

Participatory Rural Appraisal of Sundarbans (East) Wildlife Sanctuary

June 2009

Md. Faruque Biswas

**Integrated Protected Area Co-management (IPAC) Project,
Sundarbans Cluster, Sarankhola Site Office,
Sarankhola, Bagerhat, Bangladesh**

Acknowledgement

The author acknowledges the hard works of PRA field team specially to three Field Facilitators Binay Krishna Rana, Sarwar Hossain and K.M. Nadim Haidar, and two Local Resource Persons Probir Kumar Mitra and Joynal Abedin Joy for their valuable information based on which this report is prepared. The author expresses his gratitude for their excellent job of gathering such multidimensional information within a very limited time.

The author acknowledges the valuable supports of FD field level personnel (Camp In-charge, Station In-charge and Range In-charge) as well as DFOs of Sundarbans East Division, Sundarbans East WS, and Bagerat Social Forestry Division for providing relevant information including identification of Landscape villages based on the dependency of village-people on Sundarbans Resources.

The author expresses in gratitude to IPAC Technical Team of Dhaka specially to Bob Winterbottom, Dr. Ram A. Sharma and Utpal Dutta, and IPAC-CODEC Project Coordinator Goutam Biswas for their overall supports to produce this report. The author recognizes valuable contributions of all IPAC team members, both from Cluster Office and Site Offices.

The author acknowledges the valuable contributions of local community people who provided their valuable times and efforts to the PRA team members in gathering field level information

Last but not the least, all praises for Him, the unique-, unparallel-, and mightiest One, without His will nothing could happen!

Table of Contents

<u>Topics</u>	<u>Page #</u>
Acknowledgement	2
Table of Contents	3
1. Introduction	8
1.1. Background	8
1.2. Purpose of the Report	9
2. The Resource Base	9
2.1. Description of the Site	9
2.2. Resources of Sundarbans	10
2.3. The Landscape Zone of Sundarbans East Wildlife Sanctuary	10
3. Methodology	12
3.1. Study Period	12
3.2. Setting PRA/RRRA Issues and Questions	13
3.3. Formation of PRA/RRA Field Teams	13
3.4. Selection of PRA/RRA Spots	13
3.5. Holding Training/ Orientation	13
3.6. Selecting PRA/RRA Methods and Tools	13
3.6.1. Metrics Covered under various PRA/RRA Tools	13
i. Venn Diagramming	13
ii. Seasonal Calendar	13
iii. Trend Analysis	13
iv. Ranking and Scoring	14
v. Transect Walk	14
vi. Resource Mapping	14
3.7. Field Implementation Strategies for the Selected Tools	14
3.7.1. Household Interview	14
3.7.2. Key Informant (KI) Interview	14
3.7.3. Group Interview	14
3.7.4. Focus Group Discussion	14
3.7.5. Direct Observation	15
3.7.6. Secondary Information Collection	15
3.7.7. PRA/RRRA Fieldwork Review	15
3.7.8. Limitation of the Fieldwork and the Report	15
4. Outcomes	15
4.1. Forest Land/Resource Use Cover	15
4.2. Forest Land/Resource Use Dynamics	16
4.3. Stakeholders Assessment	18
4.3.1. Primary Stakeholders	20
4.3.2. Secondary Stakeholders	21
4.3.3. Institutional/ Organizational Stakeholders	21

4.4. Causes for Degradation of the Sundarbans and its Resources	24
4.4.1. Exploitation of Resources	24
4.4.2. Resource Exploitation Points/Areas	29
4.5.1. Demographic Profile	31
4.5.2. Livelihood Analysis	31
4.6. Opportunities	32
4.6.1. Alternative income generating activities (AIGA) at local level	33
4.6.2. Employment generation in and around/ outside the locality	34
5. Present Issues and Challenges for IPAC	34
5.1. Present Issues of Concern	34
i. Damage on Sundarbans Mangrove Forest Ecosystem	34
iii. Unsuitable Local situation for human settlement	34
iv. Indiscriminate resource extraction	34
v. Deteriorating local law and order situation and weak law enforcement for forest protection	35
vi. Poor management situation	35
vii. Local poverty and unemployment	35
viii. Rapid growth of population	35
ix. Lack of governance in institutions	35
x. Hunting and killing of Wildlife	35
xi. Disturbances to Tiger	35
5.2 Challenges	36
i. Reduction in dependency on SRF Resources for dependent people	36
ii. Sustainable management of Sundarbans Forests	36
iii. Reduction in local poverty and unemployment	36
iv. Reducing vulnerability to natural calamities	36
v. Addressing the conflict between adjacent people and FD	36
vi. Complexity in management and implementation issues	36
6.0. Suggestions and Recommendations	36

Annexes

Annexure 1: Household Survey Questionnaire	38
Annexure 2: PRA Data Sheet	41

List of Figures & Maps

Map 01: Site Map of Protected Areas of Bangladesh/Sundarbans East WS	6
Map 02: Map of Landscape Villages	7
Map 03: Sketch Map of Entry/Exit Points Affecting Sundarbans East WS	30
Map 04:	

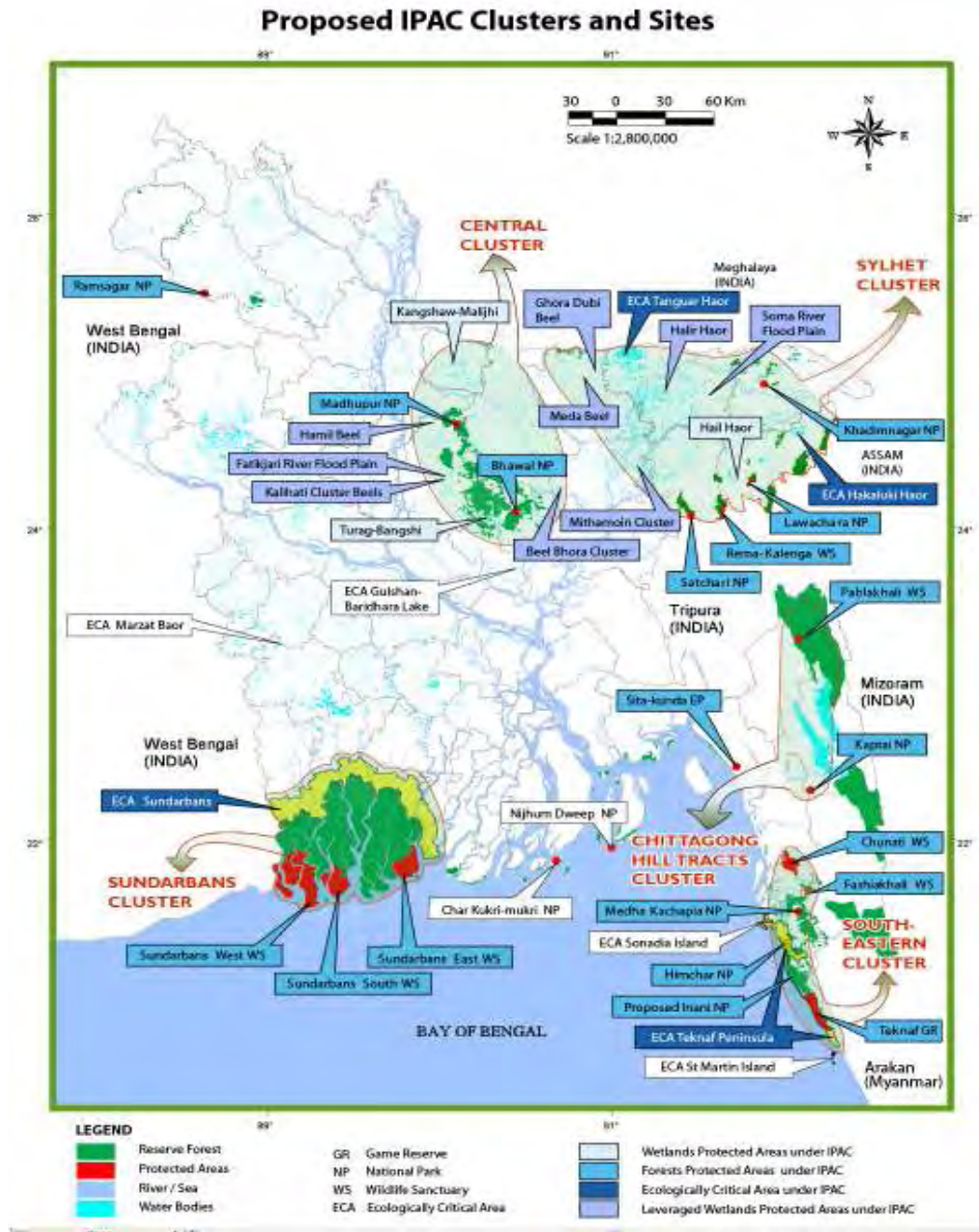
List of Tables

- Table 01: Sundarbans Wildlife Sanctuaries. P-9
Table 02: Landscape Zone Villages of Sundarbans East WS. P-10
Table 03: List of selected spots and schedule for conducting primary data collection and PRA/RRA field work. P-12
Table 04: Team to conduct PRA/RRA in the Field. P-13
Table 05: Trend Analysis (Forest quality and resource use matrix). P-17
Table 06: Stakeholders of Sundarbans East WS. P-18
Table 07: Information of CBOs/ NGOs/ Financial Institutions. P-22
Table 08: Resource harvesting calendar of Sundarbans Forest. P-24
Table 09: Occupational status of households in the villages understudy. P-25
Table 10: Causes and Effect Ranking for understanding underlying factors for SRF resource extraction. P-26
Table 11: List of sawmills in different villages adjacent of SRF. P-27
Table 12: List of Brick Field owner in different villages adjacent of SRF. P-28
Table 13: List of Char Coal owner in different villages adjacent of SRF. P-28
Table 14: Entry and exit points affecting conservation of Sundarbans East WS. P-29
Table 15: HH solvency status. P-32
Table 16: Village-wise List of AIGAs. P- 33

Acronyms

CO	Camp Office (of FD)
FD	Forest Department
FGD	Focus Group Discussion
GOB	Government of Peoples' Republic of Bangladesh
HHs	Households
IPAC	Integrated Protected Area Co-management
NTFP	Non-timber Forest Products
NSP	Nishorgo Support Project
PA	Protected Area
PRA	Participatory Rural Appraisal
RO	Range Office (of FD)
RRA	Rapid Rural Appraisal
SRF	Sundarbans Reserved Forests
SO	Station Office (of FD)
USAID	United States Agency for International Development
WS	Wildlife Sanctuary

Site Map of Protected Area of Bangladesh



Map of Landscape Villages of Sundarbans East Wildlife Sanctuary

1. Introduction

1.1. Background

Natural forests in Bangladesh are under constant pressure and have already been significantly degraded and fragmented. In an estimate, forest cover in the country has already been reduced 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 situations. 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 lining in and around the forest, biodiversity dependant 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, international and global perspective as reflected in its endorsement and ratification of many national, international and conventions, treaties and protocols related to biodiversity conservation.

The alarming situation in forest degradation in the country and the government's commitment to national and international community, spurred government effort to designate and establish a number of protected areas (including national park, wildlife sanctuary and game reserve) under the provision of Wildlife Preservation Act, 1973. But there has been a little change in the degrading situation of these Protected Areas (PAs) with regard to biodiversity and environmental conditions. Poor governance and lack of appropriate and pragmatic management practices for these PAs has been linked to the failure in PA management.

Responding to the need to address to forest conservation and related opportunity creation, the US government and government of Bangladesh signed a Strategic Objective Grant Agreement to improve management of open water and tropical forest resources. The agreement sets target for improving forest management.

In the context of the agreement, Forest Department (FD) has worked with USAID develop a project called Integrated Protected Area Co-management (IPAC) with the activity purpose: (i) Support the further development of the natural resources sector and the conservation of biological diversity; (ii) Develop a protected area strategy that applies to all ecologically and economically significant areas, including freshwater and forest ecosystems; (iii) Build technical capacity for protected areas co-management; (iv) Expand the geographic area under co-management to ensure the long-term success of the model and to extend socio-economic benefits to surrounding communities; (v) Address climate change mitigation and adaptation issues.

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 and 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).

1.2. Purpose of the Report

The main purpose of this report is to present a synthesis of findings from PRA/RRA exercises conducted in the selected landscape villages/communities of Sundarbans East Wildlife Sanctuary during April-May 2009. The report also highlights the issues in forest management and biodiversity conservation and identifies challenges to address the issues. The report presents some recommendations for the improved management of Sundarbans forests targeting conservation of Sundarbans East Wildlife Sanctuary by reducing dependency of adjacent resource poor people on Sundarbans resources.

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 #	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 (East) WS is located at the south-eastern part of SRF adjacent to the Bay of Bengal which was previously managed by Sarankhola Range of Sundarbans East Forest Division. Sundarbans East WS is consisting of the compartment 4, 5, 6 and part of 7. This WS is bounded by SRF in the north and west, the Bay of Bengal in the south and the Baleshwar River in the east. Reserved Forests of Sarankhola and Chandpai Ranges are situated along the northern periphery of this WS. Further north and along the periphery of

SRF of Sarankhola and Chandpai Ranges there are areas/ localities called *Landscape Zone* under the civil administration.

2.2. Resources of Sundarbans

Sundarbans Reserve Forest (SRF) is a vital source of livelihood for thousands of people (whether rich or poor) living next to the SRF including those living in adjoining & distant places. From times 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 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 people adjoining locality. Golpata is one of the important plant resources on which livelihoods of large number of people depend. Goran is another important resource mostly used as fuel wood, making charcoal, housing structures and making 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 evolved.

Among the fisheries resources, varieties of fin fishes, shrimps, crabs and shrimp PL (Post larvae) are the major harvestable resources from within and adjacent to the SRF. Although hilsha fishing grounds include the entire coasts and coastal major river systems of the country, the lower part of the SRF and further south in the Bay of Bengal outside the (SRF) are also being treated as suitable and lucrative hilsha fishing areas.

2.3. The Landscape Zone of Sundarbans East Wildlife Sanctuary

The Landscape Zone consists of 46 villages of (i) Sundarbans, Chandpai and Chila Unions of Mongla Upazila, Bagerhat; (ii) Rayenda, Southkhali and Dhansagar Unions of Sarankhola Upazila, Bagerhat and (iii) Nisanbaria Union of Morelgonj Upazila, Bagerhat. Villages of Landscape Zone are placed in Table 2

Table 2: Landscape Zone Villages of Sundarbans East WS

SL #	Village	No. of Household	Union	Distance from SRF (km)	Dependency on SRF
A. Sarankhola Upazila of Bagerhat District					
01	Sarankhola	530	Southkhali	0.5	High
02	Khuriakhali	523	Southkhali	1.0	High
03	Bogi	726	Southkhali	0.5	High
04	Sonatola	1200	Southkhali	1.0	High
05	Dakhin Tafalbari	800	Southkhali	3.5	Medium
06	Uttar Southkhali	550	Southkhali	3.0	Medium
07	Dakhin Southkhali	635	Southkhali	2.5	High
08	Chaletabunia	590	Southkhali	2.0	High

09	Rayenda	600	Southkhali	3.0	Medium
10	Bakultola	400	Southkhali	3.0	Medium
11	Uttar Tafalbari	400	Southkhali	3.5	Medium
12	Rajeshwar	650	Rayenda	5.0	Low
13	Lakurtala	165	Rayenda	5.0	Low
14	Uttar Tafalbari	600	Rayenda	4.0	Medium
15	Uttar Rajapur	1100	Rayenda	1.0	High
16	Dakhin Rajapur	950	Rayenda	1.5	High
17	Malia	863	Rayenda	2.0	High
18	Daser Varani	250	Rayenda	2.0	Medium
19	Chal Rayenda	600	Rayenda	4.0	Medium
20	Khada	700	Rayenda	3.0	Medium
21	Rosia Rajapur	450	Dhan Sagar	0.5	High
22	Poschim Rajapur	837	Dhan Sagar	0.5	High
23	DhanSagar	278	Dhan Sagar	0.5	High
24	Khejurbaria	300	Dhan Sagar	0.5	High
	Subtotal A	14697			
B. Morelgonj Upazila of Bagerhat District					
25	Amarbunia	920	Nisanbaria	0.5	High
26	Gulsakhali	750	Nisanbaria	0.5	High
27	Paschim Geodhara	800	Nisanbaria	0.5	High
28	Picha Baroikhali	890	Nisanbaria	0.5	High
C Mongla Upazila of Bagerhat District					
29	Baddamari	64	Sundarban	0.5	High
30	Dhakhin Bastala	550	Sundarban	0.5	High
31	Bazikarkhondho (Uttor+Dhakhin)	867	Sundarban	0.5	High
32	Kachubunia	210	Sundarban	0.5	High
33	Boraitala	90	Sundarban	0.5	High
34	Golbunia	410	Sundarban	0.5	High
35	Katakhali	257	Sundarban	0.5	High
36	Hoglabunia	70	Sundarban	0.5	High
37	Goraburburia	500	Sundarban	0.5	High
38	Dhakhin Haldibunia	575	Chila	0.5	High
39	Haldibunia	450	Chila	3.0	Medium
40	Dhakhin Chila	450	Chila	0.5	High
41	Ulukata	300	Chila	2.0	High
42	Chila Gabunia	280	Chila	2.5	High
43	Joymoni	1350	Chila	0.5	High
44	Phaschim Chila	350	Chila	1.5	Medium
45	Kanainagar	860	Chandpai	1.5	High
46	Dakhin Kainmari	300	Chandpai	1.5	Low
	Sub Total B	11,293			
	Total Household	25,990			
	Total Population	142,945			

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

Preparatory work for primary and secondary data collection including focus group discussions and social mapping of some the selected spots of landscape zone of Sundarbans East Wildlife Sanctuary of the selected villages were conducted in March 2009. Formal PRA/RRA field works were conducted during April, May and June of 2009. The detail time schedule of field studies are shown in Table 3

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

Date	Name of RRA Spots	Uninon; Upazila	Remarks
5/4/2009	Uttor Rajapur	Rayenda; Sarankhola	Formal PRA
6/4/2009	Dakhin Rajapur	Rayenda; Sarankhola	Formal PRA
7/4/2009	Bogi	Southkhali; Sarankhola	Formal PRA
7/4/2009	Sarankhola	Southkhali; Sarankhola	Formal PRA
7/4/2009	Sonatola	Southkhali; Sarankhola	Formal PRA
8/4/2009	Malia	Rayenda; Sarankhola	Formal PRA
8/4/2009	Chaletabunea	Southkhali; Sarankhola	Formal PRA
8/4/2009	Dakhin Southkhali	Southkhali; Sarankhola	Formal PRA
13/5/2009	Dakhin Chila	Chila; Mongla	Formal PRA
14/5/2009	Dakhin Banstola	Sundarban; Mongla	Formal PRA
16/5/2009	Dakhin Holdibunea	Chila; Mongla	Formal PRA
16/5/2009	Boiddamari	Chila; Mongla	Formal PRA
17/5/2009	Joymoni	Chila; Mongla	Formal PRA
19/5/2009	Goraburburea	Sundarban; Mongla	Formal PRA
20/5/2009	Hoglabunea	Sundarban; Mongla	Formal PRA

3.2. Setting PRA/RRRA Issues and Questions

3.3. Formation of PRA/RRRA Field Teams

The PRA/RRRA field team was formed with the members of Sarankhola and Chandpai Site/Field Offices of IPAC-CODEC including two resource persons from the locality. Details of the PRA/RRRA field team shown in Table 4.

Table 4: Team to conduct PRA/RRRA in the Field

SL #	Name	Designation	Remarks
01	Md. Faruque Biswas	Site Coordinator	IPAC-CODEC
02	Mr. Binoy Krishna Rana	Site Facilitator	IPAC-CODEC
03	Mr. Sarwar Hossain	Site Facilitator	IPAC-CODEC
04	Md. Nadim Haidar	Site Facilitator	IPAC-CODEC
05	Mr. Probir Kumar Mitra	Social Worker	Local Resource Person
06	Mr. Joynal Abedin Joy	Social Worker	Local Resource Person

3.4. Selection of PRA/RRRA Spots

On the basis of the information received from FD local officials and staff as well as field information received from IPAC field team members 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 Sarankhola Site Office for that purpose.

3.5. Holding Training/ Orientation

A day-long planning and orientation for PRA/RRRA team members was organized at Sarankhola Site Office on April 4, 2009. The similar planning and orientation was organized at Chandpai field office. The purpose was to finalize PRA/RRRA spots, plan for conducting PRA/RRRA field works, and to give the team orientation in using various tools.

3.6. Selecting PRA/RRRA Methods and Tools

3.6.1. Metrics Covered under various PRA/RRRA Tools

i. Venn Diagramming

Local power structure, local community organizations, local institutions and agencies, local conflicts and conflict resolution, family decision making, mobility, women & men, local NGO/CBOs.

ii. Seasonal Calendar

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

iii. Trend Analysis

Forest cover, forest thickness, trees, herbs and shrubs, 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 goalpata collection, fish/crab trapping, honey/ wax collection, medicinal plants, other NTFP livestock, agricultural activities.

iv. Ranking and Scoring

Local problem ranking, wealth ranking and livelihood analysis

v. Transect Walk

Soil, vegetation, land use, crops, wildlife, human activities, etc.

vi. Resource Mapping

Land use cover, resource zones, resource exploitation zones, animal distribution, settlements.

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. Checklist of conducting households' interview are placed in Annexure-I.

3.7.2. Key Informant (KI) Interview

Secondary information was collected from Key Informants (KI) including Union Parishad 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 Resource Map, Wealth Rank, Mobility Map, 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 and the Report

On the basis of geographical locations villages: Gyanpara (Union- Chardoani), Chardoani (Union- Chardoani), Noli (Union- Chardoani) & Kataltoli (Union- Kataltoli) of Patharghata Upazila under Barguna District and villages: Shapleja (Union- Shapleja) & Kochubunia (Union- Shapleja) of Matbaria Upazila under Pirojpur District are included under Landscape area of Sundarbans East WS but field study has not been conducted for physical and administrative limitations; and therefore, not included in this report.

4. Outcomes

4.1. Forest Land/Resource Use Cover

The SRF is a source of livelihoods of thousands of people lining 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-fisheries forest products. There is no official permit to fell tree or harvest timber.

Sundarbans East WS is consisting of the compartment 4, 5, 6 and part of 7 with an area of about 31,227 ha; land and water areas are 22,575 ha and 8652 ha respectively. This WS is bounded by SRF in the north and west, the Bay of Bengal in the south and the Baleswar River in the east. 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 bio-geographical 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 boar, 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 5 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 68% (average 17% reduction in every decade), wildlife abundance decreased by 53% (average 13% decrease in very decade), fish abundance reduced by 59% (average 13.5% reduction in every decade), and dependency on forest by the adjacent people increased by 58% (average 14.5% increase in every decade) during last 40years. There are large number of issues and reasons behind such abrupt 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 produces, fishing,
- Corruption of some staff of concerned government department specially FD
- Illegal removal of trees using permit issued by FD previously and without permit at present
- Increase forest dependent people for increase of population and extreme poverty
- 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 due to shift of agriculture to shrimp culture in Gher system
- Inadequate/ absence of income generating opportunities

Table: 5. Trend Analysis (Forest quality and resource use matrix)

Issue	1970	1980	1990	2000	Present	Major Causes for Change
Tree Cover	*****	****	***	**	*	-Poverty -Population increase - Corruption and Poor governance of concerned management authority -Ignorance and lack of awareness -Natural disaster -Increase salinity -Increase dependency of forest -Illegal tree felling
Wildlife abundance	*****	****	***	***	**	-Indiscriminate hunting -Habitat destruction -Increase illegal entrance of people for resource harvesting -Corruption and Poor governance of concerned management authorities -Lack of awareness
Fish abundance	*****	****	***	**	*	-Involving more people in fishing as other pass permits stopped -Use of Banned fishing-net -Fishing by poisoning -Stopping agricultural activities due for introduction Gher system -Extreme poverty -Fishing in banned areas & seasons
Dependency on Forest resources	*	**	***	****	*****	-Extreme poverty -No employment opportunity -Decrease agricultural opportunity due to introduction of Ger for shrimp culture

Note: 1 star (*) indicates relatively lowest abundance/ intensities, 5 stars (5) indicate relatively highest abundance/ intensities.

4.3. Stakeholders Assessment

Information collected on the stakeholders during PRA is summarized and presented in Table 6 below. A total of 23 categories of stakeholders has been identified, of them, six are primary stakeholders-extract resources from the SRF, eleven are secondary stakeholders- indirectly involved with use of forest resources, and several institutional stakeholders remain in six such group. Some of the stakeholders is described in the following sections

Table 6: Stakeholders of Sundarbans East WS

SL #	SH Name	Description of SH	Stake	Level of Stake
A. Primary Stakeholders				
01	Bawalies (NTFP collector)	Poor people: Mainly male; sometimes female and child	Collection of NTFP, specially golpata, goran, hantal, catkin, reeds and other minor plant based products	Major
02	Moualies (Honey collector)	Poor people: Male	Collection honey and wax	Major
03	Hilsha Fishers	Poor people: Male	Hilsha fishing inside and adjacent water bodies of SRF	Major
04	Other Fishers	Poor people: Male, female and child	Fishing and fish drying in dry season	Major
05	Crab Collectors	Poor people: Male, female and child	Collect crabs from SRF. Also catch fishes in seasons	Major
06	Shrimp PL collectors	Poor people: Female, child and male	Collect shrimp PL from water bodies from inside and edges of SRF	Major
B. Secondary Stakeholders				
07	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
08	Large Mohajons (Money lenders)	Rich influential people, either local or from outside	Commercial collection of SRF resources, invest either in full or part from his own	Major
09	NTFP/ Timber Aratdar	Large traders and investors, influential	Control collection and marketing of SRF resources	Major

10	Saw Mill Owners	Influential person from local or outside	Purchase round wood in log form timber wood collector as well as invest money to collect the same from SRF	Major
11	Brick Field Owners	Influential person from local or outside	Purchase fuel wood for brick kiln from wood collectors as well as employ labor to collect it from SRF	Major
12	Charcoal Producers	Local businessmen	Purchase wood for charcoal burning from wood collectors as well as invest money to collect it from SRF	Major
13	Fish Arottdars/ businessmen	Large traders and investors, influential	Make business out of managing/ investing in fishing in SRF and adjoining rivers and canals	Major
14	Gher Owners	Influential and powerful persons either of local or outside	Purchase shrimp PL from PL collectors as well as invest money to collect the same from SRF and adjoining water bodies	Major
15	Private Tour Operators	Business concern. Have potential to generate awareness among wider communities	Make business through organizing guided tours inside SRF	Moderate
16	Robbers	Group of derailed armed people, organized, powerful in SRF area	Make money by robbery, making hostage who collect SRF resources	Major
17	Political Leader	Political leaders of local and adjacent areas	Encourage and provide supports to collect forest resources illegally	Major

C. Tertiary Stakeholders/ Institutions				
18	Local Community Organization and NGOs	Work with the poor communities on their rights and entitlement	-Demand co-management and conservation of SRF -Support poor communities, demand transparency of FD	Major
19	Local Government/ Administrative Structures	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 other than SRF, control law & order	Major
20	Coast Guard and Bangladesh Navy	Government institutions have free access in and around Sundarbans forest.	Have power to control law and order	Major
21	Wildlife Division of FD	Government FD institution	Wildlife conservation, sanctuary management	Major
22	Sundarbans East Division of FD	Government FD institution	Conservation, management, control and revenue collection	Major
23	IPAC Team	GOB Project	Capacity building, co-management with stakeholders, infrastructure development, AIGA support, conservation	Major

4.3.1. Primary Stakeholders

There are six types of primary stakeholders identified through PRA/RRA field work. These primary stakeholders are Bawalies (NTFP collector), Mawalies (Honey collector), Hilsha Fishers, Other Fishers, Crab Collectors, and Shrimp PL collectors.

PRA/RRA studies show that primary stakeholders cover 78% households. Fishers' involvement is the highest 39% (covering hilsha fisher, other fisher, crap collection and shrimp PL collector). Wood collectors are in second position covering 29% 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 7% 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 eleven types of secondary stakeholders identified through PRA/RRA field work. These secondary stakeholders are Small Mohajons (Money lenders), Large Mohajons (Money lenders), NTFP/ Timber Aratdar, Saw Mill Owners, Brick Field Owners, Charcoal Producers, Fish Arotdars/ businessmen, Gher owners, Private Tour Operators, Robbers and Political Leader.

PRA/RRA studies show that businessmen covering Small Mohajons (money lenders), Large Mohajons (Money lenders), NTFP/ Timber Aratdar, Saw Mill Owners, Brick Field Owners, Charcoal Producers and Fish Arotdars/ businessmen represented 04% of households.

Gher owners, 03% 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.

Private Tour Operators are not stationed in the area. They generally operate from Khulna and Dhaka; providing overnight- stay arrangements inside the Sundarbans forest. They maintain general norms when conducting package tour for smaller group sizes. But they could not maintain discipline when group sizes become larger that affect biodiversity conservation of the forest.

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

Political Leaders are leaders of the locality or adjacent areas backed by political parties/leaders from distant places, even from Dhaka. They encourage and provide supports to carry out illegal activities in the forest and forest resource collection. It creates negative impact on forest management and biodiversity conservation.

4.3.3. Institutional/ Organizational Stakeholders

These institutional/ organizational stakeholders are NGOs, Local Government/ Administrative Structures, Wildlife Division of FD, Sundarbans East Division of FD, Coast Guard/Bangladesh Navy 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 was found in the list, majority of which were involved in relief and rehabilitation

after the SIDR and not in operation at present. PRA field study shows that only a few NGOs are providing micro-credit, education, health & sanitation and social awareness services to the community people. Moreover, financial institutions like Bangladesh Rural Development Board (BRDB) and Bangladesh Krishi Bank (BKB) providing agricultural credits in some of the communities. List of NGOs is presented in Table 7 below where there are total 33 of which top 10 are providing services to the villages/ communities under PRA study.

Table 7: Information of CBOs/ NGOs/ Financial Institutions along with their activities

SL #	Name of CBOs/NGOs	Area of Work	Activities
01	BRAC	Dakhin-Southkhali, Sonatola, Uttor-Rajapur, Dakhin-Rajapur, Maila, Sarankhola, Bogi, Joymoni, Dokhin Bastola, Dakhin Holdibunia, Baiddamari, Gora Burburia, Hoglabunia, Boroitola, Dakhin Chila	Micro-credit, Education, Social awareness, Health & sanitation, Emergency relief
02	ASA	Dakhin-Southkhali, Sonatola, Dakhin-Rajapur, Maila, Sarankhola, Chaletabunia, Bogi, Joymoni, Dokhin Bastola, Dakhin Holdibunia, Baiddamari, Gora Burburia, Hoglabunia, Boroitola, Dakhin Chila	Micro-credit
03	Grameen Bank	Dakhin-Southkhali, Sonatola, Uttor-Rajapur, Dakhin-Rajapur, Maila, Sarankhola, Chaletabunia, Bogi	Micro-credit
04	World Vision	Joumoni, Dakhin Bastola, Hoglabunia	Relief & rehabilitation, Health & sanitation
05	Caritas	Joumoni, Dakhin Bastola, Hoglabunia, Dakhin Chila	Mecro-credit, Education, Relief and rehabilitation
06	Prodipon	Sarankhola, Hoglabunia	Micro-credit
07	Dak Die Jai	Dakhin Holdibunia, Boroitola	Micro-credit
08	Heed Bangladesh		Micro-credit
09	Bridge	Dakhin Holdibunia	Micro-credit, Health & education
10	Rupantar	Joymoni,	Relief, Social, Micro-credit, Environmental awareness.
11	Gono Shakti Kendra	Some areas around Sarankhola and Mongla Upazila	Micro-credit Education.
22	Agradut Foundation	Some areas around Sarankhola and Mongla Upazila	Micro-credit, Relief & Sanitation

13	Chasi Kayllan	Some areas around Sarankhola and Mongla Upazila	Micro-credit
14	CRC	Some areas around Sarankhola and Mongla Upazila	Relief, Rehabilitation & Family Planning.
15	HELP	Some areas around Sarankhola and Mongla Upazila	Micro-credit
16	Nobolok	Some areas around Sarankhola and Mongla Upazila	Micro-credit Relief, Rehabilitation & Fish culture
17	VDF	Some areas around Sarankhola and Mongla Upazila	Micro-credit
18	Udayan Bangladesh	Some areas around Sarankhola and Mongla Upazila	Micro-credit & Education.
19	ESHO	Some areas around Sarankhola and Mongla Upazila	Micro-credit & Relief
20	Sundarbon Samaj Kayllan Samity	Some areas around Sarankhola and Mongla Upazila	Micro-credit
21	Dusta Kayllan Samity	Some areas around Sarankhola and Mongla Upazila	Micro-credit
22	Muslim Aid	Some areas around Sarankhola and Mongla Upazila	Micro-credit, Relief & Rehabilitation
23	RIC	Some areas around Sarankhola and Mongla Upazila	Micro-credit, Relief & Social
24	Friendship	Some areas around Sarankhola and Mongla Upazila	Relief, Rehabilitation & Micro-credit
25	DSK	Some areas around Sarankhola and Mongla Upazila	Relief & Health
26	JJS	Some areas around Sarankhola and Mongla Upazila	Education, Relief & Rehabilitation.
27	Ashory Foundation	Some areas around Sarankhola and Mongla Upazila	Disaster, Relief & Rehabilitation.
28	Sundarban Multiple Janokayllan Samity	Some areas around Sarankhola and Mongla Upazila	Micro-credit
29	Gramin Shakti Kendro	Some areas around Sarankhola and Mongla Upazila	Renewable/Solar Energy.
30	SS Foundation	Some areas around Sarankhola and Mongla Upazila	Relief & rehabilitation, Solar Energy & Health
31	Daridra Kayllan Songshta	Some areas around Sarankhola and Mongla Upazila	Micro-credit
32	Susilon	Some areas around Sarankhola and Mongla Upazila	Relief, Rehabilitation, Proscab Project.

Local Government/ Administrative Structures such as union parisad, upazila parisad, and zila parisad have jurisdiction outside SRF and therefore no control over resources of SRF but the community people responsible for destruction of SRF lives under the jurisdiction of local government/ administrative structures. Therefore they can play vital role in

conservation/ sustainable use of SRF resources involving community people in co-management approach of natural resource management.

The bases of Coast Guard and Bangladesh Navy are in and around SRF area having free access throughout the SRF. It is believed that Coast Guard and Bangladesh Navy or only Coast Guard is capable to uphold law and order in Sundarbans if government desires it honestly. Therefore, Coast Guard and Bangladesh Navy can play vital role in conservation of Sundarbans.

Forest Department (FD) has the sole authority to carry out overall responsibility of day to day administration as well as technical management and development of SRF including Sundarbans East WS. FD is not in a position to establish full control over Sundarbans resources due to its limitations of adequate well-equipped field staff, lack of support services and honest will of taking management actions.

IPAC

4.4. Causes for Degradation of the Sundarbans and its Resources

4.4.1. Exploitation of Resources

A total of 10 important resources are exploited from SRF by the community people of landscape zone of Sundarbans East 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 8 below.

Table 8: Resource harvesting calendar of Sundarbans Forest

Resources	Months											
	Baishak Apr/ May	Jaistha May/ Jun	Ashar Jun/ Jul	Shrabon Jul/ Aug	Badro Aug/ Sep	Ashin Sep/ Oct	Kartik Oct/ Nov	Agrahan Nov/ Dec	Poush Dec/ Jan	Magh Jan/ Feb	Falgun Feb/ Mar	Chaitra Mar/ Apr
Fish		←					→	←				→
Golpata									←			→
Goran								←			→	
Honey/ wax	→											→
Reeds								←		→		
Catkin								←		→		
Hental	←		→		←		→	←		→		←
Hilipata/ Maila							←		→			
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 Sundary, 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 9 below) that 78% household of the landscape zone completely depend on SRF resources (29% in collecting wood, 39% in fishing, 3% in collecting honey/wax, and 7% 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, charcoal producer, fuel wood business men, and so on).

Table 9: Occupational status of households in the villages understudy

SL #	Particulars	Number	Percentage
1	Household	10243	
2	Total Population	52453	
3	Occupation	10243	100
	i Wood Collector	2968	28.98
	ii Fisher	3980	38.86
	iii Honey collector	258	2.52
	iv Agriculture	1046	10.21
	v Day Labor	766	7.48
	vi Gher owner	260	2.54
	vii Business	428	4.18
	viii Service	375	3.66
	ix Others	162	1.58

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 10 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.

Table 10: Causes and Effect Ranking for understanding underlying factors for SRF resource extraction

SL #	Resources Problems	Fuel wood	Other plant based NTFP collection	Timber wood collection	Aquatic/ Fish resource collection
01	Poverty	*****	***	**	*****
02	Unemployment	*****	***	*	*****
	Physical location	*****	*	*	*****
03	Additional income needed	*	*	*	*
03	Scarcity of resources in the locality	*****	****	***	*****
04	Household consumption	*****	***	*	**
05	Less/ No employment opportunity	*****	**	*	*****
06	Natural calamities	**	*	*	*
07	Involvement of influential persons & money lenders	*	*	*****	***
08	Lack of FDs facilities to control/ manage resources	***	***	***	***
09	Brick field	*****		*	
10	Sawmill	**	**	****	
11	Gher shrimp culture				*****
12	Fish aratdar				*****

NOTE: 1 star (*) indicates relatively lowest abundance/ intensities, 5 stars (*) indicate relatively highest abundance/ intensities

Sawmills situated in landscape zones plays an important role in illegal extraction of timber wood from SRF. There are as many as 20 sawmills in the landscape villages/ communities of which where PRA/ RRA studies are conducted. Village wise sawmills are presented in Table 11 below.

Table 11: List of sawmills in different villages/ communities adjacent of SRF

SL#	Sawmill owner	Village	Union, Upazila	Remarks
01	Abdul Goni Khan	Bakultala	Southkhali, Sarakhola	
02	Samsul Haque Master	Bakultala	Southkhali, Sarakhola	
03	Fazlul Haque Akan	Dhakhin Tafalbari	Southkhali, Sarakhola	
04	Nazlul Islam Khan	Dakhin Tafalbari	Southkhali, Sarakhola	
05	Farid Haoladar	Uttor Tafalbari	Southkhali, Sarakhola	
06	AbdusSattarHaoladar	Uttor Tafalbari	Southkhali, Sarakhola	
07	Bodirul Haoladar	Rayenda	Southkhali, Sarakhola	
08	Dulal Haoladar	Malia	Rayenda, Sarankhola	
09	Matleb Talukdar	Malia	Rayenda, Sarankhola	
10	Aynal Boyati	Malia/Bangla Bazar	Rayenda, Sarankhola	
11	Jahanghir Farazi	Malia	Rayenda, Sarankhola	
12	Nanna Mia Akon	Rayenda Bazar	Rayenda, Sarankhola	
13	Md. Nasil Khan	Rayenda Bazar	Rayenda, Sarankhola	
14	Alul Sadhok	Lakurtala	Rayenda, Sarankhola	
15	Md. Hemayet	Chal Rayenda	Rayenda, Sarankhola	
16	Saiful Islam Khokon	Rayenda	Rayenda, Sarankhola	
17	Mona Haoladar	Amragachi	Dhansagor, Sarankhola	
18	Khalek Haoladar	Amragachi	Dhansagor, Sarankhola	
19	Kadam Ali	Amragachi	Dhansagor, Sarankhola	
20	Saiful Islam Khokon	Nalbunia	Dhansagor, Sarankhola	

There are 17 brickfields in the landscape villages/ communities of Sundarbans East Wildlife Sanctuary. All the brickfields used Sundarbans' wood, almost entire quantity as fuel for brick burning. Species used from Sundarbans SRF are Goran, Amor, Baen, Keora, Singra, Gewa and Bolai. These brick fields pose a great threat for conservation of Sundarbans resources. List of these brick fields' owners are presented in Table 12 below.

Table 12: List of Brick Field owner in different villages/ communities adjacent of SRF

SL#	Brick field owner	Village	Union, Upazila	Remarks
01	Shajahan Matubbar	Sonatola	Southkali, Sarakhola	
02	Dalim Khan	Sonatola	Southkali, Sarakhola	
03	Mujibur Haoladar	Sonatola	Southkali, Sarakhola	
04	Dalim Haoladar	Sonatola	Southkali, Sarakhola	
05	Jalil Talukdar	Dhakhin Tafalbari	Southkali, Sarakhola	
06	Faruque Haoladar	Dhakhin Tafalbari	Southkali, Sarakhola	
07	Lal Mia Munshi	Rayenda	Southkali, Sarakhola	
08	Jamal	Rayenda	Southkali, Sarakhola	
09	Moniruzaman	Rayenda	Southkali, Sarakhola	
10	Nazrul Islam Khan	Rayenda	Southkali, Sarakhola	
11	Harunor Rasid	Uttor Southkhali	Southkali, Sarakhola	
12	Nur Islam	Bakultala	Southkali, Sarakhola	
13	Goni Khan	Bakultala	Southkali, Sarakhola	
14	Joynal Boyati	Khada	Rayenda, Sarankhola	
15	Dr. Masum	Dhakhin Rajapur	Rayenda, Sarankhola	
16	Md. Salim	Malia	Rayenda, Sarankhola	
17	Md. Monir	Malia	Rayenda, Sarankhola	

Charcoal production in the landscape zone of Sundarbans East WS creates a remarkable threat for conservation of Sundarbans resources as entire wood used for charcoal production comes from Sundarbans forest. There are nine charcoal production units in the area and they used Goran and Sundri wood as principal raw material; sometimes they used Singra; both are collected from Sundarbans. Location of the charcoal units along with the owners names are presented in Table 13 below.

Table 13: List of Char Coal owner in different villages/ communities adjacent of SRF

SL#	Village	Union, Upazila	Sawmill owner	Remarks
01	Dhakhin Tafalbari	Southkhali, Sarankhola	Atiar Rahman (Nirob)	
02	Rayenda	Do	Salim Haoladar	
03	Rayenda	Do	Sayed Aahmod	
04	Rayenda	Do	Moniruzaman	
05	Sonatala	Do	Jalil	

06	Uttor Southkhali	Do	Asraf Haoladar	
07	Lakutala	Rayenda, Sarankhola	Baschu	
08	Lakurtala	Do	Biren Sadok	
09	Dhakhin Amragachi	Dhansagor	Emdadul Talukdar	

4.4.2. Resource Exploitation Points/Areas

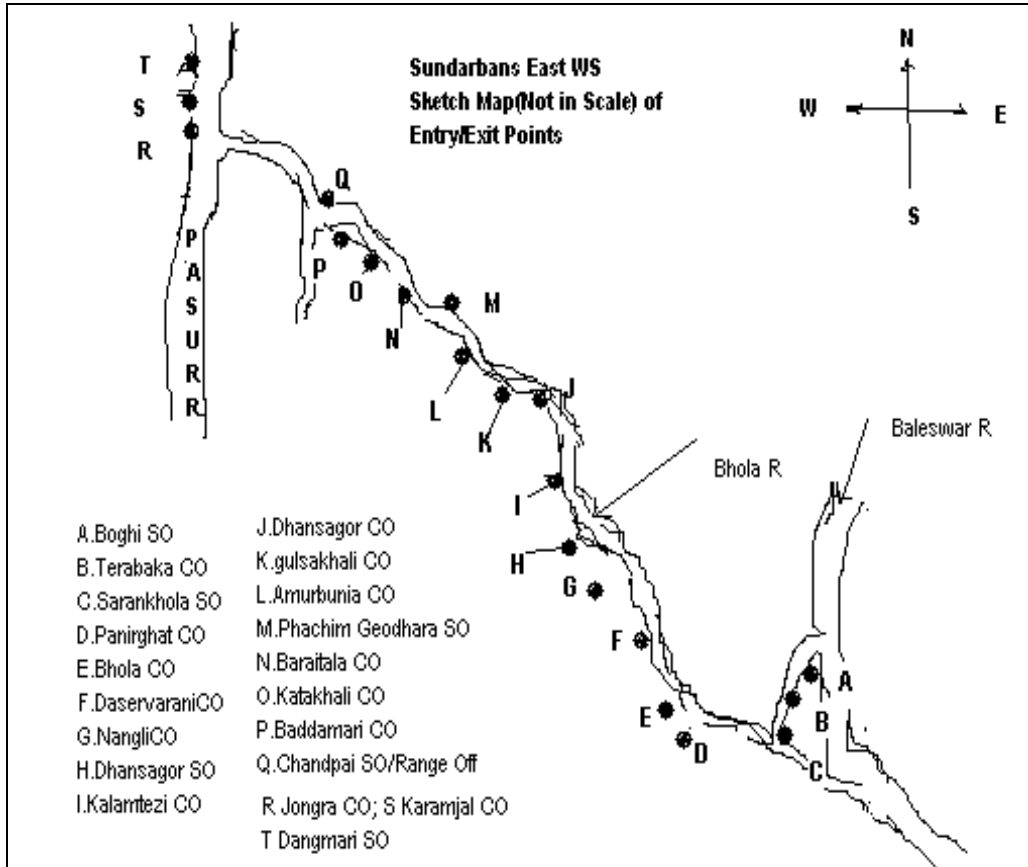
There are some specific entry and exit points through which resources collectors enters into the forests and come out with resources. These entry and exit points are used only those poachers who would establish arrangements for safe removal of resources. The entry and exit points located along the periphery of SRF through which Sundarbans resources collectors of adjacent communities collect resources. These points are of significantly important for the conservation of Sundarbans East WS. These entry and exit points are presented in Table 14 and Map 3.

Table 14: Entry and exit points affecting conservation of Sundarbans East WS

SL #	Name of entry/exit points	Location/ Adjacent Village	Remarks
01	Bogi	Village-Bogi, UP-Southkhali	
02	Terabaka	Village-Bogi	
03	Sarankhola	Village-Sarankhola/ Kuriakhali	
04	Panerghat	Village-Sarankhola, Sonatola	
05	Bhola	Sonatola	
06	Daserbharani	Rasulpur, Dakhin Rajapur,	
07	Nangli	Village-Pashim Rajapur, Dhansagor	
08	Dhansagor	Village-Dhansagor	
09	Kalamtezi	Village-Raktia Rajapur, UP-Dhansagor	
10	Gulsakhali	Village-Gulshakhali, UP-Nisanbaria	
11	Amorbunia	Village-Amorbunia, UP-Nisanbaria	
12	Geodhara	Village-Bajikarkhanda, UP-Sundarnans	
13	Boriotola	Village-Boriotola, UP-Sundarbans	
14	Katakhali	Village-Katakhali, Hoglabunia UP- Sundarbans	
15	Baiddamari	Village-Baiddamari, UP-Chila	
16	Chandpai	Village- Joymoni, UP-Chila	
17	Zongra	Village-	
18	Karamjal	Village- Chila, UP- Chila	
19	Dangmari	Village-Kanainagar, UP-Chanpai	

Moreover, in general, all other khals and canals entering into the Sundarbans from the peripheral rivers/canals are used by the Sundarbans resources collectors. Other than khal and canal, the adjoining people collect Sundarbans resources from adjacent forests indiscriminately all along.

Map 3: Sketch map (not in scale) of entry/exit points of SRF along the periphery related to the conservation of Sundarbans East Wildlife Sanctuary. SRF is situated towards the south of Bhola River. This Bhola River acts as a border area that separates SRF from Human Settlements Areas of the north



4.5.1. Demographic Profile

i. Households and Population:

According to the secondary sources, the total number of households in 46 landscape zone villages of Sarankhola and Mongla Upazila is about 25,990 with population having approximately 142,835. In both the identified areas most of the people migrated from outside/adjacent areas. Age of settlements varies from place to place. Settlements of identified villages of Sarankhola is a bit mature than that of Mongla

ii. Education:

Household interview shows that about 21% people are illiterate and 79% educated (male 38% female 41%) comprising 49% educated in primary school, 24% in high school and the rest 6% are educated in college and above. But PRA field study shows about 50% illiterate and 50% literate which is different from household interview findings.

iii. Occupation:

PRA/RRA study shows (Table 9) that 78% household of the landscape zone completely depend on SRF resources

29% in collecting wood,

39% in fishing,

03% in collecting honey/wax, and

07% in selling labor in SRF resource collection

10% households involve in agricultural activities.

03% households own Gher involving in shrimp cultivation, and

The rest 09% households are involved in business, and service

4.5.2. Livelihood Analysis (income/ expenditure, poverty/ richness, credit, skills, etc)

i. Income source:

PRA studies show that 39% households main income source is fishing that includes fishing of varieties of fishes, crabs and shrimp PL; 28% in non-timber forest products harvesting that includes fuel wood, fencing and thatching/building materials; 10% in agriculture; 07% in selling labor in SRF resource collection and handling; 04% in business; 04% in services with different institutions; 03% in honey and wax collection; 03% in Shrimp cultivation in Gher systems; and 02% in other different activities. All the households involved in shrimp cultivation are very rich and influential families around the area. Majority of the households involved in agriculture, business, services, and some of in other different activities are well to do families. Households involved in fishing, NTFP collection, labor and honey collection basically very poor, some are poor, and lead a very inhuman livelihoods round the year.

Household survey (Table 15) shows that 88% households remain insolvent with their income and expenditure where 20% remain permanently insolvent and 68% remain temporary insolvent. 12% households found solvent with their monthly income and expenditure where 04% can save for future/ development.

Table 15: HH solvency status

SL#	Particulars	Monthly Income in Taka				Remarks %
		< 2,500	2,500- 4,000	4,000- 6,000	>6,000	
01	Permanent insolvent	10 HHs (Average 6.2 members/ HH)				20%
02	Temporary insolvent		34 (Average 5 members/ HH)			68%
03	Solvent			4 (Average 5 members/ HH)		8%
04	Have savings				2 (Average 5 members/ HH)	4%
	Total	10 HHs	34 HHs	4 HHs	2	100%

ii. Land ownership:

Originally the entire area was under Sundarbans forest area and government had its ownership. With the passage of time, settlers clear-felled the forest and started settling in the area. Government leased out lands to the settlers for their housing and maintaining livelihoods. PRA study shows that about 7% households are landless in the area. Among the households (93%) those who have lands, land varying from minimum average of 12.5 decimals per HH in one community to maximum of 104 decimals per HH in another community. About 8% HH lease out their land whereas 6% HH take these land lease for shrimp culture in most of the areas and agricultural use in other areas.

iii. Credit:

PRA studies shows that about 53% households took credit from different NGOs. This rate varied from Sarankhola area 41% to Chandpai area 74%. The major credit providing NGOs in the villages are BRAC, ASA, Grameen Bank, World Vision, Caritas, Pradipon and Dak Die Jai.

4.6. Opportunities

There are opportunities found from field study during PRA/RRA and FGD which are broadly classified as (i) Alternative income generating activities (AIGA) at local level, (ii) Employment generation in and around/ outside the locality.

4.6.1. Alternative income generating activities (AIGA) at local level

AIGA opportunities of Sundarbans East Wildlife Sanctuary Landscape Zone vary from community to community. A total of eight AIGAs identifies by the people of different community of which a few have potentials for implementation, these are i) Fish nursery/culture, ii) Local variety poultry, iii) Cow & Goat rearing, iv) Small business, v) Tailoring, vi) Vegetable production, vii) Horticulture/tree nursery, viii) Handicraft. AIGAs identified by respective village/community members are presented in Table 16 below.

Table 16: Village-wise List of AIGAs

SL #	Name of Village	Possible AIGA	Remarks
A. Southkhali Union of Sarankhola Upazila, Bagerhat			
1	Sarankhola	a. Fish culture, b. Local variety poultry rearing	
2	Sonatala	a Fish culture, b Local variety poultry, c Cow & Goat rearing, d. Horticulture/tree nursery, e. Vegetable gardening	
3	Bogi	a Fish culture, b Local variety poultry	
4	Chaletabunia	a Fish culture, b Local variety poultry, d. Horticulture/tree nursery	
5	Dhakhin Southkhali	a Fish culture, b Local variety poultry	
B. Rayenda Union of Sarankhola Upazila, Bagerhat			
6	Malia	a Fish culture, b Local variety poultry, c. Horticulture/tree nursery	
7	Dhakhin Rajapur	a Fish culture, b Local variety poultry, c Cow & Goat rearing, d. Horticulture/tree nursery	
8	Uttor Rajapur	a Fish Culture, g Handicraft, j Nursery, i Vegetable cultivation, e Tailoring, d Small business,	
E. Sundarban Union of Mongla Upazila, Bagerhat			
9	Baddamari	a. Small business.	
11	Dhakhin Bastala	a Fish culture, b Local variety poultry	
11	Baraitala	a Fish culture, b Local variety poultry, c Horticulture/tree nursery	
12	Hoglabunia	a Fish culture, b Local variety poultry	
13	Gora Burburia	a Fish culture, b Local variety poultry	
G. Chila Union of Mongla Upazila, Bagerhat			
14	Dakhin Chila	a Fish culture, b Local variety poultry, c Horticulture/tree nursery d. Handicraft, e. Small business, f. Tailoring	
15	Dakhin Haldibunia	a Fish culture, b Local variety poultry, c. Handicraft, d. Small business, e. Tailoring	
16	Joymoni	a Fish nursery/culture, b Local variety poultry, e. Small business, f. Handicraft	

4.6.2. Employment generation in and around/ outside the locality

There some employment opportunities both in the locality and in adjacent areas outside the locality. Activities like agriculture, fish culture, nursery development-, vegetable gardening- and horticulture- development create some employment opportunity in the locality.

Inoperative Mongla Sea Port-, Mongla Export Processing Zone-, and industries of Mongla and Khulna can create huge employment opportunity for the community people of landscape zone of Sundarbans East WS. Ecotourism avenues, both in the locality and around, will also create employment opportunity for selected local community people.

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. It is revealed from the trend in changes in the forest quality and resources used (Table 5) that during the last 40 years-

- Forest tree cover has been reduced by 68% (average 17% reduction in every decade)
- Wildlife abundance decreased by 53% (average 13% decrease in very decade), Fish abundance reduced by 59% (average 13.5% reduction in every decade), and
- Dependency on forest by the adjacent people increased by 58% (average 14.5% increase in every decade)

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.

iii. Unsuitable Local situation for human settlement

The majority of the villages, especially some villages of Chndpai area, are settled after the independence of Bangladesh. The inhabitants are fully dependents on Sundarbans resources and remain extremely vulnerable to natural phenomena of that area. The physico-chemical and environmental conditions of the area is not suitable for permanent human settlement.

iv. 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.

v. 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.

vi. 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.

vii. 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.

viii. Rapid growth of population

Although population growth is a critical national and international 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 (food, shelter, education, healthcare, mobility, employment, environment, and so on) at the lowest level.

ix. Lack of governance in institutions

Practice of good governance in all the institutions is a precondition for achieving result of an initiative. Institutionalizing governance is a very important issue for IPAC-a complicated and multi-dimensional project.

x. Hunting and killing of Wildlife

Poaching, hunting and killing of wildlife from WS as well as SRF is totally prohibited but such activities are continuing allover the Sundarbans forest area. It creates a great threat for wildlife and become big issue for wildlife conservation.

xi. Disturbances to 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 for the sake of its existence that will ultimately help humans to have better living conditions.

5.2 Challenges

i. 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

ii. 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.

iii. Reduction in local poverty and unemployment

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

iv. 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

v. Addressing the conflict between adjacent people and FD

Where there is resource there is conflict. SRF is still has huge natural resources. As FD is the custodian of SRF resources and adjacent people are resource collector/ user/business-maker mostly of unlawful means, conflicts arise between the two parties. It is important to address the issue by involving the all concerned in the management of SRF resources somehow on benefit sharing basis. It is a huge challenge and need to be addressed in national policy

vi. Complexity in management and implementation issues

Conservation of Sundarbans resources demands in addressing lot of complex as well as conflicting issues. Strong coordinated efforts among all the stakeholders is required to handle those issues.

6.0. Suggestions and Recommendations

6.1. There is an urgent need to strengthen the capacity of FD for effective management of Sundarbans forest resources. Some of the aspects are

- Adequate qualified staffing
- Capacity building training for all local staff 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 lucrative
- Steps for improving the morale of FD staff and make them dedicated to biodiversity conservation
- Provision for strong monitoring and supervision of activities

6.2. There is no accurate information about the quality and quantity/amount of Sundarbans resources. It is an urgent need to have a complete assessment of all the available resources of Sundarbans and, make a comprehensive development plan for sustainable management the Sundarbans.

6.3. Unauthorized collection of SRF resources need to be stopped.

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

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

6.8. Local elites, sawmill owners, brickfield owners and charcoal producers 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. Strong coordinated efforts are must among all concerned agencies (development/ administration/ law enforcement/ civil society) for conservation of Sundarbans

6.11.

**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*	Education ²	Occupation ³
		Year		
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

¹Sex: 1=Male, 2=Female

²Education: 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

³Occupation: 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, Rohingya=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=Kutchha, 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

I. What are your sources of fuel?

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

1=Yes, 2=No

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>