodomtola	196	1176	0.2 Km	High
03	Dhankhali	456	2472	1 Km	Low
04	Kachu Khali	227	1135	2.5 Km	Low
05	Kultoli	278	1495	1 Km	Medium
06	Harinagar	570	3470	0.5 Km	High
07	Central Kalinagar	790	4000	0.3 Km	High
08	Hetal Khali	470	2392	1.5 Km	Medium

09	Jeil-e Khali	495	2960	2.5 Km	Low
10	East Kalinagar	686	3642	0.5 Km	High
11	Mothurapur	355	1764	0.3 Km	High
12	Shinghortoli	250	1200	0.3 Km	High
13	Chunkuri	476	2380	0.2 Km	High
14	Choto Vatekhali	509	2668	4.0 Km	Medium
15	Boro Vatekhali	300	1600	4.0 Km	Low
16	Jatindranagar	550	3120	0.2 Km	High
17	Mirgang	560	3000	0.2 Km	High
18	Pershee Khali	367	1472	1.5 Km	Medium
B. Burigoalini Union of Shyamnagar Upazila					
19	Abad Chondipur	500	2540	0.6 Km	High
20	Chuna	480	2340	1.5 Km	High
21	Bon Bibi tola	520	2340	1.0 Km	High
22	Pan Khali	500	2420	0.3 Km	High
23	Burigoalini	230	1100	0.3 Km	High
24	Kolbari	484	2400	0.2 Km	High
25	East Durgabati	240	1180	2 Km	Medium
26	West Durgabati	220	1065	1.5 Km	Medium
27	Datinakhali	878	4450	0.5 Km	High
28	Vamia	1052	6655	1.5 Km	Medium
29	East Porakatla	180	1110	2 Km	Medium
30	West Porakatla	206	1270	1.5 Km	Medium
C. Gabura Union of Shyamnagar Upazila					
31	Kholpetua				Medium
32	Gabura				Medium
33	Lebu Bunia				Medium
34	Jail-e Khali				Medium
35	Kholisha Bunia				High
36	Tengra mari				Medium
37	Kagramari				High
38	Parshee mari				Medium
39	Navidolkhali				Medium
40	Chandimukha				High
41	9 No Sora				High
42	10 No Sora				Medium
43	Dumuria				High
44	Chalkbara				High
45	Middle Khulishabunia				High
D. RamjanNagar Union of Shyamnagar Upazila					
46	Vate Khali	980	4200	4 Km	Medium
47	Tengrakhali	373	1700	2 Km	High
48	Kalinchi	560	4100	0.7 km	High
49	Golakhali	86	390	0.3 Km	High
E. Koikhali Union of Shyamnagar Upazila					
50	East Koikhali	1700	7500	0.4 Km	High
51	West Koikhali	1300	5600	1.8 Km	High

52	Middle Koikhali	145	870	2.5 Km	Medium
53	Shap Khali	520	3000	2.5 Km	Medium
54	Joya Khali	1160	6000	4 Km	High
55	Boish Khali	495	2700	5 Km	Medium

3. METHODOLOGY

The overall purpose of the PRA/RRA was to come up with a comprehensive situational analysis of the Sundarbans WS with a view to understand (i) who destroys and how the forest is destroyed, (ii) What are the underlying driving force for the forest degradation, (iii) Cause and effect of behavior of local people, and (iv) Opportunities for its improvement. RRA is designed to identify the stakeholder groups and to get a sense of range of issues that the project needs to address and be better informed during subsequent appraisals and surveys. PRA is planned to collect in-depth information on the identified issues.

3.1 Study Period

PRA and RRA field exercises in Sundarbans West WS were conducted during June and July 2009. The detailed time schedule for the field activities is given in Table 3.

Table 3: List of selected spots and schedule for conducting primary data collection and PRA/RRA field work

Date	Name of PRA/RRA spots	Union	Remarks
21/06/2009	Boishkhali	Koikhali	Formal PRA
23/06/2009	West Koikhali	Koikhali	Formal PRA
24/06/2009	Sapkhali	Koikhali	FGD
04/07/2009	Joyakhali	Koikhali	Formal PRA
06/07/2009	Kalinchi	Ramjannagar	Formal PRA
07/07/2009	Golakhali	Ramjannagar	FGD
08/07/2009	Tangrakhali	Ramjannagar	Formal PRA
09/07/2009	Vatekhali	Ramjannagar	Formal PRA
11/07/2009	Central Kalinagar	Munshigonj	Formal PRA
12/07/2009	Mothurapur	Munshigonj	Formal PRA
13/07/2009	Harinagar	Munshigonj	Formal PRA
13/07/2009	Shinghortoli	Munshigonj	FGD
14/07/2009	Mirgang	Munshigonj	Formal PRA
15/07/2009	Chunkuri	Munshigonj	Formal PRA
17/07/2009	Jatindranagar	Munshigonj	FGD
18/07/2009	Datinakhali	Burigoalini	Formal PRA
19/07/2009	Burigoalini	Burigoalini	Formal PRA
20/07/2009	Kalbari	Burigoalini	Formal PRA
21/07/2009	Abad Chandipur	Burigoalini	FGD
22/07/09	South Kodomtola	Munshigonj	FGD

3.2. Setting PRA/RRA Issues and Questions

The RRA and PRA issues and question are given in Table 4 & 5 respectively.

Table 4: Selected RRA issues for Sundarbans WS, specific activities and tools used

Sl.	RRA Issues	Specific activities	Tools Used	Participants
1	Stakeholder Assessment	Identification of settlements, resources users, local institutions, agencies and organization, community organizations etc and their roles and activities	HHs Interview, KI, FGD, Skerch mapping	Local HHs, Local school teacher, Local community people
2	SH Demographic Profile	Settlement wise no. of HHs/population, HH occupation, education, forest use, land holding	Secondary information, HH Interview, KI, FGD, Trend Analysis	Local Union Parishad, HHs head, Community people, teacher
3	SH Economic Activities/Livelihood Strategies and Human Capital Development	Primary and secondary income sources of HH, Richness/poverty Unemployment, Credit, AIGA Skill and skill development opportunities, Seasonal workload of male and female	HH Interview, KI, FGD, Seasonal Calendar	HHs heads, teacher, local elite, community people
4	Gender Issues	General impression on living standard, education and health status, participation in decision making, Women mobility in the area, Access to IGA and credit	HH inter, FGD, KI, Direct Observation	HHs head, Women group, Community people, local elites
5	Local Level Awareness	Awareness and perceptions about resource degradation and conservation, Willingness for resources conservation, Knowledge about forest and wildlife	HH interview, FGD	Local HHs, heads, local community
6	Resources/resource status	Trends in changes in major resource bases, Endangered/extinct plant and animal, Causes for the decline in different resources	Trend Analysis, HH Int., FGD, KI	Local people, Local HHs head, Community people
7	Resource exploitation	Major forests resources collected, Reasons and extent of exploitation different forest resources, Dependency on the forest, Seasonal trend in resource exploitation	HH Int, FGD, KI, Trend Analysis, Seasonal calendar	Local HHs heads, Public representative & FD staff, Community people, Local elites,

8	Legal Aspects	Access to the forest by locals, Conflict and negotiation with FD staff, Land encroachment, Law enforcement mechanisms in the PA, Illegal tree felling and forest cases	FGD KI	FD staff and forest villagers, Local community, Local Govt., Teacher
9	Power Structure	Local influential and their role, Nature and sources of power and their domain of influence, Conflict and conflict resolution	HH int, FGD KI	Local HHs , Local Community and local govt. and Local elites
10	Others	Access to areas and settlements, NGO activities in the locality Challenges for conservation Local problems Mobility in the area	HH Int FGD KI	HHs heads Local community Local govt. Local elites FD staff

Table 5: PRA issues, specific activities performed and tools used

Sl.	Issues	Specific activities	Tools used	Participants
1	Forest make up dynamics	observation on forest physiography, topography and forest make up, land use cover, resource exploitation and regeneration areas, animal distribution, changes in forest cover, thickness, vegetation, settlements, animals and availability of resources	KI Resource Mapping Secondary data FGD Trend analysis	FD staff, local elites, local community
2	Local governance system and community structure and functions	Decision makers- influential people Local community organization, institutions and their linkage Local conflict and resolution Local problem, cause and possible solution	Venn diagram, FGD & Ranking	Community people Local people
3	Livelihood strategies	Income and expenditure sources, Livestock, Richness and poverty	Wealth ranking HH interview	Local community
4	Gender Issues	Family decision making Mobility Workload education and Access to credit	Decision making chart Mobility map HH int. & FGD	Local community Women group

5	Fuel wood collection	Information on collector Dependence on the extraction for their livelihood Level of extraction and seasonality Conflict with FD Impact on the forest and future risks	FGD Seasonal analysis	Community people Fuel wood collector
6	Collection of trees as building materials	Information on collector Purpose and reason for collection Uses of the resources Dependence on the extraction Conflict and negotiation with FD Alternate sources for the collection of the resources Impact on the forest	FGD KI	Community people FD staff
7	Fish and crab collection	Information on collector Dependence on the extraction for their livelihood Level of extraction and seasonality Impacts on the forest	FGD Seasonal analysis	Fisher, crab collector Local community
8	Shrimp PL collection	Information on collector Dependence on the extraction for their livelihood Level of extraction and seasonality Impacts on the forest	FGD Seasonal analysis	Shrimp PL collector Local community
9	Golpata collection	Information on collector Dependence on the extraction for their livelihood Level of extraction and seasonality Impacts on the forest	FGD Seasonal analysis	Golpata collector Local community
10	Honey collection	Information on collector Dependence on the extraction for their livelihood Level of extraction and seasonality Impacts on the forest	FGD Seasonal analysis	Honey collector Local community
11	Illegal timber felling	Information collector Key people Uses and marketing channels and dependence	FGD KI	Community people Local elite
12	Land encroachment	Historical perspective and trend information on encroaches		Community people Local elite

3.3. Formation of PRA/RRA Field Teams

The PRA/RRA field team was formed with the members of Munshigonj Site Office of IPAC-CODEC. Details of the PRA/RRA field team shown in Table 6.

Table 6: PRA/RRA Team for Sundarbans West WS

SL	Name	Designation	Remarks
01	Mr. Goutom Kumar Ghosh	Site Coordinator	IPAC-CODEC
02	Mr. Sarwar Hossain	Site Facilitator	IPAC-CODEC
03	Abu Sayeed	Field Organizer	IPAC-CODEC
04	Rajib Joens Mitra	COGF	IPAC-CODEC

3.4. Selection of PRA/RRA Spots

On the basis of the information received from FD local officials and staff as well as information received from Union Parishad, various sample locations were selected for visit by the team for information collection. The selection was based on a number of selection criteria. The selection process was completed during the planning meeting held at Munshigonj Site Office for that purpose.

3.5. Holding Training/ Orientation
A day-long planning and orientation for PRA/RRA team members was organized at Munshigonj Site Office on June 18, 2009. The purpose was to finalize PRA/RRA spots, plan for conducting PRA/RRA field works, and to give the team orientation in using various tools.

3.6. Selecting PRA/RRA Methods and Tools

3.6.1. Metrics Covered under various PRA/RRA Tools

i. Transect Walk
Soil, vegetation, land use, crops, human activities, etc.

ii. Resource and Social Mapping
Land use cover, resource zones, resource exploitation zones, settlements, road, embankment, social and religious institutions

iii.Venn Diagramming
Local power structure, local community organizations, local institutions and agencies, local conflicts and conflict resolution, mobility, women & men, local NGOs & CBOs.

iv. Mobility Map
Movement of local people

v. Seasonal Calendar
Wood/ golpata, honey/ wax, fish/ crab and other non-timber forest product (NTFP) collection, workload, accessibility to forest, transportation problem, forest patrol, agricultural activities, ,collection of building materials, hunting, vegetable collection, damages by natural calamities.

vi. Trend Analysis
Forest cover, forest thickness, trees, forest use, unemployment, local solvency, livelihood expenditure, literacy, unemployment, use of forest for income, use of forest for HH needs, transportation and mobility, homestead plantation, food scarcity, credit and IGA, occupation, wildlife, hunting, illegal felling, fuel wood and golpata

collection, fish/crab trapping, honey/ wax collection, other NTFP, livestock, agricultural activities.

vii. Ranking and Scoring
Local problem ranking, wealth ranking and livelihood analysis

3.7. Field Implementation Strategies for the Selected Tools

3.7.1. Household Interview
Household interviews were conducted by randomly selected household-owners from the place/gathering where formal Focus Group Discussions were organized. Household interviews were conducted at the specific houses of the respective household interviewees. Specific questionnaires were used to conduct the interviews.

3.7.2. Key Informant (KI) Interview
Secondary information was collected from Key Informants (KI) including Union Parisad Chairman, Member, Local Elites, and Elderly Persons. KI interviews were conducted by making prior appointments as well as at spot visits. The interviews were conducted at the Offices/ Houses of the KI using a checklist of questionnaires developed for the purpose

3.7.3. Group Interview
The purpose of the planned group interviews was to collect some information on the locality and local situation based on the consensus of the local people. Group interviews were conducted at places like tea stalls and other local community places where local people gather spontaneously and no formal invitation to the local people was made for participation the group interview. Mapping, seasonalities, ranking and scoring exercise, whenever possible were done in group interviews. This is basically unstructured interview and a checklist of issues was used as a basis for questions.

3.7.4. Focus Group Discussion
Focus Group Discussions were conducted at public places especially on open spaces in front of mosques, schools; adjacent to tea-stalls or dwelling houses where local people usually gather together. Different information under different indicators like Social & Resource Map, Wealth Rank, Mobility Map, Venn diagram, Seasonal Calendar, Trend Analysis, etc., were collected using previously developed checklist as well as semi structured interviews.

3.7.5. Direct Observation
The team while walking through the area, talked to the local people, discussed many things and made observation on the resources, people's behavior and their activities, etc. It also helped in triangulation of collected information and also helped in generation new questions for interview or discussions.

3.7.6. Secondary Information Collection
Some demographic data were collected from respective local Union Parishad sources. Relevant reports and documents were consulted and some information was used whenever necessary.

3.7.7. PRA/RRA Fieldwork Review

After each day fieldwork, the team sat together at night for team interaction and triangulation. The activities performed during the session included (i) reviewed information gathered that day and made summary of the information, triangulated whenever necessary; (ii) planned the next day's activities; and (iii) make methodological review.

3.7.8. Limitation of the Fieldwork

This report only covers four unions namely Munshiginj, Burigoalini, RamjanNagar and Koikhali of Shyamnagar Upazila.

The main limitation of the field work was that it took place during the rainy season. Sundarbans West WS Covered Koyra and Dacope Upazila of Khulna District and Shyamnagar Upazila of Satkhira District. PRA/RRA field work was not conducted in Koyra and Dacope Upazila of Khulna District.

PRA/RRA field work was not conducted at Gabura Union of Shyamnagar Upazila due to Cyclone Aila.

4. OUTCOMES

4.1. Forest Land/Resource Use Cover

The SRF is a source of livelihoods of thousands of people living next to the SRF including those living in adjoining and distant places. From the time immemorial, thousands of people are involved in harvesting/collecting various resources from SRF for their livelihoods. Major resources that are officially allowed to collect/ harvest include varieties of NTFP, fisheries and non-timber forest products. There is no official permit to fell tree or harvest timber.

Sundarbans West WS is consisting of the compartments 53, 54, 55 and part of 49 with an area of about 71,502 ha; land and water areas are 47,354 ha and 24,148 ha respectively. The WS is bounded by Jamuna River in the east, Harinbhanga River in the west, Burigang River in the north and Bay of Bengal & South Talpatti Island in the south. Naturally the land area is very rich in flora (both timber and NTP) and fauna (wildlife), and water areas are very rich in aquatic flora and fauna (including fish/ shrimp and crabs).

In the line with the biogeo-graphical zoning approach, five habitat types are identified namely: shore, low mangrove forest, high mangrove forest, open land/ grassland and estuarine-riverine. The shore habitat covers the open sandy to muddy areas along the edges of the WS on the Bay of Bengal which generally serve as the main habitat of a lot of shore bird species in the Sundarbans. The shore is rich in tiny aquatic organisms including shells, crabs, shrimps, and fishes for the shore birds.

The low mangrove forest habitat type is a flooded area or a tidal area and generally characterized by low vegetation composed of small trees, shrubs, hental and others. This habitat type harbors important mammals, e.g., the Royal Bengal Tiger, spotted

deer, wild beer, Rhesus monkey, Otter, Jackal, and others; reptiles, snakes, and others; birds; fishes, and amphibians.

The high mangrove forest habitat type is generally characterized by high vegetation consisting of medium to large trees such as sundri, gewa, keora, baen, passur, and others. This habitat type harbors arboreal mammals, e.g., the Royal Bengal Tiger, fishing cat civet jackal, squirrel and others; reptiles, birds, fishes, and amphibians.

The grassland habitat type is partly flooded and generally dry land, characterized by grass vegetation consisting mainly of sungrass/Ullu and some *Imperata cylindrical*. This habitat harbors mainly the spotted deer, the Royal Bengal Tiger. It also harbors other mammals (wild boar, rat & others), birds, reptiles, snakes, fishes, and amphibians.

The estuarine-riverine habitat type is areas embracing the mouths of rivers and muddy riverbanks which are normally flooded during high tide with grass, shrubs and herbaceous vegetation. This is the main habitat of estuarine crocodile. It also harbors some other reptiles; mammals; birds; amphibians; and a good number of economically valuable fishes, crustaceans and mollucs.

4.2. Forest Land/Resource Use Dynamics
Table 7 shows the trend in changes in the forest quality and resources used and the causes for the changes. It is revealed that forest tree cover has been reduced by 46% (Big tree reduced by 75%), wildlife abundance decreased by 65%, fish abundance reduced by 56%, and dependency on forest by the adjacent people increased by 71%) during last 30 years. There are large number of issues and reasons behind such unexpected situation. Some of the reasons are:

- Rapid growth of population
- Extreme poverty
- Indiscriminate harvesting of natural resources; cutting tree, hunting wildlife, collecting non timber forest products, over fishing,
- Corruption of staff of concerned government department specially FD
- Illegal removal of trees using permit issued by FD previously and without permit at present
- Increase dependency on forest for their livelihood
- Lack of knowledge and awareness among the people on forest, tree, wildlife and environmental conservation
- Natural disaster
- Salinity increase
- Habitat destruction for Sundarbans' flora and fauna; ecological imbalances
- Decreased employment opportunities in agriculture sector
- Inadequate/ absence of income generating opportunities at local level
- Unplanned shrimp culture

Table 7: **Trend Analysis** (Forest quality and resource use matrix)

Issues	1980	1990	2000	Present	Major Causes for Change
Tree Cover	00000	0000	000	00	Excessive exploitation Illegal tree felling Tree poaching Poverty Population increase Corruption and Poor management Ignorance and lack of awareness Natural disaster Increase salinity Increase dependency on forest
Wildlife abundance	00000	0000	000	00	Indiscriminate hunting Habitat destruction Increase illegal entrance of people for resource harvesting Corruption and Poor management
Fish abundance	00000	0000	000	000	Involving more people in fishing Over-fishing Use of Banned fishing-net Fishing by poisoning Shrimp/Prawn PL collection Extreme poverty Fishing in banned areas & seasons
Agricultural Land	00000	0000	00	0	Start unplanned shrimp gher Involving influential people for shrimp gher in and outside the area. Pressurized local marginal farmer to lease their agriculture land for shrimp gher Convert agriculture land to shrimp gher for more benefit
Shrimp Culture	0	0000	00000	00000	More profit International demand Govt. cooperation Involvement of influential people Pressurized local marginal farmer to lease their land for shrimp gher
Livestock abundance	00000	000	00	0	Feed and shelter crisis Decrease agriculture land
Dependency on Forest resources	00	000	0000	00000	Extreme poverty No employment opportunity at local level Decrease agricultural opportunity due to shrimp culture

Note: 1 circle indicates relatively lowest abundance/ intensities, 5 circles indicate relatively highest abundance/ intensities.

4.3. Stakeholders Assessment

Information collected on the stakeholders during PRA is summarized and presented in Table 8 below. A total of 21 categories of stakeholders have been identified, of them, seven (7) are primary stakeholders-extract resources from the SRF, six (6) are secondary stakeholders- indirectly involved with use of forest resources, and several institutional stakeholders remains in eight (8) such group. Some of the stakeholders are described in the following sections

Table 8: Stakeholders of Sundarbans West WS

SL	SH Name	Description of SH	Stake	Level of Stake
A. **Primary Stakeholders**				
01	Fishers	Poor people: Male, female and child	Fishing and fish drying in dry season	Major
02	Crab Collectors	Poor people: Male, female and child	Collect crabs from SRF. Also catch fishes in seasons	Major
03	Shrimp/Prawn PL collectors	Poor people: Female, child and male	Collect shrimp/ prawn PL from water bodies from inside and edges of SRF	Major
04	Bawalies (NTFP collector)	Poor people: Mainly male; sometimes female and child	Collection of NTFP, specially golpata, goran, and other minor plant based products	Major
05	Moualies (Honey collector)	Poor people: Male	Collection honey and wax	Major
06	Labor	Poor people	Work as day laborer	Minor
07	Hunter	Local people	Hunting wild animal from sundarbans	Medium
B. Secondary Stakeholders				
01	Small Mohajons (money lenders)	Local people, influential	Collect forest products commercially, tend to make profits, invest either in full or part from his own	Major
02	Saw Mill Owners	Influential person from local or outside		Major
03	Brick Field Owners	Influential person from local or outside		Medium
04	Fish Arotdars/ businessmen	Large traders and investors, influential people	Make business out of managing/ investing in fishing in SRG area	Major
05	Gher Owners	Influential people		Major
06	Robbers	Group of derailed armed people, organized, powerful in SRF area	Make money by robbery, making hostage who collect SRF resources	Major

C. Tertiary Stakeholders/ Institutions				
01	Sundarbans West Division of FD	Government FD institution	Conservation, management, control and revenue collection	
02	Wildlife Division of FD	Government FD institution	Wildlife conservation, sanctuary management	
03	Political Leader	Local and national leader	Play an important role for conservation	
04	Local Administration	Govt. Authority	Control and implementation of govt. rules & regulation	
05	Local Government	Have no direct role in SRF issues. Can play role in conservation of SRF through forest & environment protection committees	Rural development, protection of environment and forest , control law & order	
06	BDR & Police	Govt. Agency	Control and implementation of govt. rules & regulation	
07	Local Community Organization and NGOs	Work with the poor communities for their livelihood development	Demand co-management and conservation of SRF Support poor communities, Demand transparency of FD	
08	IPAC Team	GOB Project	Capacity building, Co-management with stakeholders, Infrastructure development, AIGA support, Conservation	

4.3.1. Primary Stakeholders

There are seven types of primary stakeholders identified through PRA/RRA field works. These primary stakeholders are Fishermans, Crab Collectors, Shrimp PL collectors, Bawalies (NTFP collector), Mawalies (Honey collector), Labour and Hunter.

PRA/RRA studies show that primary stakeholders cover 71% households. Fishers' involvement is the highest 53% (covering other fisher, crab collection and shrimp PL collector). Wood collectors are in second position covering 15% covering timber wood/ firewood, fencing material, thatching material/golpata, and other plant based non timber produces collector. Laborers, involved directly in collection, transportation and handling of SRF resources, cover 10% household; and the honey/ wax collectors represents the lowest 3% households. Fishers (for selected species, size & site),

Golpata harvesters, and honey/ wax collectors possessed legality as they got PERMIT for collection of such resources from SRF during specific period of time.

4.3.2. Secondary Stakeholders

There are six types of secondary stakeholders identified through PRA/RRA field work. These secondary stakeholders are Small Mohajons (Money lenders), Saw Mill Owners, and Brick Field Owners, Fish Arotdars / businessmen, Gher owners and Robbers.

PRA/RRA studies show that businessmen covering Small Mohajons (money lenders), Saw Mill Owners, Brick Field Owners and Fish Arotdars/ businessmen.

Gher owners, 07% of households, played destructive roles in environment and natural resources conservation by converting land from agriculture based production system to captive salt water shrimp culture system.

Although Robbers/Dacoits are important stakeholders, also a great concern of other stakeholders of SRF, they normally limit their operations inside SRF affecting interests of other stakeholders.

4.3.3. Institutional/ Organizational Stakeholders

These institutional/ organizational stakeholders are Wildlife Division of FD, Sundarbans West Division of FD, Political Leaders, Local Administration, BDR, Local Government, NGOs and IPAC Team.

Local Community Organization (CBOs)/ NGOs/ Financial Institutions work with poor communities on their rights and entitlement. They support poor communities with micro-credit and skill development training. They demand transparency of forest department for conservation of SRF and sustainable management of SRF resources. Large number of NGOs and CBOs were found in the list, majority of which were involved in micro-credit operation. PRA field study shows that only a few NGOs are providing education, environment, health, safe water & sanitation, environment conservation and social awareness services to the community people. List of NGOs and CBOs are presented in Table 9.

Table 9: Working NGOs and CBOs and their activities

Sl.	Name of NGOs & CBOs	Working Areas	Activities
01	Caritas	Micro-credit, Group Formation, Training, Relief & Rehabilitation activities	Shyamnagar Upazila
02	Grameen Bank	Munshigonj, Burigoalini, Gabura & Ishshoripur Union	Micro-credit
03	BRAC	Munshigonj, Burigoalini & Atulia Union	Micro-credit, Health
04	Shushilon	All Unions of Shyamnagar Upazila	Micro-credit, Peoples Union Parishad, Safe Water & Sanitation,

			House Making, Food Program, Relief & Rehabilitation
05	Jagoroni Chakro Foundation	All Unions of Shyamnagar Upazila	Micro-credit
06	ASA	Munshigonj, Burigoalini, Gabura & Ishshoripur Union	Micro-credit
07	Uttaran	Munshigonj, Kashimari, Atulia, Paddhopukur, Gabura, Burigoalini, Nurnagar and Shyamnagar Union	Financial support to landless people
08	Noabeki Gonomukhi Foundation	Munshigonj & Burigoalini	Micro-credit, Safe water & Sanitation
09	Srizony Bangladesh	Munshigonj. Burigoalini, Gabura, Atulia & Ishshoripur Union	Solar Energy
10	Barsic	Munshigonj & Burigoalini Union	Financial Support to Honey Collectors
11	Barsa	Munshigonj, Burigoalini, Gabura, Atulia & Paddhopukur Union	Micro-credit & Tourism
12	Bridge		Solar
13	Dalit	Munshigonj, Burigoalini, Koikhali, Ramjannagar and Ishshoripur Union	Education, Health & Hanicrafts
14	Joar	Munshigonj, Burigoalini, Gabura, Atulia, Ishshoripur & Koikhali Union	Food Security Project, Plantation, Education, Federation of Fisherman & Wood Collector, Rehabilitation of tiger attacked family & Sundarbans Conservation
15	Ledars	Micro-credit, Land Rights	Munshigonj Union
16	Rural Services Foundation	Munshigonj. Burigoalini, Gabura & Ishshoripur Union	Solar Energy, Biogas, Improved Chulla
17	Grameen Shakti	Munshigonj, Burigoalini & Gabura Union	Solar, Biogas, Improved Chulla & Organic Fertilizer
18	CCEC	Kashimari, Munshigonj, Gabura, Burigoalini, Atulia & Ramjannagar Union	Group Formation, Support to Honey Collector and Fisherman, Mangrove Plantation, Sundarbans Conservation
19	Asar Alo		
20	Nakshi Katha	10 Unions of Shyamnagar	Micro-credit, Training,

		Upazila	Handicrafts
21	Dream		
22	Progati		
23	Shetu		
24	Rural Reconstruction Foundation (RRF)		
25	Varosa	Ramjannagar & Munshigonj	
26	Sudipti	Munshigonj Union	Micro-credit, Support for Small Business, Water & sanitation, Health & Hygiene, eduation & Cultural Program.
27	BRDB		
28	Wave	Munshigonj, Burigoalini & Atulia Union	Group Formation, Training & Organic Shrimp
29	Islami Samaj Kollyan Sangstha	Munshigonj & Burigoalini	Micro-credit & Financial support to orphan
30	Gono Unnayan Federation	Burigoalini & Atulia	Micro-credit, Support for Small Business, Goat Rearing, Poultry Rearing, Cow Rearing & Shrimp culture
31	Kakra Samity	Munshigonj & Burigoalini	Micro-credit, Support for Small Business & Shrimp culture
32	Bahumukhi Samobai Samity	Ramjannagar & Munshigong	Savings & Credit
33	Harinagar Bazar Samity	Munshigonj	Savings & Credit
34	Samaj Kalayan Sangstha		
35	Bhumihin Samity	Ramjannagar & Munshigong	
36	Mathurapur Samobai Samity		
37	Malancho Samobai Samity		

4.4. Causes for Degradation of the Sundarbans and its Resources

4.4.1. Exploitation of Resources

A total of six resources are exploited from SRF by the community people of landscape zone of Sundarbans West Wildlife Sanctuary. Exploitation of resources takes place round the year. Different resources are harvested during different period of times. Resource harvesting times/ periods of SRF are provided in Table 10 below.

Table 10: Resource harvesting calendar of Sundarbans Forest

Resources	Months											
	Baish Apr/May	Jaisth May/Jun	Ashar Jun/Jul	Shrab Jul/Aug	Badro Aug/Sep	Ashin Sep/Oct	Karti Oct/Nov	Agrah Nov/Dec	Poush Dec/Jan	Mag Jan/Feb	Falgu Feb/Mar	Chaitr Mar/Apr
Fish		←――――――――→					←――――――――――→					
Golpata									←――――――――→			
Goran								←―――――→				
Honey/wax	←――→											←――→
Crabs		←――――――→					←―――――→			←――――→		
Shrimp PL	←――――→									←――――――――→		

The government of Bangladesh stopped harvesting of timber trees from SRF for a period of four years (January 2006 to December 2010) to comply with the international treaties. So, officially no permit is being issued for collecting timber trees like Sundory, Baen, Kakra, Gewa, Kewra and other commercial timber species from the SRF, but illegal harvesting timber trees as well as other non-timber forest produces including fuel wood has been continuing.

PRA/RRA study shows (Table 11 below) that 81% household of the landscape zone completely depend on SRF resources (15% in collecting wood, 53% in fishing, 3% in collecting honey/wax, and 10% in selling labor in SRF resource collection). Collection of wood is mainly of two types; (i) timber wood and (ii) fuel wood. Timber wood is collected mainly for commercial purpose. Fuel wood is collected both for own consumption as well as for selling to others (market, hotel & restaurant, brick field, fuel wood businessmen, and so on).

Table 11: Occupational status of households in the villages under study

SL #		Particulars	Number	Percentage
1		Household	20738	
2		Total Population	106972	
3		Occupation		100
	i	Wood Collector		15
	ii	Fisher		53
	iii	Honey collector		03
	iv	Agriculture		2
	v	Day Labor		10
	vi	Gher owner		07
	vii	Business		07
	viii	Service		03

Resources from SRF are collected both for household consumption as well as for commercial purposed. Cause-effect analysis for understanding underlying factors for SRF resource extraction in Table shows that local poverty, unemployment, physical

location of SRF, scarcity of resources in the locality drive the local people particularly the poor to exploit the resources from SRF. Poor forest department's controlling/resource management facilities and involvement of influential persons & money lenders are also responsible for indiscriminate resource extraction. Shrimp culture in Gher system is responsible for aquatic resources destruction during the process of shrimp PL collection.

Sawmills situated in landscape zones plays an important role in illegal extraction of timber wood from SRF. There are 5 sawmills in the landscape villages/ communities. Village wise sawmills are presented in Table 12 below.

Table 12: List of sawmills in different villages/ communities adjacent of SRF

SL.	Sawmill owner	Village	Union	Remarks
01	Abu Taleb	Noabeki	Atulia	
02	Abdus Sabur	Noabeki	Atulia	
03	Nazrul Islam Moral	Noabeki	Atulia	
04	Habibar Rahman	Noabeki	Atulia	
05	Hafez Tazul Islam	Noabeki	Atulia	

There are 2 brickfields in the landscape villages/ communities of Sundarbans West Wildlife Sanctuary. All the brickfields use Sundarbans' wood, almost entire quantity as fuel for brick burning. These brick fields create a great threat for conservation of Sundarbans resources. List of these brick fields' owners are presented in Table 13 below.

Table 13: List of Brick Field owner in different villages/ communities adjacent of SRF

SL.	Brick field owner	Village	Union	Remarks
01	Md. Kamruzzaman Zaman Trading Bricks	Noabeki	Atulia	
02	Hazrat Ali	Noabeki	Atulia	

4.5   SOCIO-ECONOMIC SETTING AND DYNAMICS

4.5.1   Demographic Profile

i.   **HHs and Population:** As per secondary sources, the total number of HHs is about 20,738 with having approximately 1, 06,972 people.

ii.   **Education:** HH interview shows that about 24% people are illiterate, 55% are educated in the primary schools, 15% in the High School and the rest 6% are educated in the colleges and above. FGD indicates that the literacy rate would be much lower as reflected in HH interview. As per FGD, literate rate is 45% and illiterate rate is 55%.

iii.   **Occupation:** As per HH interview, primary occupation of the local people is fishing 44.68%, agriculture 14.89%, business 10.64%, honey collector

8.5%, day lobour 10.64%, wood collector 4.25% and service & others 6.4%. As per FGD, fisherman 53%, bawali 15%, day labour 10%, honey collector 3%, agriculture 2%, gher owner 7%, business 7% and service 3%.

4.5.2   Livelihood Analysis

i. **Income source**: Fishing is the main income source for 53% HHs, bawali 15%, day labour sale 10%, honey collector 3%, agriculture 2%, gher owner 7%, business 7% and service 3%. They have some secondary income sources.

ii. **Land ownership**: As revealed from HH interview that 21% of the HHs are totally landless. About 79% households have homestead land of their own, on the other hand only 30% household owned cultivated land and 70% owned no cultivable land.

iii. **Credit**: About 80% HHs took credit from different sources, both from bank and NGO sources. The males mainly take loans from bank while women from NGOs.

iv. **Condition of House**: About 4% HHs have own pucca house, 49% HHs have semi pucca house and 47% HHs have kacha house.

v. **Livestock Resources**: About 10% HHs have cow and goat.

vi. **Poultry Rearing**: About 80% HHs have duck & chicken.

vii. **Sanitary Latrine**: Only 11% HHs use sanitary latrine. About 78% HHs have ring-slub but not sanitized and 11% HHs use open latrine.

viii. **Access to Safe Drinking Water**: HH interview shows that about 51% HHs have access to safe drinking water and sources are PSF, Rain Water Harvesting and Tube-well. About 49% HHs do not get access to safe drinking water.

ix. **Fuel Wood Consumption**: HH interview shows that about 59% HHs are fully dependent on sundarbans, 19% HHs on social forestry and 22% HHs on both sundarbans and social forestry for their fuel wood consumption.

4.6. Opportunities
There are some opportunities found from field study during PRA/RRA and FGD which are Alternative Income Generating Activities (AIGA) at local level.

4.6.1. Alternative income generating activities (AIGA) at local level
AIGA opportunities of Sundarbans West Wildlife Sanctuary Landscape Zone vary from community to community. A total of seven AIGAs identified by the people of different community of which a few have potentials for implementation, these are:

i.   Pond Fish Culture,
ii.   Poultry & Livestock,
iii.   Homestead gardening,
iv.   Small business,
v.   Tailoring ,
vi.   Weaving and
vii.   Eco-Tourism

5.   PRESENT ISSUES AND CHALLENGES FOR IPAC

5.1. Present Issues of Concern

i. Damage on Sundarbans Mangrove Forest Ecosystem
The natural ecological conditions of Sundarbans Mangrove Forest are at a critical stage at present. The situation is so alarming that the existing Sundarbans Mangrove Forest may disappear in near future due to non-functioning of ecological systems for the survival of the forest and our next generation would find it only in the history.
These are only a few measurable indicators other than a lot of qualitative indicators such as situation of forest regeneration stages including different stages of successions for healthy growth and development of the forest.

ii. Indiscriminate resource extraction
Almost all the resources are collected illegally from the forest and naturally no sivicultural system is applicable for the management of resources there. The resource harvesters harvest resources at its highest level without considering its conservation.

iii. Deteriorating local law and order situation and weak law enforcement for forest protection
The local law and order situation along with the over all national law and order situation is so deteriorated that forest department with its limited capacity in terms of manpower, equipment and credibility is not in a position to control over the vast area of forest along with its resources.

iv. Poor management situation
Management of Sundarbans forest needs special sivicultural attention for its special features as well as complexity. It is not possible to regain the status of the forest without changing the traditional practices of forest management, rather adopting appropriate silvicultural practices required by specific niches and sites of the forest.

v. Local poverty and unemployment
Almost all the inhabitants of the villages situated adjacent to the SRF are fully dependent on SRF resources as they are very poor and do not have any employment opportunity there. Such situation exists because resource poor people migrated from other areas and settled there depending only on the SRF resources as there were resource-full forests at that time. Now a days, local poverty and unemployment is in such an alarming stage that all the members of the family (even the child learned walking) are somehow involve in SRF resource gathering. All the things are very unethical.

vi. Rapid growth of population

Although population growth is a national issue, it is one of the most important issues in and around the area because of its vulnerability in terms of critical situation of maintaining livelihoods at the lowest level.

vii. Illegal tree felling

Although, there is a scarcity of big trees in the WS, yet tree felling is going on causing a threat for the conservation of sundarbans.

viii. Hunting and killing of wildlife

Some organized group are more active in this site for hunting wild animals mainly deer. Sometimes Royal Bengal Tiger enters to the nearest villages and they are killed by the village people. So hunting and killing of wild life is a serious threat for the conservation of wild life in sundarbans.

ix. Disturbances of Tiger

Tiger stays at the topmost level of food-chain in Sundarbans and its distribution at appropriate level is a must for the existence of Sundarbans. The ecosystem of Sundarbans has so heavily been damaged that habitats for all of its components become unfavorable for their existence including Tiger. Now it is very urgent to initiate scientific management of Sundarbans.

5.2 Challenges

i. Awareness raising of all stakeholders for conservation of SRF

To aware all stakeholders for conservation of sundarbans is a big challenge.

ii. Reduction in dependency on SRF Resources for dependent people

Reduction in dependency on SRF resources for dependent people is a big challenge. It is important to create provisions so that resources required by the people could be easily available

iii. Sustainable management of Sundarbans Forests

Sundarbans forest is in a deteriorating condition and in fact no development of it is evident. It is now a great challenge to develop an appropriate management plan for the forest and implement it for the sustenance of the valuable mangrove forest.

iv. Reduction in local poverty and unemployment

The problem is huge in magnitude and comprehensive national policy is needed to address the issue.

v. Reducing vulnerability to natural calamities

As most of the areas adjoining SRF are not suitable for permanent human settlement and subject to frequent destruction by natural calamities, comprehensive national program is required to address the issue

vi. Building good relationship and trust with local people

Local people are hostile and therefore it will be necessary to build a good relationship with them and this will a challenging job for the project.

vii. Stopping of fuel wood collection
Livelihood of a huge population is dependent on this activity. Therefore, it could be difficult to stop fuel wood collection in order to enhance the forest regeneration.

viii. Preventing illegal tree felling
The illegal tree fellers are organized and powerful and many of them are armed. It could be difficult to prevent them from tree felling.

6.   SUGGESTIONS AND RECOMMENDATIONS

6.1. There is an urgent need to strengthen the capacity & increase facility of FD for effective management of Sundarbans forest resources. Some of the aspects are
- Adequate qualified and skilled staffing
- Capacity building training for all local staffs on sustainable management of forest resources and biodiversity conservation
- Provide appropriate logistics and support services to field staff
- Provision for incentives to field staff to make the job satisfying
- Provision for strong monitoring and supervision of activities

6.2 Need complete inventory of Sundarbans resources.

6.3 Start awareness raising program for all stakeholders for conservation of Sundarbans.

6.4 Unauthorized collection of SRF resources need to be stopped.

6.5. Rehabilitation of resource poor vulnerable people who are fully dependent on SRF resources

6.6 Create opportunity for SRF dependent people.

6.7. Provision for habitat restoration through forest regeneration ensuring appropriate protection need to be executed

6.8. Local elites, sawmill owners and brickfield owners need to be brought on board with the concept of forest protection and sustainable natural resources management

6.9. Awareness programs need to be taken to make the people understand how the people could be benefited by conserving SRF resources

6.10 Introduce Improved Stove for reducing pressure on sundarbans for fuel wood consumption.

6.11 Proper implementation of govt. laws and regulations by the concerned authority.

6.12. Stop corruption at all levels.

6.13 Stop shrimp PL collection for reducing pressure on sundarbans fisheries resources.

6.14 Prepare a National Policy for planned shrimp culture.

6.15 Need proper management & awareness raising program for the growth of mangrove plants on riverbank.

6.16 Develop all facilities for Eco-tourism.

6.17 Initiate organic shrimp culture among gher owners.

6.18 Increase strong coordination among all concerned agencies (GO-NGO/ administration/ law enforcement/ civil society) for conservation and sustainable management of Sundarbans.

6.19 Need Plantation Program at all levels.

Integrated Protected Area Co-management (IPAC) Socio-Economic Field Survey

Household Survey Questionnaire

AREA IDENTIFICATION

Protected Area   : _____

District   : _____

Upazila   : _____

Union   : _____

Village   : _____

RESPONDENT'S IDENTIFICATION

Respondent's Name   1 _____

                              2 _____

ENUMERATOR & DATA ENTRY OPERATOR

Date of interview   :   ☐☐   ☐☐   ☐☐☐☐

Name of Enumerator   : _____

Name of Supervisor   : _____   Signature_____

Name of re-interviewer   : _____   Signature_____

1. HOUSEHOLD PROFILE

Name of HH Member (Start with the name of HH head)	Sex[1]	Age* Year	Education[2]	Occupation[3]
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

[1]Sex: *1=Male, 2=Female*
[2]Education: *0=No class, 1=Class I-V, 2=Class VI-IX, 3=SSC & HSC, 4=Degree & above, 5=Not applicable (If age is less than 5 years), 6 = Dropped-out*
[3]Occupation: *0=Unemployed, 1=Agriculture, 2=Business, 3=Govt. Employee, 4=Non-Govt. Employee, 5=Pensioner,6=Other, 7=Child labourer, 8=Not applicable (when below age 5 years)*

Please enter HH heads details in first row
*Age: Round up the age in year for the individuals 5 year old and above.
If the household got more than 11 members use a separate piece of paper.

1A. RELIGION   Muslim = 1, Hindu = 2, Christian = 3, Buddha = 4, Other = 5   ☐
1B. ETHNICITY   Adibashi= 1, Non-adibashi= 2, Rohinga=3, Other = 4   ☐

2. MIGRATION PATTERN

a) Have you and your family always resided in this area? Yes/No

b) Have you migrated to this place? Yes/No

   If yes, When? _____(year)

3. HOUSEHOLD HOUSING and FACILITIES
3A. Type of residential main house
a) Kacha ☐   b) Tinshed ☐   c) Semi-pucka ☐   d) Pucka ☐   e) Others ☐

e) No of rooms in the house (main + other) ☐

3 a,b,c.d. If a household owns more than one house, you have to collect only the information of main residential house.
3B. Household lightening
Code: 1. Electricity, 2. Keros____,____s (Specify)
4. HOUSEHOLD HEALTH STATUS
4A. Type of latrine ☐

Code: 1=Sanitary, 2=Pucca, 3=Kutcha, 4=Open field, 5=Others (Specify)

4B. Source of drinking water

i) Do you have access to safe water? ☐ Code: 1=Yes, 2=No

ii) What are the sources of drinking water? ☐

Code: 1=Tap, 2=Tubewell, 3= Well, 4=Pond, 5=Canal/River, 6=Rain water

iii) Ownership of drinking water source: ☐

Code: 1=Own, 2=Neighbour, 3=Govt. 4=Hired, 5=Natural, 6=Others (Specify)

4C. Prevalence of malaria disease

Do any of your member infected with Malaria during last 1 year? ☐ Code: 1= Yes, 2 = No

ii. If yes, How many? ☐

5. LAND RELATED INFORMATION
Information of land *(In Decimals)*

	Land Type	Area			
a)	Total owned land				
b)	Homestead Land				
c)	Agricultural land				
d)	Other land				

6. ECONOMIC CONDITION OF HOUSEHOLD
6A. How much do you earn in a month? _____ Tk.

6B. What is the status of your economic condition (for last 1 year)?

Code: 1=Permanent insolvency, 2=Temporary insolvency, 3=Equal income and expenditure, 4 = Solvent, 5 = Savings

8. HOUSEHOLD FUEL FOR COOKING

1=Yes, 2=No

I. What are your sources of fuel?

a)	Straw	☐
b)	Bran	☐
c)	Wood/bamboo*	☐
d)	Kerosine	☐
e)	Electricity	☐
f)	Others	☐