

**Site Level Field Appraisal  
Of  
Sundarbans South Wildlife Sanctuary**

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

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**December 2009**

## **Acknowledgement**

The author acknowledges the hard works of PRA field team specially to Site Facilitator Md. Sarwar Hossain, Local Resource Person Debashis Roy and Md. Saheb Ali 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 Range office and field level personnel (ACF, Camp In-charge, Station In-charge and Range In-charge) as well as DFO of Sundarbans West Division, Sundarbans West WS for providing relevant information including identification of Landscape villages based on the dependency of village-people on Sundarbans Resources.

The author acknowledges the respective Union Parishad Chairmans, Members and UP Secretary for providing valuable information and kind support for the field works.

The author expresses in gratitude to IPAC Technical Team of Dhaka especially to Mr. Bob Winterbottom, Dr. Ram A. Sharma and Utpal Dutta, IPAC-CODEC Project Coordinator Goutam Biswas and CSPC Md. Rafiqul Islam 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, the author all praises for God, the unique, unparallel, and mightiest One, without His will nothing could happen!

## Table of Contents

<u>Topics</u>	<u>Page No</u>
Acknowledgement	ii
Table of Contents	iii
List of Tables	v
Acronyms	vi
<b>1. Introduction</b>	<b>1</b>
1.1. Project Background	1
1.2. Purpose of the Report	2
<b>2. The Resource Base</b>	<b>2</b>
2.1. Description of the Site	2
2.2. Resources of Sundarbans	3
2.3. The Landscape Zone of Sundarbans South Wildlife Sanctuary	3
<b>3. Methodology</b>	<b>6</b>
3.1. Study Period	6
3.2. Setting PRA/RRRA Issues and Questions	7
3.3. Formation of PRA/RRA Field Teams	9
3.4. Selection of PRA/RRA Spots	10
3.5. Holding Training/ Orientation	10
3.6. Selecting PRA/RRA Methods and Tools	10
3.6.1. Metrics Covered under various PRA/RRA Tools	10
3.7. Field Implementation Strategies for the Selected Tools	11
3.7.1. Household Interview	11
3.7.2. Key Informant (KI) Interview	11
3.7.3. Group Interview	11
3.7.4. Focus Group Discussion	11
3.7.5. Direct Observation	11
3.7.6. Secondary Information Collection	11
3.7.7. PRA/RRA Fieldwork Review	12
3.7.8. Limitation of the Fieldwork	12
<b>4. Outcomes</b>	<b>12</b>
4.1. Forest Land/Resource Use Cover	12
4.2. Forest Land/Resource Use Dynamics	13
4.3. Stakeholders Assessment	15
4.3.1. Primary Stakeholders	17
4.3.2. Secondary Stakeholders	18
4.3.3. Institutional/ Organizational Stakeholders	18
4.4. Causes for Degradation of the Sundarbans and its Resources	21
4.4.1. Exploitation of Resources	21
4.5. Socio-economic setting and dynamics	23
4.5.1. Demographic Profile	23

4.5.2. Livelihood Analysis	24
4.6. Opportunities	25
4.6.1. Alternative income generating activities (AIGA) at local level	25
4.6.1.1. AIGA of Dacope Upazila	25
4.6.1.1. AIGA of Koyra Upazila	26
<b>5. Present Issues and Challenges for IPAC</b>	<b>26</b>
5.1 Present Issues of Concern	26
5.2 Challenges	27
<b>6. Suggestions and Recommendations</b>	<b>28</b>
Annex-1	30

## List of Tables

<b>Table No.</b>	<b>Content</b>	<b>Page No.</b>
Table 1	Sundarbans Wildlife Sanctuaries	2
Table 2	Landscape Zone Villages of Sundarbans South WS (Dacope & Koyra)	3
Table 3	List of selected spots and schedule for conducting primary data collection and PRA/RRA field work	6
Table 4	Selected RRA issues for Sundarbans WS, specific activities and tools used	7
Table 5	PRA issues, specific activities performed and tools used	8
Table 6	PRA/RRA Team for Sundarbans South WS	10
Table 7	Trend Analysis (Dacope Upazila)	14
Table 8	Trend Analysis (Koyra Upazila)	15
Table 9	Stakeholders of Sundarbans South WS	16
Table 10	Working NGOs and CBOs and their activities of Dacope Upazila	18
Table 11	Working NGOs and CBOs and their activities of Koyra Upazila	20
Table 12	Resource harvesting calendar of Sundarbans Forest	21
Table 13	Occupational status of households in the villages under study in Dacope Upazila	22
Table 14	Occupational status of households in the villages under study in Koyra Upazila	22
Table 15	List of sawmills in different villages/ communities adjacent of SRF	23

## **Acronyms**

ACF	Assistant Conservator of Forest
CO	Camp Office (of FD)
CODEC	Community Development Centre
DFO	Divisional Forest Officer
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

# 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 South Wildlife Sanctuary (WS) during November, 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 South 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 South WS is consisting of the compartments 43 and 44. The South WS is bounded by Kaga and Morjat River in the east, Malncha and and Boro Pangasia River



in the west, Kaga River and Dobeki Canal in the north and Bay of Bengal & Putnichar 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 from SRF for their livelihoods. Major resources that are officially allowed to collect/harvest include varieties of non-timber forest products (NTFP), Honey, Crab 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 South Wildlife Sanctuary

The Landscape Zone consists of 114 villages of Koyra sadar, Moheshoripur, North Bedkashi, South Bedkashi & Maharajpur Unions of Koyra Upazila and Sutorkhali, Banishanta, Lowdove, Kamarkhola & Koilashgonj Unions of Dacope Upazila. Villages of Landscape Zone are placed in Table 2.

**Table 2: Landscape Zone Villages of Sundarbans South WS (Dacope & Koyra)**

Sl No.	Village	No of HH	Total Population	Distance from SRF (KM)	Dependency on SRF
<b>A. Koyra Proper Union of Koyra Upazila</b>					
01	North Modinabad	967	4130	04 Km	Low
02	South Modinabad	1047	4472	04 Km	Low
03	Gobra	305	1305	4.5 Km	High
04	Ghata Khali	270	1155	4.5 Km	High
05	Horin Khola	355	1518	4.5 Km	High
06	1 no Koyra	1046	4460	03 Km	Medium
07	2 no Koyra	1105	4720	04 Km	Medium
08	3 no Koyra	1077	4603	03 Km	High
09	4 no Koyra	1291	5535	0.75 Km	High
10	5 no Koyra	745	3180	0.75 Km	High
11	6 no Koyra	570	2435	0.5 Km	High

<b>B. Moheshoripur Union of Koyra Upazila</b>					
12	Gilabari	320	1575	03 Km	Low
13	Amtola	335	1642	0.5 Km	Low
14	Shingher Choak	315	1555	2.0 Km	Low
15	Moheshoripur	1828	8995	0.5 Km	High
16	Chowkuni	989	4850	03 Km	High
17	Sathalia	840	4140	03 Km	Medium
18	Kalikapur	782	3830	03 Km	Medium
19	Tetultila	959	4710	0.5 Km	High
20	Vagbah	760	3740	02 Km	Low
21	Middle Hadda	630	3110	0.5 Km	Medium
22	East Hadda	765	3750	0.5 Km	Medium
<b>C. North Bedkashi Union of Koyra Upazila</b>					
23	Kathmarchor	319	1475	1.25 Km	Medium
24	West Hazat Khali	300	1386	1.5 Km	Low
25	Bedkashi	339	1565	01 Km	Medium
26	East Hazat Khali	320	1478	1.5 Km	Low
27	Sheakh Sardarpara	398	1696	1.5 Km	Low
28	Borobari	470	2170	01 Km	Medium
29	Botul Bazar	300	1372	1.5 Km	Medium
30	Pathor Khali	230	1070	01 Km	High
31	Gazipara	150	670	0.5 Km	High
32	Gabubunia	110	490	0.5 Km	High
33	Shakh Baria	102	456	0.5 Km	High
34	Horihoropur	220	1016	0.25 Km	Medium
35	Gatir Gheri	180	830	0.25 Km	High
36	Padmapukur	380	1750	1.25 Km	Medium
<b>D. South Bedkashi Union of Koyra Upazila</b>					
37	Goal Khali	650	2199	0.5 Km	High
38	Matiavanga	300	1017	0.7 Km	High
39	Ghorilal	500	1692	01 Km	High
40	Choto Angtihara	754	2552	0.5 Km	High
41	Angtihara	838	2890	0.5 Km	High
42	Jorr Shingh	825	2802	0.5 Km	High
43	Patakhali	720	2450	0.5 Km	High
44	South Bedkashi	449	1572	01 Km	Low
45	Chora Mukho	540	1892	04 Km	Low
46	Meder Chor	200	680	04 Km	Low
47	Binapani	721	2523	0.5 Km	Medium
48	Holud Bunia	300	1065	01 Km	Low
<b>E. Moharajpur Union of Koyra Upazila</b>					
49	Moharajpur	1800	6930	02 Km	Low
50	East Mothbari	1000	3890	0.5 Km	High
51	West Mothbari	850	3280	0.5 Km	High
52	Kalna	500	1930	04 Km	Low
53	Megharite	400	1550	04 Km	Low
54	Gobindapur	300	1160	09 Km	Low
55	Lota	250	980	09 Km	Low
56	Doshania	250	965	09 Km	Low
57	Shimlarite	320	1135	06 Km	Low

58	Joypur	450	1595	06 Km	Low
59	Acra	330	1170	06 Km	Low
60	Antabunia	220	880	05 Km	Low
61	Srirampur	350	1400	05 Km	Low
62	Khoria	230	920	05 Km	Low
63	Deara	925	3560	04 Km	Low
64	Motherbaria	850	3290	07 Km	Low
65	Laxmikhola	300	1165	06 Km	Low
66	Shyam Khali	250	975	06 Km	Low
67	Kulkhali	300	1170	6.5 Km	Low
<b>F. Sutorkhali Union of Dacope Upazila</b>					
01	Gonari				High
02	Sutorkhali				High
03	Nalian				High
04	Kalabogi				High
<b>G. Banisanta Union of Dacope Upazila</b>					
05	North Banisanta	416	2020	05 Km	Medium
06	Andharmanik	130	632	03 Km	Low
07	Jhor khali	94	460	05 Km	Low
08	Kakrabunia	152	740	06 Km	Low
09	Amtola	160	775	05 Km	Medium
10	East Amtola	146	710	04 Km	Medium
11	West Banisanta	110	535	03 Km	Medium
12	North Amtola	349	1696	04 Km	Low
13	Banisanta Bazar	336	1630	01 Km	Medium
14	East Banisanta	164	795	01 Km	Medium
15	East Dhangmari	447	2170	0.5 Km	High
16	Bhozonkhali	234	1140	0.5 Km	High
17	East Khejuria	338	1640	02 Km	Medium
18	West Khejuria	399	1945	02 Km	Medium
19	West Dhangmari	210	1020	0.5 Km	High
20	Portkata	175	852	0.5 Km	High
<b>H. Lowdove Union of Dacope Upazila</b>					
21	Lowdove Poshurdhar	695	2960	03 Km	Medium
22	Lowdove Middlepara	510	2110	04 Km	Low
23	Khutakhali	305	1266	06 Km	Low
24	Khutakhali Bazar	152	630	05 Km	Low
25	Harintana	298	1260	04 Km	Medium
26	Kalikabati	65	254	02 Km	High
27	Ruakata Borobak	58	270	01 Km	High
28	Burirdabur	105	460	0.5 Km	High
<b>I. Kamarkhola Union of Dacope Upazila</b>					
29	Kamarkhola	539	2858	08 Km	Low
30	Jelia Khali	228	1210	7.5 Km	Low
31	Channirchok	164	867	07 Km	Low
32	Shibnagar	76	395	06 Km	Low
33	Fakirdanga	52	275	06 Km	Low

34	Rajnagar	72	375	7.5 Km	Low
35	Rekha Mari	49	257	7.5 Km	Low
36	Joynagar	296	1570	06 Km	Medium
37	Per Joynagar	250	1324	05 Km	Low
38	Bhitavanga	150	800	04 Km	Medium
39	Kalinagar	270	1426	03 Km	Medium
40	Satghoria	155	826	03 Km	Low
41	Shaharabad	215	1138	02 Km	High
42	Srinagar	294	1640	01 Km	High
<b>I. Koilashgong Union of Dacope Upazila</b>					
43	Ramnagar	602	2525	0.5 Km	High
44	Ramnagar Dhopadi	554	2150	02 Km	Low
45	Dhopadi	575	2250	03 Km	Low
46	Koilashgong	1460	5690	0.5 Km	High
47	Harintana	971	3872	03 Km	Low

### 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. (v) Cause and effect of increasing dependency on forest. 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 South WS were conducted during November 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
11/11/2009	East Dhangmari	Banishanta UP, Dacope Upazila	Formal PRA
14/11/2009	Koilashgonj	Koilashgonj UP, Dacope Upazila	Formal PRA
15/11/2009	Sutorkhali	Sutorkhali UP, Dacope Upazila	Formal PRA
16/11/2009	Harintana	Laudob UP, Dacope Upazila	Formal PRA
20/11/2009	4 No. Koyra	Koyra UP, Koyra Upazila	Formal PRA
21/11/2009	Mathbari	Maharajpur UP, Koyra Upazila	Formal PRA
23/11/2009	Jorsingh	South Bedhashi UP, Koyra Upazila	Formal PRA
23/11/2009	Gazipara	North Bedkashi UP, Koyra Upazila	Formal PRA
24/11/2009	Moheshoripur	Moheshoripur UP, Koyra Upazila	Formal PRA

### 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, Sketch mapping	Local HHs, Local school teacher, UP professional, 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, Imam. 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 & NGO`s
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 Cultivable land & different resources.	Trend Analysis, HH Int., FGD, KI	Local elite, Local HHs head, Community people
7	Resource exploitation	Major forests resources collected, Reasons and extent of exploitation different forest resources, Dependency on the	HH Int, FGD, KI, Trend Analysis, Seasonal	Local HHs heads, Public representativ

		forest, Seasonal trend in resource exploitation	calendar	e & 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, 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, NGO`s & 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, HHs head, UP professional

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, FD
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 FD staff
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 Information collection	Golpata collector Local community, FD staff
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 Information collection	Honey collector Local community, FD staff
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	Trend analysis, Seasonal analysis	Community people Local elite, UP professional

### 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 and local resource person from Dacope and Koyra upazila. 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	Debashis Roy	Local Resource Person	Dacope Upazila
04	Md. Saheb Ali	Local Resource Person	Koyra Upazila

**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, NGO`s 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 November 5, 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, social resource, human activities, etc.

**ii. Resource and Social Mapping**

Land use cover, resource zones, resource exploitation zones, settlements, road, embankment, social and religious institutions, Hat Bazar, canals & rivers.

**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 for work, business, education, health, conflict resolution, government & non government services.

**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, seasonal migration, income expenditure trend, seasonal business, 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, poultry & livestock, agricultural activities, Gher culture, water & sanitation & pond fish culture.

### **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 Parishad Chairman, Member, UP Secretary, 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 local community places where local people gather spontaneously and formal invitation to the local people was made for participation the group interview. Mapping, seasonality's, ranking and scoring exercise, resource & opportunity identify whenever possible were done in group interviews. This is basically structured 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 FD, respective local Union Parishad, NGO's 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**

The main limitation of the field work was that it took place within very short time. Beside it, a natural disaster cyclone Aila has affected a large area of Dacope and Koyra upazilla of Khulna District. The road communication was very bad. That time there was no road communication. We traveled by boat for communication purposes.

## **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 South WS is consisting of the compartments of 43 and 44 with an area of about 36,970 ha, land and water areas are 21,000 ha and 15,970 ha respectively. The South WS is bounded by Kaga and Morjat River in the east, Malncha and Boro Pangasia River in the west, Kaga River and Dobeki Canal in the north and Bay of Bengal & Putnichar Island in the south. Naturally the land area is very rich in flora (both timber and NTFP) 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 bear, 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, goran, 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-river 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 molluscs.

#### **4.2. Forest Land/Resource Use Dynamics**

Table 7 and 8 shows the trend in changes in the forest quality and resources used and the causes for the changes. In Dacope Upazila, it is revealed that forest tree cover has been reduced by 52% (Big tree reduced by 80%), wildlife abundance decreased by 57%, fish abundance reduced by 64% and dependency on forest by the adjacent people increased by 46%) during last 30 years.

In Koyra Upazila, it is revealed that forest tree cover has been reduced by 56% (Big tree reduced by 80%), wildlife abundance decreased by 64%, fish abundance reduced by 49% and dependency on forest by the adjacent people increased by 55%) 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 like Cyclone SIDR & Aila
- 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) (Dacope Upazila)

<b>Issues</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>Present</b>	<b>Major Causes for Change</b>
Tree Cover	000000	000000	0000	000	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	000000	000000	0000	000	Indiscriminate hunting Habitat destruction Increase illegal entrance of people for resource harvesting Corruption and Poor management
Fish abundance	000000	000000	0000	00	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	000000	0000	00	000000	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	---	00	0000	0	More profit International demand Govt. cooperation Involvement of influential people Pressurized local marginal farmer to lease their land for shrimp gher
Dependency on Forest resources	0	00	000	000	Extreme poverty No employment opportunity at local level Decrease agricultural opportunity due to shrimp culture

**Note:** 1 circle indicates relatively lowest abundance/ intensities, 6 circles indicate relatively highest abundance/ intensities.

Table 8: **Trend Analysis** (Forest quality and resource use matrix) (Koyra Upazila)

Issues	1980	1990	2000	Present	Major Causes for Change
Tree Cover	000000	00000	0000	000	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	000000	0000	000	00	Indiscriminate hunting Habitat destruction Increase illegal entrance of people for resource harvesting Corruption and Poor management
Fish abundance	000000	00000	0000	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	000000	0000	00	00	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	---	00	0000	0000	More profit International demand Govt. cooperation Involvement of influential people Pressurized local marginal farmer to lease their land for shrimp gher
Livestock abundance	000000	0000	00	3% exist	Feed and shelter crisis Decrease agriculture land
Dependency on Forest resources	000	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, 6 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 20 categories of stakeholders have been identified, of them, seven (7) are primary stakeholders-extract resources from the SRF, five (5) 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 9: Stakeholders of Sundarbans South WS**

SL	SH Name	Description of SH	Stake	Level of Stake
<b>A. Primary Stakeholders</b>				
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	Minor
03	Shrimp/Prawn PL collectors	Poor people: Female, child and male	Collect shrimp/ prawn PL from water bodies from inside and edges of SRF	Medium
04	Bawalies (NTFP collector)	Poor people: Mainly male; sometimes female and child	Collection of NTFP, specially golpata, goran, and other minor plant based products	Medium
05	Moualies (Honey collector)	Poor people: Male	Collection honey and wax	Minor
06	Labor	Poor people	Work as day laborer	Medium
07	Hunter	Local people	Hunting wild animal like Deer from sundarbans	Medium
<b>B. Secondary Stakeholders</b>				
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	Fish Arotdars/ businessmen	Large traders and investors, influential people	Make business out of managing/ investing in fishing in SRG area	Major
04	Gher Owners	Influential people		Major
05	Robbers	Group of derailed armed people, organized, powerful in SRF area	Make money by robbery, making hostage who collect SRF resources	Major

<b>C. Tertiary Stakeholders/ Institutions</b>				
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	Coast Guard & 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 in Dacope Upazila, primary stakeholders cover 58% households. Fishers' involvement is the highest 41% (covering other fisher, crab collector, shrimp PL collector and wood, honey collector). Laborers, involved directly in collection, transportation and handling of SRF resources, cover 17% household. In Koyra Upazila, primary stakeholders cover 65% households. Fishers' involvement is the highest 48% (covering other fisher, crab collector, shrimp PL collector and wood, honey collector). Laborers, involved directly in collection, transportation and handling of SRF resources, cover 17% household 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 five types of secondary stakeholders identified through PRA/RRA field work. These secondary stakeholders are Small Mohajons (Money lenders), Saw Mill Owners, Fish Arotdars / businessmen, Gher owners and Robbers.

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

Gher owners, 10% 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, Coast Guard, 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 10 & 11.

**Table 10: Working NGOs and their activities of Dacope Upazila**

Sl.	Name of NGOs	Working Areas	Activities
01	Proshika	Dacope Upazila	Micro-credit, Group Formation, Agriculture, Training, Education, Violence against women
02	Grameen Bank	Dacope Upazila	Micro-credit
03	BRAC	Dacope Upazila	Micro-credit, Health, Enterprise Development, Crab Fattening
04	Shushilon	Dacope Upazila	NNP, Disaster
05	Heed Bangladesh	Dacope Upazila	Micro-credit, Agriculture
06	ASA	Dacope Upazila	Micro-credit
07	Prodipan	Dacope Upazila	Micro-credit, Disaster, Environment
08	Rupantar	Dacope Upazila	Micro-credit, Safe water



			& Sanitation, Disaster, Environment
09	Srizony Bangladesh	Dacope Upazila	Solar Energy
10	DSK	Kamarkhola and Sutorkhali union of Dacope Upazila	Relief and Rehabilitation
11	Upakulio Unnayan Sangashtha	Kamarkhola union of Dacope Upazila	Micro-credit, Savings
12	Ulishi Srizony Sangho	Kamarkhola and Sutorkhali union of Dacope Upazila	Relief and Rehabilitation
13	World Vision	Dacope Upazila	Education, Health and Emergency response
14	JJS	Dacope Upazila	Food Security Project, Plantation, Education, Agriculture, Relief and Rehabilitation
15	ASOD	Dacope Upazila	Micro-credit and Water & sanitation
16	CSS	Dacope Upazila	Micro-credit, Fisheries Project, Health
17	Grameen Shakti	Dacope Upazila	Solar, Biogas, Improved Chulla
18	Bridge	Banishanta & Koilashgonj union of Dacope Upazila	Solar
19	Caritas	Dacope Upazila	Micro-credit, Education, Violence against women
20	Bhagni Nivedita Foundation	Dacope Upazila	Education
21	ADO	Banishanta union of Dacope Upazila	Strengthen UP
22	Ashroyan Foundation	Dacope Upazila	Education
23	Rural Reconstruction Foundation (RRF)	Dacope Upazila	Micro-credit, Emergency Response
24	Light Bangladesh	Banishanta Union of Dacope Upazila	Solar
25	BASD	Banishanta Union of Dacope Upazila	Micro-credit
26	BRDB	Dacope Upazila	Micro-credit

**Table 11: Working NGOs & CBOs and their activities of Koyra Upazila**

Sl.	Name of NGOs	Working Areas	Activities
01	Proshika	Koyra Upazila	Micro-credit, Group Formation, Agriculture, Training, Education, Violence against women
02	Grameen Bank	Koyra Upazila	Micro-credit
03	BRAC	Koyra Upazila	Micro-credit, Health, Enterprise Development, Crab Fattening
04	Shushilon	Maharajpur, South Bedkashi & North Bedkashi Union of Koyra Upazila	Disaster, Food security
05			Micro-credit, Agriculture
06	ASA	Koyra Upazila	Micro-credit
07	Prodipan	Koyra Upazila	Micro-credit, Disaster, Environment
08	Rupantar	Koyra Upazila	Micro-credit, Safe water & Sanitation, Disaster, Environment
09	Srizony Bangladesh	Koyra Upazila	Solar Energy
10	Uttaran	Koyra sadar, Maharajpur union of Koyra Upazila	Relief and Rehabilitation
11	Islamic Relief	Koyra Upazila	Relief and Rehabilitation
12	Bangladesh Red Crescent Society	Koyra Upazila	Emergency response
13	World Vision	Koyra Upazila	Education, Health and Emergency response
14	JJS	Koyra Upazila	Food Security Project, Plantation, Education, Agriculture, Relief and Rehabilitation
15	Souro Shakti	Koyra Upazila	Solar
16	Caritas	Koyra Sadar & South Bedkashi union of Koyra Upazila	Micro-credit, Fisheries Project, Health
17	Grameen Shakti	Koyra Upazila	Solar, Biogas, Improved Chulla
18	Bridge	Koyra Upazila	Solar
19	SUS	Koyra Upazila	Micro-credit
20	Noabeki Gonomukhi Foundation	Koyra Upazila	Micro-credit
21	Palli Daridro Bimochon Foundation	Koyra Upazila	Micro-credit
22	Progati	North Bedkashi	Micro-credit
23	Rural Reconstruction Foundation (RRF)	Koyra Upazila	Micro-credit, Emergency Response
24	Koyra Foundation	Koyra Upazila	Micro-credit with savings

25	Young Brothers	Koyra sadar union of Koyra Upazila	Micro-credit with savings
26	BRDB	Koyra Upazila	Micro-credit
27	Bandhu Kollayan Foundation	Koyra Upazila	Micro-credit with savings
28	FoSHoL Krishak Moitri	Koyra sadar & North Bedkashi union of Koyra Upazila	Agriculture, Poultry & Livestock, Advocacy
29	Matri Sangstha	South Bedkashi union of Koyra Upazila	Health
30	TMSS	Koyra Upazila	Solar, Micro-credit
31	Rural Vision	Koyra sadar & Maharajpur union of Koyra Upazila	Micro-credit
32	Sun	Koyra sadar & Maharajpur union of Koyra Upazila	Micro-credit
33	Shuvo Shakti	Koyra Upazila	Solar
34	Dokan Malik Samity	Koyra sadar union of Koyra Upazila	Micro-credit

#### 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 South 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 12 below.

**Table 12: Resource harvesting calendar of Sundarbans Forest (Dacope & Koyra Upazila)**

Resources	Months											
	Bais h 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 13 below) that in Dacope Upazila 41% household of the landscape zone completely depend on SRF resources (Fisherman, Wood & Golpata Collector, occasionally Honey Collector). Some agriculture farmers occasionally go to Sundarbans. 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 13: Occupational status of households in the villages under study in Dacope Upazila**

SL #	Particulars	Number	Percentage	Remarks
1	Household	13,020		3% fisherman always collects wood and seasonally collect golpata. 5% fisherman collects honey seasonally.
2	Total Population	59,418		
3	Occupation		100	
i	Fisherman		41	
ii	Wood & Golpata Collector			
iii	Honey collector			
iv	Agriculture		37	
v	Day Labor		17	
vi	Business		3	
vii	Service		2	

PRA/RRA study shows (Table 14 below) that in Koyra Upazila 48% household of the landscape zone completely depend on SRF resources (Fisherman, Wood & Golpata Collector, occasionally Honey Collector). Some agriculture farmers and gher owners occasionally go to Sundarbans for collecting Sundarbans resources. 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 14: Occupational status of households in the villages under study in Koyra Upazila**

SL #	Particulars	Number	Percentage
1	Household	37,791	
2	Total Population	1,58,113	
3	Occupation		100
i	Fisherman		48
ii	Wood & Golpata Collector		
iii	Honey collector		
iv	Agriculture		15
v	Day Labor		17
vi	Gher owner		10
vii	Business		06
viii	Service		04

Resources from SRF are collected both for household consumption as well as for commercial purposes. Cause-effect analysis for understanding underlying factors for SRF resource extraction 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 play an important role in illegal extraction of timber wood from SRF. There are 9 sawmills in the landscape villages/ communities. Village wise sawmills are presented in Table 15 below.

**Table 15: List of sawmills in different villages/ communities adjacent of SRF**

SL.	Sawmill owner	Village	Union	Upazila	Remarks
01	Md.Mosharaf	1 no.Koyra	Koyra	Koyra	
02	Abdul Gazi	1 no.Koyra	Koyra	Koyra	
03	Erfan Gazi	1 no.Koyra	Koyra	Koyra	
04	Abul Kashem	1 no.Koyra	Koyra	Koyra	
05	Kalam Gazi	1 no.Koyra	Koyra	Koyra	
06	Rabiul Gazi	1 no.Koyra	Koyra	Koyra	
07	Fate Ali Gazi	1 no.Koyra	Koyra	Koyra	
08	Shadat Sarder	1 no.Koyra	Koyra	Koyra	
09	Fariduddin Gazi	1 no.Koyra	Koyra	Koyra	

## 4.5 SOCIO-ECONOMIC SETTING AND DYNAMICS

### 4.5.1 Demographic Profile

- i. **HHs and Population:** In Dacope Upazila, as per secondary source, the total number of HHs is about 13,020 with having approximately 59,418 people

In Koyra Upazila, as per secondary sources, the total number of HHs is about 37,791 with having approximately 1, 58,113 people.

- ii. **Education:** In Dacope Upazila, HH interview shows that about 16% people are illiterate, 44% are educated in the primary schools and 27% in the High School and the rest 13% are educated in the colleges and above. As per FGD, literate rate is 53% and illiterate rate is 47% (75% people can signature).

In Koyra Upazila, HH interview shows that about 28.75% people are illiterate, 42.5% are educated in the primary schools and 21.25% in the High School and the rest 7.5% are educated in the colleges and above. As per FGD, literate rate is 51% and illiterate rate is 49% (76% people can signature).

- iii. **Occupation:** In Dacope Upazila, as per HH interview, primary occupation of the local people is fishing 41%, agriculture 10%, business 22%, day labour 15%, service & others 9% and unemployed 3%. As per FGD, fisherman (including wood and honey collector) 41%, day labour 17%, agriculture 37%, business 3% and service 2%.

In Koyra Upazila, as per HH interview, primary occupation of the local people is fishing 36%, agriculture 6%, business 15%, day labour 31% and unemployed 9%. As per FGD, fisherman (including wood and honey collector) 48%, day labour 17%, agriculture 15%, gher owner 10%, business 6% and service 4%.

#### 4.5.2 Livelihood Analysis

- i. **Income source:** In Dacope Upazila, Fishing (including wood and honey collection) is the main income source for 41% HHs, day labour sale 17%, agriculture 37%, business 3% and service 2%. They have some secondary income sources.

In Koyra Upazila, Fishing (including wood and honey collection) is the main income source for 48% HHs, day labour sale 17%, agriculture 15%, gher owner 10%, business 6% and service 4%. They have some secondary income sources.

- ii. **Land ownership:** In Dacope Upazila, as revealed from HH interview that 14% of the HHs are totally landless. About 30% households have homestead land of their own, on the other hand only 56% household owned cultivated land and 44% owned no cultivable land.

In Koyra Upazila, as revealed from HH interview that 18.75% of the HHs are totally landless. About 62.5% households have homestead land of their own, on the other hand only 18.75% household owned cultivated land and 81.25% owned no cultivable land.

- iii. **Credit:** In Dacope Upazila, about 75% HHs took credit from different sources, both from bank and NGO sources. The males mainly take loans from bank while women from NGOs.

In Koyra Upazila, about 44% HHs took credit from different sources, both from bank and NGO sources. The males mainly take loans from bank while women from NGOs

- iv. **Economic Condition of HH:** In Dacope Upazila, HH interview shows that about 25% HHs are permanently insolvent, 50% HHs are temporary insolvent, 19% HHs are in equal and 6% HHs are solvent.

In Koyra Upazila, HH interview shows that about 43.75% HHs are permanently insolvent, 43.75% HHs are temporary insolvent, 12.5% HHs are in equal condition.

- v. **Condition of House:** In Dacope Upazila, HH interview shows that about 44% HHs have own tin shed house and 56% HHs have kacha house.

In Koyra Upazila, HH interview shows that about 6.25% HHs have own packa house, 6.25% HHs have semi packa house, 37.5% HHs have tin shed house and 50% HHs have kacha house.

- vi. **Poultry & Livestock Resources:** In Dacope Upazila, poultry & livestock resources have 32%.

In Koyra Upazila, poultry & livestock resources have 3%.

- vii. **Sanitary Latrine:** In Dacope Upazila, HH interview shows that about 94% HHs use sanitary latrine and 6% HHs use kacha latrine.

In Koyra Upazila, HH interview shows that about 44% HHs use sanitary latrine, 25% HHs use kacha latrine and 31% HHs use open field.

- viii. **Access to Safe Drinking Water:** In Dacope Upazila, HH interview shows that about 62.5% HHs have access to safe drinking water and sources are PSF and Rain Water Harvesting. About 37.5% HHs do not get access to safe drinking water.

In Koyra Upazila, HH interview shows that about 100% HHs have access to safe drinking water and sources are tube-well and Rain Water Harvesting. People collect drinking from very distance place.

- ix. **Fuel Wood Consumption:** In Dacope Upazila, HH interview shows that about 37.5% HHs are fully dependent on Sundarbans, 25% HHs on social forestry, cowdung & straw and 37.5% HHs on both sundarbans and social forestry, cowdung & straw for their fuel wood consumption.

In Koyra Upazila, HH interview shows that about 68.75% HHs are fully dependent on Sundarbans, 6.25% HHs on social forestry and 25% 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 South Wildlife Sanctuary Landscape Zone vary from community to community. Many AIGAs have identified by the people of different community of which a few have potentials for implementation, these are:

#### **4.6.1.1. AIGA of Dacope Upazila:**

- i. Poultry & Livestock
- ii. Agriculture,
- iii. Integrated Fish Farming,
- iv. Homestead gardening,
- v. Pond Fish Culture,

- vi. Tailoring,
- vii. Handicrafts,
- viii. Salt processing,
- ix. Small business,
- x. Reed cultivation
- xi. Fish processing

#### **4.6.1.2. AIGA of Koyra Upazila:**

- i. Pond Fish Culture,
- ii. Agriculture,
- iii. Poultry & Livestock,
- iv. Integrated Fish Farming,
- v. Homestead gardening,
- vi. Small business,
- vii. Tailoring ,
- viii. Handicrafts,
- ix. Reed cultivation,
- x. Weaving (তাতের কাপড় বোনা) and
- xi. Block Buttick
- xii. Ice factory

## **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.

#### **x. Unplanned shrimp culture**

In this area, shrimp culture started in 1980. Before shrimp culture, local people cultivated paddy and vegetables in this area. All HHs reared poultry and livestock resources. That time they had many works at local level. Most of the people did not go to sundarbans. After starting shrimp culture, most of paddy field converted into shrimp gher. As a result, now there is no work in the locality. At present most of the villagers had to go to Sundarbans for their livelihood. Now they have no alternative.

## **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 be 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.

### **ix. Stopping hunting of wild life**

Hunter is very organized. It could be very difficult to prevent hunting.

## **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
- Provide safe drinking water
- Provision for incentives to field staff to make the job satisfying
- Provide risk allowance
- Provide Ration for FD staff
- Provision for strong monitoring and supervision of activities
- Ensure FD transparency.

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 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. Empower community people.
- 6.20. Increase activities and mobility of coast guard
- 6.21. Include Sundarbans in the national curricula of text book
- 6.21. Forest Department has to provide not only pass permit for primary stakeholders but also provide close monitoring in the deep forest.
- 6.22. Conduct Combined operation with Coast Guard.
- 6.23. Identify actual time of fish & crab breeding and prohibit fish & crab harvest and that time arrange miking for community people
- 6.24. 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	:	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table> <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table> <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>								
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 <sup>1</sup>	Age*	Education <sup>2</sup>	Occupation <sup>3</sup>
		Year		
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

<sup>1</sup>Sex: 1=Male, 2=Female

<sup>2</sup>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

<sup>3</sup>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, 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) Tinished  c) Semi-pukka  d) Pukka  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=Kutchu, 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 in  and expenditure, 4 = Solvent, 5 = Savings

**8. HOUSEHOLD FUEL FOR COOKING**

2=No

1=Yes,

**I. What are your sources of fuel?**

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

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