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Participatory Small Scale Water Resources Sector Project

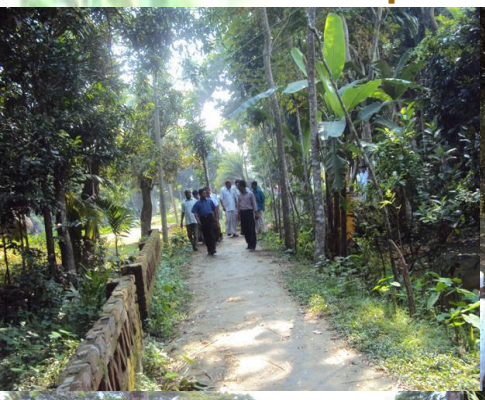
Local Government Engineering Department

PARTICIPATORY RURAL APPRAISAL REPORT

of

Baro Raghunathpur Drainage Sub-project

Upazilla- Bakerganj, District-Barisal






Submitted to:

The Project Director
LGED HQ, RDEC Bhaban (Level-5) , Agargaon
Dhaka-1207

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To
The Project Director
Participatory Small Scale Water Resouces Sector Project
LGED HQ, RDEC Bhaban (Level-5) , Agargaon
Dhaka-1207

Subject: Submission of Participatory Rural Appraisal Report on Baro Ragunathpur Drainage Sub-project under Bakerganj Upazila of Barisal district

Dear Sir,
Greetings from PRA Group.

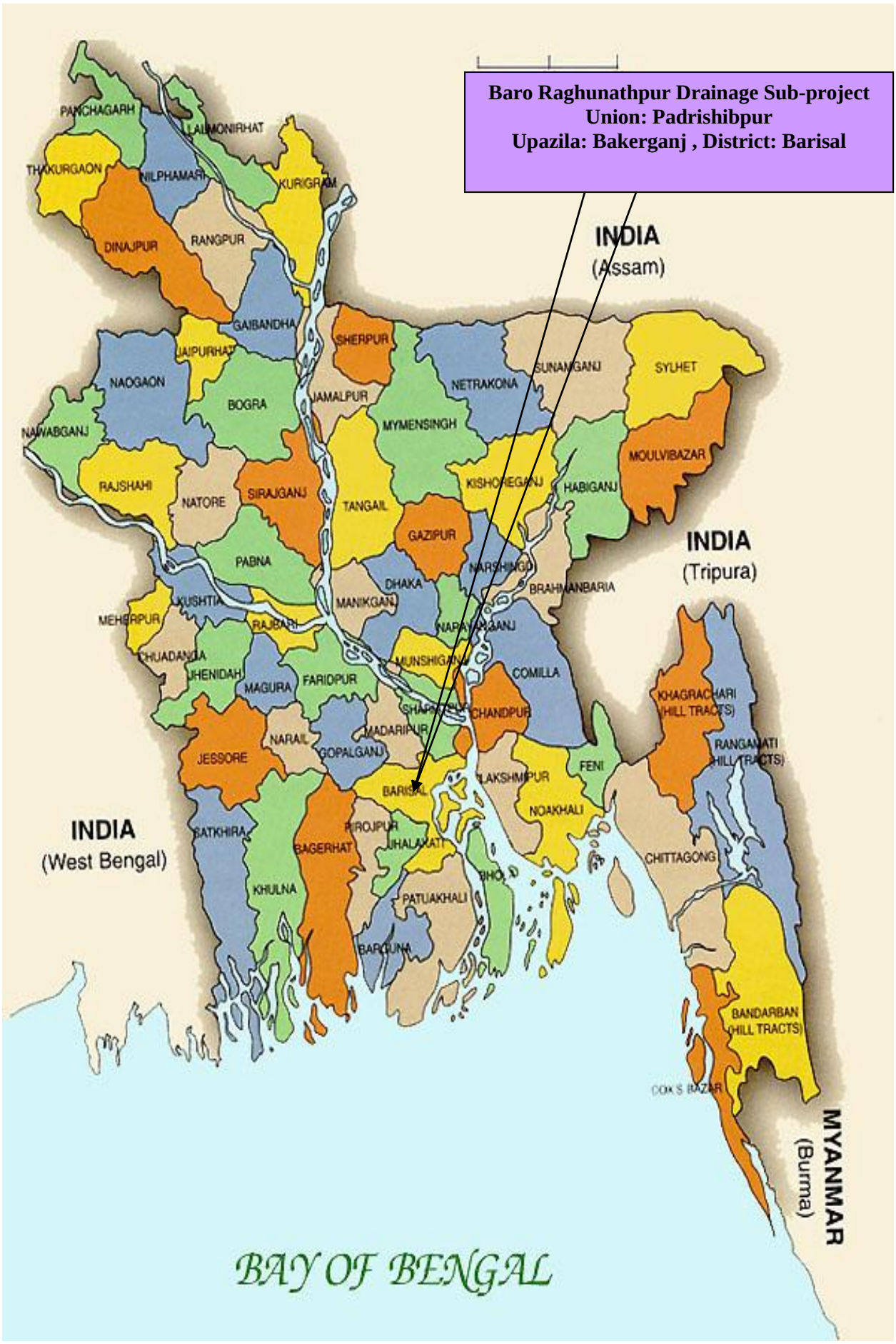
We are pleased to submit herewith the PRA Final Reports of Baro Raghunathpur Drainage Sub Project in Bakerganj Upazila of Barisal district under PSSWRSP for your kind perusal and necessary action. This is corrected version of the report as per your comments and suggestions made on the draft final report

We are looking forward to your consideration of this submission.If there is any query regarding the submission, please contact with us.

Thanks and best regards.

(Fakrun Nahar)
Team Leader
PRA Team

Encl: Final Report of Baro Raghunathpur Drainage Sub-Project-3 copies


Baro Raghunathpur Drainage Sub-project
Union: Padrishibpur
Upazila: Bakerganj , District: Barisal
INDIA
(Assam)
INDIA
(Tripura)
INDIA
(West Bengal)
MYANMAR
(Burma)
BAY OF BENGAL
PANCHAGARH
LALMONIRHAT
THAKURGAON
NILPHAMARI
KURIGRAM
DINAJPUR
RANGPUR
GAIBANDHA
JAIPURHAT
SHERPUR
NAOGAON
BOGRA
JAMALPUR
NETRAKONA
SUNAMGANJ
SYLHET
NAWABGANJ
MYMENSINGH
MOULVIBAZAR
RAJSHAHI
NATORE
SIRAJGANJ
TANGAIL
KISHOREGANJ
HABIGANJ
GAZIPUR
PABNA
DHAKA
NARSHINGDI
BRAHMANBARIA
KUSHTIA
MANIKGANJ
MEHERPUR
RAJBARI
NARAYANGANJ
CHUADANGA
JHENIDAH
MUNSHIGANJ
COMILLA
MAGURA
FARIDPUR
KHAGRACHARI
(HILL TRACTS)
SHARIATPUR
CHANDPUR
MADARIPUR
NARAIL
RANGAMATI
(HILL TRACTS)
JESSORE
GOPALGANJ
FENI
LAKSHMIPUR
BARISAL
NOAKHALI
SATKHIRA
PIROJPUR
JHALAKATI
BAGERHAT
CHITTAGONG
KHULNA
BHOLA
PATUAKHALI
BARGUNA
BANDARBAN
(HILL TRACTS)
COX'S BAZAR

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Intorduction

Participatory Small Scale Water Resources Sector Project (PSSWRSP) of LGED is carrying out the Participatory Rural Appraisal (PRA) as part of the process for determining feasibility of proposed subprojects. It was specifically undertaken to determine the social and environmental viability of proposed subprojects. The purpose of PRA is to obtain a comprehensive overview of the perceptions of different local stakeholders' groups concerning water issues in the proposed subproject area. PRA findings will be useful in selecting socially and environmentally sound and sustainable subprojects.

Baro Raghunathpur Drainage Sub-project is situated in Niamati Union union of Bakerganj Upazilla of Barisal district. The Subproject is located 50 km away from Barisal district headquarters.It takes 1 to 1.5 hours to reach there by faster transport. Subproject area is approx. 9.1 sq.km & Subproject consists of 5 villages namely Puiauta, Purba Krishnanagar, Purachina, Baro Raghunathpur and Ramnagar (Partial). Gross Area of the subproject is about 850 ha having net cultivated area of about 750 ha. The expected benefitted area is about 680 ha..

The PRA Team met the Executive Engineer, LGED (Barisal) and the Upazila Engineer, Bakerganj and in consultation with them proceeded with PRA activities. which included Transect walk, FGDs, SSIs and large meetings with stakeholders. and conducted from 17.11.11 to 23.11.11 .

After completion of Transect walk, FGDs, SSIs, etc. for the subproject the PRA team conducted a debriefing session with the Upazila Engineer and some other officials of Bakerganj Upazila and representatives from LGED Barisal district on 19/11/2011. Later the PRA Team Leader conveyed the outcomes of the PRA activities for the proposed subproject to the Executive Engineer, LGED, Barisal.

Baro Raghunathpur Drainage Sub-project Area

The following consultants were involved in the PRA activities of the subproject

1. Fakrun Nahar - Team Leader
2. Shah Riazur Rahman - Water Resources Engineer
3. Md. Zahidul Islam - Agriculturalist
4. Md.Yusouf Ali - Environmental Specialist
5. Afifa Khatun - Gender Specialist

Executive Summary

Baro Raghunathpur Drainage Sub-project is situated in Niamati Union union of Bakerganj Upazilla of Barisal district. The Subproject is located 50 km away from Barisal district headquarters.It takes 1 to 1.5 hours to reach there by road transport.

Subproject area is approx. 9.1 sq.km & Subproject consists of 5 villages namely Puiauta, Purba Krishnanagar, Purachina, Baro Raghunathpur and Ramnagar (Partial). Gross Area of the subproject is about 1200 ha having net cultivated area of about 1000 ha. The expected benefitted area is about 920 ha..

Engineering

The Sub-project is bounded with the Bakerganj to Barisal Highway Road along the Bishkhali River on the west. Flood is not a big problem in the subproject area because of the Bakerganj to Barisal Highway Road. In normal flood, homesteads are not submerged. But land in the low lying areas remains fallow during monsoon due to water logging.The Bishkhali river has sufficient water during dry season. The river is connected with the internal sixteen numbers of khals through culverts.Existing culverts over the internal khals are found in good condition.These culverts will remain as it is.The Subproject intended to improve drainage congestion and increase availability of surface water by enhancing entrance of tidal water for irrigation from neighboring Bishkhali river and Nazurhuta Khal through re-excavation of Seven numbers internal khals.The main problem of the subproject area is shortage of irrigation water in dry season and monsoon drainage congestion. Major portion of the khals dries up in winter and irrigation season. Tidal water is not available in the khals throughout the dry season. The present practice of irrigation is mainly by rain water. Almost 55% of the irrigable land remain fallow during Aus cultivation. For Aman cultivation, farmers are fully dependent on rain. These Aus and Aman crops are main practices in the subproject area. Farmers cannot cultivate Boro crop due to the shortage of tidal water in the internal khals. Monsoon and post monsoon drainage congestion is the another severe problem because of siltation of internal khals. Monsoon drainage congestion damages Aus and Aman crops at early stage and post monsoon drainage congestion delays cultivation of Rabi crops especially Kalai. Local farmers and beneficiaries are very much enthusiastic for solving the prevailing constraints to crop production.

Agriculture:

In the SP area about 60% land remains fallow. Local Aus by boardcasting and transplanting method is grown in the remaining areas. In few plots Sesbania is grown for fuel purpose. Aus crop is damaged by tidal flash floods very often. Vegetable cultivation is restricted to the homestead areas only. About 70% land is cultivated for transplanted Aman of mostly local variety. The common varieties are BR3,22,23,31,32 and 33 . Aman crops in most of the area are subjected to high standing water (2-3 feet) throughout the growing season. Crops are very much subjected to lodging. Monsoon tidal floods very often submerge the standing crops. Crop damage due to lodging is also very significant. One of the main reasons for not growing Boro in the area is crop damage due to tidal flood at later stage. The other Rabi crops are groundnut, Mung, Felon (pulse) Chili, Turmeric, Colocasia, Water Melon and some winter vegetables (Spinach, Radish) in the homestead area.

Fishery

In the monsoon 80% of this area is submerged between 5 inch or 2 inch for about 5 months. Total area is about 670 hactres. Indigenous fishes grow here but with regular tidal innundation no catch fish could be harvested. Approximate catch is about 3550 kg /year

There are 290 ponds. Total area is about 20 ha.. Total fish yield from the ponds is about 38000 kg per year. In the khal/beel only indigenous fish are grown. However some carps and prawns coming out through tidal flood from the ponds are also available here. There are 59 subsistence fisherman most of whom also engaged in fishing activities in river. There are 38 genuine fish farmers who grow fish in the project area. Interestingly the number is not the the indicator of extent of fish culture as many of them combinedly culture fish is only few ponds. There are 185 subsistence fishers who are actually engaged in fish catching in the project area .

Environment:

There is no historical site and conserved forest or wetland within the proposed Baro Raghunathpur Drainage Sub-project area. So no environmental impact is anticipated in respect of these issues. In Baro Raghunathpur Drainage Sub-project mostly seasonal waterbodies are available.The proposed project is for drainage improvement through re-excavation of a series of interlinked khals/canals. However these works will not cause any permanent drying of any of the water bodies within the subproject area. Through Focus Group Discussion (FGD) and Semi Structure Interview (SSI), it was learnt that no family or homestead area will be affected due to more than annual average of flood water submersion as the result of Sub-project implementation.Expected impacts of proposed SP are quick drainage with tidal effect and no drainage congestion. Other Impacts would be more water availability for irrigation use and no entrapment of saline water in low agricultural lands and low crop damage.

Social & Women Aspects:

A total of 150 stakeholders were interviewed to identify their problems. Of them 80 identified water congestion as main problem, 10 identified tidal flood as main problem, 50 identified canal extension as main problem,20 identified erosion as main problem, The details have been enclosed in the problem census survey .

It has been observed that the household members are involved with different NGOs. NGOs cover 26.62% (highest) of the total members who are involved with different organizations..No major social conflict in the Baro Raghunathpur Drainage Sub-project area. Women household members reported that water logging is the major problem in the area. During monsoon since most of the area remains under water it is very hard for them to undertake various income generation programmes. They are very much interested in kitchen gardening, poultry rearing, food processing, handicrafts, small trading, tree plantation etc. For these activities, they need training and capital support.

PRA Team's Overall Conclusion:

The Sub project requires the structures required for water management which will fulfill the expectations of the community people. Stakeholders are well aware about the problems and do agree with the intervention proposed. WMCA has already been formed and it seems to be very active. It has already collected about Tk.20,000 as part of their contribution to project implementation. Most of the people are very much ready to pay 3% of earthwork cost and 1.5% of structural cost if the project is implemented. They will also shoulder the land acquisition problems by involving the PAP's in O & M, canal fishery, tree plantation etc. The WMCA will take the responsibility of O & M of the project.From economic analysis it appears that if the project is implemented per year economic benefit from agriculture alone would be Tk 3, 21,56,000.This single factor is justified enough in favor of the project implementation. The project will be environment friendly. No major environmental change will occur due to project implementation. Culture fish production will be increased.. Physical environment of the subproject including soil is suitable for crop production. Surface water is free from all sorts of pollution.

CHAPTER – 1: Engineering Aspects

1.1 Description Of The Subproject Area And People

Baro Raghunathpur Drainage Sub-project is situated in Niamati Union union of Bakerganj Upazilla of Barisal district. The Subproject is located 50 km away from Barisal district headquarters.It takes 1 to 1.5 to reach there by road transport.

Subproject area is approx. 9.1 sq.km & consists of 5 villages namely Puiauta, Purba Krishnanagar, Purachina, Baro Raghunathpur and Ramnagar (Partial). Gross Area of the subproject is about 850 ha having net cultivated area of about 850 ha. The expected benefitted area is about 680 ha. The subproject is bounded as follows:

On the North: Moheshpur
On the West : Desantokathi
On the South : Choitabazar
On the East Raghushree Union

Main occupations of the sub-project area Agriculture 80%, fishing 2%, wage labourer 12%, service 2%, others 5%.

1.2 History Of Water Development Related Activities

The Sub-project is bounded with the Bakerganj to Barisal Highway Road along the Bishkhali River on the west. Flood is not a big problem in the subproject area because of the Bakerganj to Barisal Highway Road. In normal flood, homesteads are not submerged. But land in the low lying areas remains fallow during monsoon due to water logging.The Bishkhali river has sufficient water during dry season. The river is connected with the internal sixteen numbers of khals through culverts.Existing culverts over the internal khals are found in good condition.These culverts will remain as it is.

1.3 Proposed subproject development plan/concept

The original subproject proposal initiated by the chairman of Niamati union parishad on behalf of the local stakeholders submitted to the Upazila Engineer, Bakerganj and subsequently recommended by the Upazila parisad and then forwarded by the Executive Engineer, LGED, Barisal to PMO, PSSWRSP, LGED HQ for drainage & Irrigation subproject with a gross area of 680 ha. The subproject required re-excavation of 7 nos khal .

The Subproject intended to improve drainage congestion and increase availability of surface water by enhancing entrance of tidal water for irrigation from neighboring Bishkhali river and Nazurhuta Khal through re-excavation of Seven numbers internal khals.

The main problem of the subproject area is shortage of irrigation water in dry season and monsoon drainage congestion in monsoon. Major portion of the khal dries up in winter hampering irrigation . Tidal water is not available in the khals throughout the dry season. The present practice of irrigation is mainly by rain water. Almost 55% of the irrigable land remain fallow during Aus cultivation. For Aman cultivation, farmers are fully dependent on rain. These Aus and Aman crops are main practices in the subproject area. Farmers cannot cultivate Boro crop due to the shortage of tidal water in the internal khals. Monsoon and post monsoon drainage congestion is the another severe problem because of siltation of internal khals. Monsoon drainage congestion damages Aus and Aman crops at early stage and post monsoon drainage congestion

delays cultivation of Rabi crops especially Kalai. Local farmers and beneficiaries are very much enthusiastic for solving the prevailing constraints to crop production.
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Data from the field, conducted social, technical and environmental analysis and based on independent PRA, the key improvement elements for the subproject are:

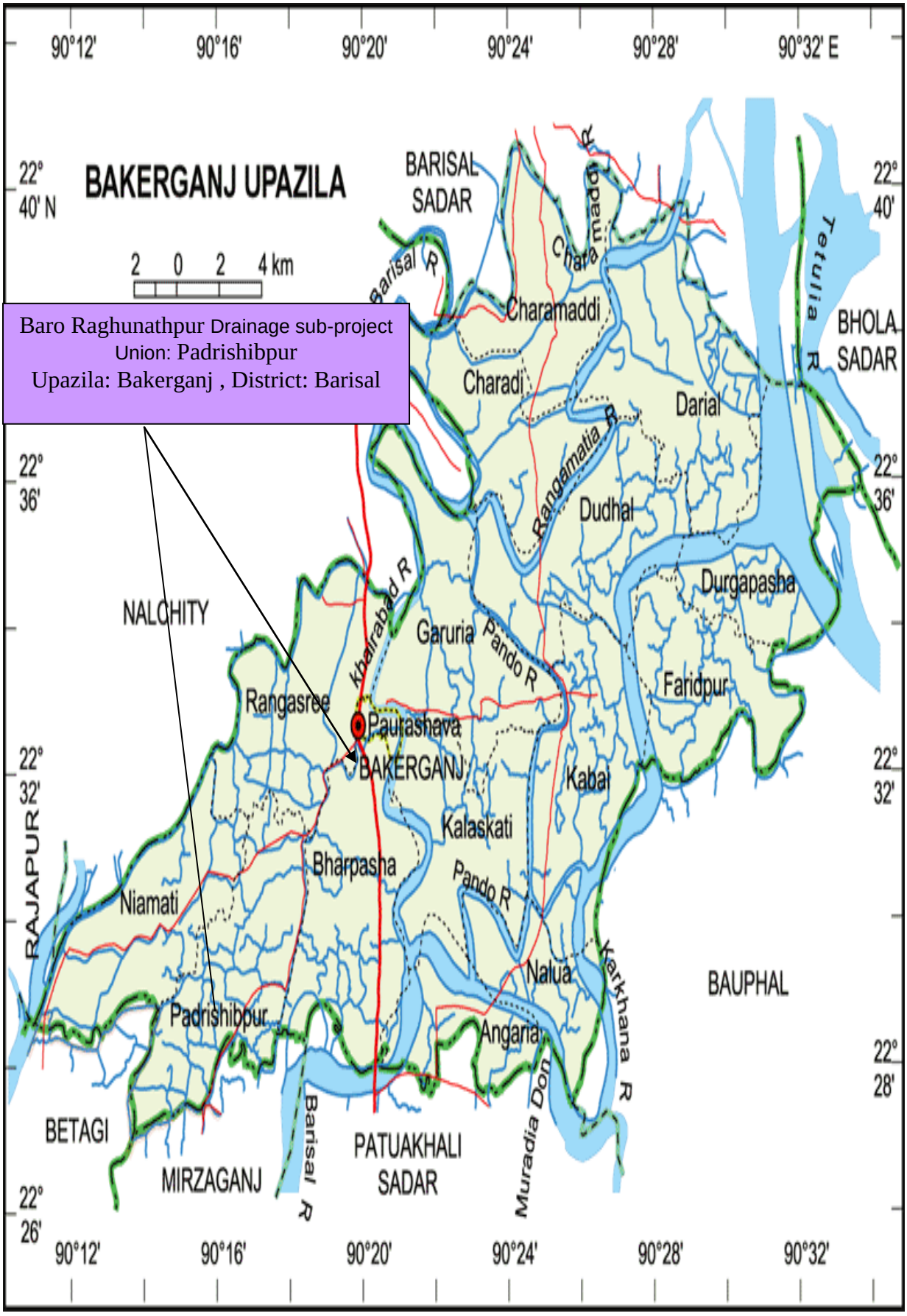
Subproject type	: Baro Raghunathpur Drainage Sub-project
Subproject gross area	: 1200 ha
Subproject Catchment area	: 1000 ha
Subproject Net Benefitted area	: 920 ha

Proposed Works

Problems of the Subproject area can be solved by re-excavating internal khals
As demanded by local people re-excavation of following khals are proposed.

a) Re-excavation of Nazurhuta Khal
b) Re-excavation of Pacha Cira's Khal
c) Re-excavation of Madrar Buniar Khal
d) Re-excavation of Kata Khali's Khal
e) Re-excavation of Tulatuli's Khal
f) Re-excavation of Nazurhuta West Beel
g) Re-excavation of Kalika Bari's Beel

Indication of proposed subproject area at Bakerganj Upazila's Map



1.4 Expected impact of the proposed subproject on the water conditions in the area

There is no significant adverse effect of the intervention by the proposed subproject. The quantity of capture fish will only be reduced which can be supplemented by culture fish. But the benefit by the sub-project will accrue many fold e.g.

- Water logging problem will be solved.
- Drainage will be improved by re-excavation of canals.
- Availability of Irrigation water in the dry season will be improved.
- Production of culture fish will be increased
- No crop damage, rather agricultural production will increase.

Stakeholders draw map

FGD with stakeholders

Transect Walk

CHAPTER – 2:

CHAPTER – 2: Agriculture

2.1 Land Use types

Type & Condition of land

The above subproject area has the following classification of Agriculture land (Source Agriculture Extension office)

- High land - 6 ha
- Medium high land - 105 ha
- Medium low land - 786 ha
- Low land - 29 ha
- Very low land - 0 ha

If this project has been implemented remarkable crop production on the above land will be possible

Location & Area :

Location :

The Subproject is located 50 km away from Barisal district headquarters.It takes 1 hour to 1 to 1.5 hours to reach there by road transport.

Area :

The area of Sub-project of Padrishibpur Union is 9.1 Sq.killometers (approx.).This Subproject consist with 1 Village .

Villages are

Baro Raghunathpur.

Land & Land use

Sl.No.	Particulars	Total quantity (ha)
1	1 crop land	276
2	2 crop land	237
3	3 crop land	217
4	wetland	36
5	Garden/Home	154
Total		920

(Source: Upazila Agriculture Office)

Land Type

Sl.no.	Particulars	Total quantity (Hectre)
1	High Land	0
2	Medium Land	105
3	Medium Land	786
4	Low land	29
5	Very Low land	0
Total		920

(Source: Upazila Agriculture Office)

SoIl Condition :

Clay , loamy & Sandy soil.

Major Cropping Patterns

The farmers were asked about type of crops they grow in different crop seasons ie in Monsoon, in winter and in summer with approximate area in which it is grown. The data obtained was analyzed statistically and the following patterns were identified.

Sl. No	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	Net Crop (tons/ ha)	Total Crop (tons/h a)
1			T Aman								B. Aus		73	150
2		B. Aman							Chilli				62	100
3		LT.Aman					Sweet Potato						68	44
4		B. Aman					Cucumber						12	23
5		LT.Aman					Boro						13	8
6	Mixed Aus Aman												260	154
7			LT. Aman										120	120
8		HYV T. Aman				pulses				Vegetables			24	65
9		HYV T. Aman					13						15	45
10		LT.Aman					Vegetables						16	22
11	Sugarcane												5	5
12		LT.Aman					Oil Seed						14	10
13			LT.Aman						Pulses				35	25
14		LT.Aman						water Melon					20	15
15			LT.Aman					Groundnut					20	50
16	Termaric								Tarmaric				3	3
17	LT.Aman					Oil Seed			Vegetables				10	24
18								Vegetables					30	30
19	LT.Aman					Oil Seed			Chilli				11	28
16	Termaric												4	3
17	LT.Aman					Oil Seed			Vegetables				10	24
19	LT.Aman					Oil Seed			Chilli				11	28
													745	**1004**

Crop Yields

Present crop yield information were also collected from the interview of 80 stakeholders and analyzed statistically, the result is as follows

1	Local T Aman	1.6-2.1 tons/ha	9	Water Melon	7-8 tons/ha
2	B.Aman	1.4-1.7 tons/ha	10	Sugarcane	8.0-10.0 tons/ha
3	Mixed T. Aman	1.2-1.6tons/ha	11	Ground Nut	0.6-0.8 tons/ha
4	HYV T.Aman	2.2-2.4 tons/ha	12	Sea same	0.4-0.5 tons/ha
5	B.Aus	1.3-1.7 tons/ha	13	HYV Boro	3-4 tons/ha
6	Chilli	0.6-0.7 tons/ha	14	Sweet Potato	7.0-8.0 tons/ha
7	Kheshari	0.5-0.6 tons/ha	15	Mashkalai	0.6-1.0tons/ha
8	Mustard	0.3-0.4 tons/ha			

Anticipated benefits:

An assessmentof present crop culture, yield and value vis –a-vis Future crop culture yield and value was assessed by the focal groups which is as follows

Sl	Name of Crops	Without Project					With Project				
		Area	Yield/ ha	prod/T	Value/T	Total/000	Area	Yield/ ha	prod/T	Value/T	Total/000
1	Local T Amon	350	1.2	420	800	336	150	2	300	800	240
2	Hyv T. Amon	150	2.2	330	7500	2475	400	3.5	1400	7500	10500
3	Chilli	50	0.8	40	3000	120	52	0.8	41.6	3500	145.6
4	Pulses	35	0.9	31.5	1200	37.8	240	1	240	1400	336
5	Winter Vegetable	15	1	15	5000	75	50	2	100	5000	500
6	Oil Sheeds	27	0.7	18.9	10000	189	80	0.8	64	10000	640
7	Sweet potato	37	7	259	4000	1036	20	10	200	4000	800
8	T. Aus(Local)	300	1.1	330	70000	23100	350	2.8	980	7000	6860
9	T. Aus(Hyv)	100	2	200	7000	1400	350	2.5	875	7000	6125
10	Summar Vegatable	25	3	75	4000	300	23	5	115	4000	460
11	Water Milon	4	5	20	2000	40	15	10	150	2000	300
12	Ground Nut	10	0.7	7	15000	105	30	0.8	24	1500	36
13	Termrie	1	1.4	1.4	20000	28	4	1.5	6	2000	12
14	Hyv Boro	0	0	0	0	0	250	340	85000	300	25500
14	Sugarcane	1	8	8	8000	64	5	15	75	8000	600
Total:		**1105**	**35**	**1755.8**	**157500**	**29305.8**	**2019**	**397.7**	**89570.6**	**64000**	**53054.6**

ncremental Yield in Tk. per year with the project is =Tk 2, 37,49,000/=
(Pressent Market Price & Govemment Procurement Price Basis)

2.2 Flood related crop production limitations;

Flood is not a big problem in the subproject area because of the Bakerganj to Barisal Highway Road. In normal flood, homesteads are not submerged. But land in the low lying areas remains fallow during monsoon due to water logging.

Discussion with Stakeholder about the project

Discussion with Stakeholder about the project

2.3 Water Logging Related Crop Production Limitations

Only an insignificant area of land is being made cultivable in the high season by waterlogging. Mostly, it is destroying houses, disrupting communication and the rhythm of daily life, drying up coconut, palm, and date palm trees and reducing the number of domestic animals. Because of water-logging, fuel crisis is becoming acute, the collection of wood fuel and drinking water is becoming increasingly more difficult; many have migrated to other areas as life is becoming difficult to support. Water logging is also a serious problem in the area. The sub-project area is a saucer shaped one; water logging problem is acute in the central portion. This area is comparatively lower and when water enters into the area during high tide in dry season, it is logged and damages standing crops. The extent of damage is very significant. Even in the month of December, during undertaking of transect walk with the participants, the team observed water logging in the area causing damage to the standing crops.

2.4 Drought Related Crop Production Limitations

It is prognosticated that, under climate change scenario evapo-transpiration will increase significantly, especially during the post- monsoon and pre-monsoon season. In the backdrop of diminishing rainfall in winter and already erratic rainfall variability over time and space. As a consequence, severity of moisture stress, particularly in the north-western districts will increase leading to drought conditions. Drought hazard in recent days become great problem at subproject area because of climate change which destroys crops, vegetation and dries up surface water sources. Agriculture faces great losses and threat. These hazards compelled the poor to sell movable assets, even tin roof of houses, utensils and livestock to buy food. Great negative impact falls on health of children, women and men due to starvation, diseases outbreak and malnutrition. People become physically weak to work. Nearly 60% people of the subproject area are affected by seasonal famine due to drought every year appear as great challenge for poverty and hunger eradication.. Drought tendency is high in sub-project area. As a result most of the farmers of this area can not produce Boro and Kharif-1 crop . For this production rate has been decreased. Farmers become poor and extreme poor due to this situation. Kharif-1 and Boro cultivation are much difficult due to the reason of lack of water in khals. Seed bed preparation of Aus, Aman and Boro rice are not possible due to lack of water.

2.5 Expected Impact Of Subproject On Crop Production

Stakeholders were interviewed to assess their level of understanding about expected benefit from the Subproject. This was needed on the perspective that if the beneficiaries are well acquainted with the problems as well as expected benefits. It will not only help the successful implementation of the project but also help in conflict mitigation, cost sharing and smooth operation and maintenance. From the findings it was observed that implementation and improvement of the existing facilities would bring in the following agricultural benefits.

- Replacement of local varieties with high yielding varieties and increment of the HYV area in the Kharif-II season due to flood protection and drainage facilities
- Creation of irrigation scopes specially in the Rabi season by the water coming with tidal flood from Sundha river and Durgamundir Khal

Crop yield/production will be enhanced due to reasons stated below:

- Ensuring better conditions for growing HYV T Aman and Boro due to flood protection and drainage improvement
- Promoting the farmer choice of crop variety of Aman and Boro rice for cultivation in favour of HYV Aman and Boro
- Expected increase in area under HYV T Aman with replacement of local T. Aman although the same would still remain in practice (in less area) because of its advantage of early /late planting , low management requirement and high quality straw for cattle feed
- Increasing the area under HYV Boro because of reduction of damage risk due to flooding at maturity and because of scope for providing irrigation water as needed.
- Significant increase of F1 and F2 lands due to water management system that will enable HYV production and efficient fertilizer management practices. It may be noted here that at present minimum fertilizer is applied due to the risk of flooding and loss of fertilizer.

FGD with stakeholders

FGD with stakeholders

CHAPTER – 3:

CHAPTER – 3:

Fisheries

3.1 Fisheries Resource Base

The fisheries resource base of the proposed subproject area is comprised of ponds, ditches, Nazurhuta Khal, inundated agricultural land. Fisheries resource bases of the subproject area are described as follows

A.Seasonal water body

There are about 750 hectares of seasonal water-bodies in the form of inundated paddy field and one khal in the subproject area. These water bodies along with the crop lands are owned by the villagers. Different indigenous fishes start to migrate in these water bodies for grazing, growing and spawning with the onset of monsoon. Local people including land owners catch fishes in the inundated paddy fields and canals.The catches of different natural fishes according to their occurance are as follows

Sl. No.	Local Name	Present Occurrence
1.	Tara Baim	C
2.	Gura Chingri	C
3.	Tengra	C
4.	Koi	C
5.	Mola	C
6.	Chanda	C
7.	Taki	C
8.	Chala	C
9.	Shing	C
10.	Shoal	C
11.	Khalisha	FC
12.	Nola	FC
13.	Magur	FC
14.	Tatkini	FC
15.	Foli	R
16.	Boal	R
17.	Kalibaosh	R
18.	Chital	R
19.	Shal Bain	Th
20.	Gura Chingri	Th
21.	Swarpunti	Th

Note: C=Common,FC=Farly Common, R=Rare, Th= Threatened

The above table depicts that the subproject is moderately rich in fish biodiversity. About 21 natural fish species are found in the subproject area out of which 10 are common, 4 are fairly common, 4 rare and the rest 3 species are threatened. In addition to the above fishes there is few other aquatic living organisms like fresh water mussels, snail, crabs etc. are also found in abundance during the monsoon.

Inundated Paddy field: During monsoon the entire agricultural land is shallowly to moderately flooded. During this period genuine fishermen, part time fishermen and villagers catch different types of indigenous fish as mentioned earlier. During dry season the land is used for growing cereal and non-cereals crops.

Khals: There Seven seasonal khals in the subproject area. Tidal water enters into the khals for seven to eight months to sufficient depth and at that time genuine fishermen, parttime fishermen and villagers catch different kinds of capture / indigenous fish from the khals as mentioned earlier.

Ponds:
There are 190 ponds. Total area of these ponds is about 50 ha.. In 6 ponds fish culture is done on cooperative basis where about 80 man and women cultivate carps & prawn. Fish growth is statisfactory. These ponds are used for culture of native carps like Rui, Katla, Mrigel etc. and exotic carps like Grass Carp, Silver Carp,Thai Swarputi and Telapia.

B. Perennial Water Bodies

Ponds and Ditches: There exist about 50 ponds, which are mostly located in agricultural land of the subproject area. With recession of post monsoon water different indigenous fishes starts to gather in these ponds. One pond is personal and another is Khas but owned by the villagers of the subproject area and which is leased from Government by the local people. The pond owners usually catch on natural and cultured fishes too from these ponds.

Khal & beel
In the khal ,beel only indigenous fish are grown. However some carps & prawn coming out through tidal flood from the ponds are also available here. It may here be mentioned that there is no actual beel in the project area.

3.2 Fish Production

The data on fish production from different water bodies are given in **Table- 3.2.**

Table - 3.2 Water bodies and Fish Production in the Subproject Area

Type of Water Bodies	Area (ha)	Annual Production (kg)			
		Fish	Galda	Bagda	Total
A. Seasonal Water Body					
Floodplain Ricefields	750	3500	--		3500
Pond, Dighi, Ditch	50	5500	--		5500
Khal (Khas)	17	2000	--		2000
B. Perennial					
Pond (Private)	40	4500			900
Khal (Khas)	12	--			--
Total	**857**	**16500**			**16500**

Source: Farmers interview

3.3 Fish Migration Routes

In the wet season natural fish migrate into the subproject area from the river to Khal. In full monsoon the entire area is submerged turning the whole subproject area under large water body, which allows free movement of fish in all directions. In pre-monsoon and post monsoon also natural fishes of this khal and of outside use the migration route. In pre-monsoon mainly small and medium sized fishes migrate or move in to the khal. Some adult fish go out to Bishkhali River for breeding which is not loss as young offspring return to the khal for growing and become available. In post-monsoon many fishes from outside return to the khal for taking shelter/refuge for over wintering (to overcome vulnerable situation of dry season with less water). Very few bigger fish return to river which is a natural process and maintains in strengthening biodiversity. It may be mentioned that intermixing of fish population from another area is important and if the khal areas quality can be ensured through Fish sanctuary, planting plants and bushes that can be in water will invite more fish.

3.4 Fishing Communities

This indicates that fishermen are around the area and may be dependent on fishes in the khal area too.

3.4 Involvement of Women In Fisheries

In all 78 women are involved in fish culture activities within the project of which 37 for feeding, 30 for pond culture, 6 for caretaking, 5 women contributing involved in natural fish etc..There are 73 female headed households engaged primarily with fish culture activities.

3.5 Expected Impact of The Proposed Subproject on Fisheries.

The beneficiaries anticipates the following impacts if the project is implemented

Type of Intervention	Positive		Negative	Possible Mitigation Measures
	Direct	Anticipated		
Re-excavation of khals(7 Khals)	Inflow of tidal water will be increased in the water bodies where natural fish will be available. Re-excavation will increase the khal section and depth resulting in the increase of fish roaming area round the area. Duration of fish migration will be increased	Culture fish will be increased in the ponds, where these ponds dry out in dry season at present by supply of water.	Nil	Not Applicable

CHAPTER – 4:

Environment

4.1 Historical Sites, Conserved Wetland/Forest that Might be Threatened

There is no historical site and conserved forest and/or wetland within the proposed Baro Raghunathpur Drainage Sub-project area. So no environmental impact is anticipated in respect of these issues.

4.2 Water Bodies that may be Affected

Water bodies of the Subproject primarily seasonal water bodies, khals, fish ponds and ditches which were initially deep but are shallow now due to siltation by tidal water.
The proposed subproject is drainage improvement through re-excavation of a series of interlinked khals/Canals. However these works will not cause any permanent drying of any of the water bodies within the subproject area.

4.3 Land Acquisition Issue

There is no land acquisition issue in the subproject area.

4.4 Description of Navigation

There is no recognized navigation system in khals/ Canals. Few small Dingies operate for family purposes but no commercial navigation. So no impact on navigation.

.4.5 Villages/Areas Vulnerable to Flooding

Through Focus Group Discussion (FGD) and Semi Structure Interview (SSI), it was learnt that no family or homestead area will be affected due to more than annual average of flood water submersion as the result of Sub-project implementation.

4.6 Use of Chemicals and Fertilizer

The people of the subproject area apply various chemical fertilizers and insecticides for achieving optimum crop yield. The people of the area mainly cultivate paddy. They use various chemical fertilizers and insecticides which are- urea, potash, phosphate, zypsum, DAP, Basudin, Thiovit etc. The utilization of these for paddy cultivation in the area is summarized in the following table(**Table 4.6)**.

Table 4.6: Uses of chemical fertilizers and insecticides for paddy cultivation.

Crop	Fertilizer/ insecticides	Kg/ acre
Paddy	Urea	72
	Phosphate	41
	Potash	22
	Sulphate	26
	Zypsum	43
	DAP	41

Source: Farmers interview

It was reported by the local people that the fertility and organic matter contents of the soil of the area is decreasing day by day for using chemical fertilizers. On the other hand it is mentioned by the local people that water reservoir is polluted and the aquatic ecosystem (e.g; zooplankton, phytoplankton, fishes etc.) is disrupted by chemical fertilizers and insecticides

4.7. Description of Project Affected People & Mitigation Measures.

Types of Loss	Nature of Loss	No of PAPS	Description of Loss	Opinion
Re-excavation of Khal				
Loss of Private Land & Property	Loss of houses, shed, shops Loss of Planted trees Loss of Cultivable lands	Nill	--	--
Loss of Public Land & Pro	Loss of houses, shed, shops Loss of Planted trees Loss of Cultivable lands	Nill	--	--
Loss of Professional Scope	Boatman (Full time) Boatman (Parttime) Fisherman	Nill	--	--

4.8 Expected Impact of Proposed SP & Possible Mitigation Measures.

The following impacts are expected as the result of SP implementation.

Type of Intervention	Positive	Anticipated	Negative	Possible Mitigation Measures
	Direct			
Preservation of water in khals and distributing irrigational water to agricultural lands.	Availability of irrigational water for the subproject area. Using the water reservoir as fish culture. More land will be come under cultivation. Crop production of the area will be increased. Economic empowerment of the people of the subproject area.	Removal of pre-monsoon and post-monsoon drainage congestion from the subproject area. Increase of crop and fish production.	The aquatic ecosystem may be disrupted if the fish culture will be performed unsustainably. The health of the people of the subproject area who use the water resource of khals for various purposes will be affected.	Awareness about sustainable fisheries may be build up among the people who will use the water resource of khals for fisheries purpose. A designed environmental management plan may be introduced and applied for implementation of the subproject.

Transect Walk

FGD with stakeholders

CHAPTER – 5:

CHAPTER – 5:

Social & Gender Aspects

5.1 Social Aspects

5.1.1 Number and Percentage of Stakeholder Groups in Subproject Area and Inventory of Landless and Destitute Adult Male and Female

Number and Percentage of Stakeholder Groups

Gender	Above 60 years	50-60 years	40-50 years	30-40 years	20-30 years	10-20 years	0-10 years	Total
Female	400	401	450	408	411	410	400	2880
%	13.89	13.92	15.63	14.17	14.27	14.24	13.89	51.68
Male	400	424	334	327	350	424	434	2693
%	14.85	15.74	12.40	12.14	13.00	15.74	16.12	48.32
Total	1180	1225	1214	1233	1241	1234	1254	5573

(Source: Union Parishad)

Table – 5.3: Distributions of Farmer Households

Types of Farmers	Households	
	No.	%
Landless	424	52
Marginal Farmers	122	15
Small Farmers	114	14
Medium Farmers	57	07
Large Farmers	98	12
Total	**815**	**100**

5.1.2 General Problem Ranking and Proposed Solutions

Crop Production Problem

Of the 150 stakeholders interviewed to identify their major problems, 80 identified water congestion as main problem, 10 identified tidal flood as main problem, 50 identified canal extension as main problem,20 identified erosion as main problem, The details have been provided in the problem census survey from enclosed. The problem ranking is as follows

Sl. No.	Problem	Score	Rank
1.	Water congestion	336	First
2.	Water logging	312	Second
3.	Canal Extension	297	Third
4.	Water Shortage	140	Fourth
5.	Water borne diseases of crops	110	Fifth
6.	Dearth of Agri input	30	Ninth

7.	Erosion	25	Tenth
8.	Grazing Land	87	Sixth
9.	Non Availability of Fishes	58	Eight

a. Problems and Solutions Identified by Male Stakeholders

Stakeholder Group	No. of Individuals Consulted	Stakeholders' Response/Comments	
		Present Problems (highest and second highest priority)	Proposed Solutions(for each problem mentioned)
Landless (operating less than 0.5 acre). Livelihood mainly depends on manual labor.	82	Limited Scope of work	Increase of agricultural activities & Community Development Activities in order to increase additional employment opportunities.
		Food Insecurity	Improved drainage and irrigation scope within the project will increase agricultural production significantly
Small and Marginal Farmers (operating <2.5 acres)	65	Water logging	Drainage improvement
Medium-Large Farmers (operating 2.5 acres or more)	30	Water logging	Drainage improvement
		Flooding	Drainage improvement
Fishers and Boatmen	20	Tidal flooding of ponds	Efficient water management
		Non availability of fish in canals	Water control system allowing tides in breeding season.
Service holders and others	3	Communication	Improvement of water management
		Homestead Development	Drainage Improvement

b. Problems and Solutions Identified by Female Stakeholders

Stakeholder Group	No. of Individuals Consulted	Stakeholders' Response/Comments	
		Present Problems (highest and second highest priority)	Proposed Solutions(for each problem mentioned)
Landless (operating less than 0.5 acre). Livelihood mainly depends on manual labor.	23	Limited Scope of work	Scope of work need be created
		Lack of fund for income generation	Loan to be provided
Small and Marginal Farmers (operating <2.5 acres)	7	Limited scope for income generation	Physical facilities to be created
		Lack of training for IGA	Training for various trademanship

Medium-Large Farmers (operating 2.5 acres or more)	6	No scope of work due to water congestion	Income generating activities scope needs to be improved.
		Lack of training for IGA	Training needed
Fishers and Boatmen	14	Insecurity in nurser y establishment & fish culture	Water Management Improvement
		Lack of training	Fishery Training needed
Service holders and others	5	Communication	Road communication needs to be improved.
		Lack of scope of work	Income generation & credit opportunity.

5.1.4 Reactions/Recommendations to the Proposed Subproject

It was found through the FGD with the local male and female stakeholders in the subproject area that everybody in the subproject area is in favor of implementation of the subproject. At present people in the area are suffering from drought, water logging and flash flood problems. Most of the people strongly demanded for irrigation water and re-excavation about half subproject. Reaction and recommendation is the stakeholders are shown in **Table- 5.7.**

Table 5.7

Male Stakeholders		Female Stakeholders	
Reaction	**Recommendations**	**Reaction**	**Recommendations**
The proposed subproject will be very helpful for growing HYV Boro crops and rabi crops.	Proposed subproject should be implemented in accordance with the desire of the stakeholders.	The subproject will be helpful for crop production. Storage of water in the khals Employment prospect will be increased for both men and women.	Proposed schemes should be executed immediately as per desire of the stakeholders.

5.1.5 Expected Impact of Proposed Subproject on Various Social Classes and Occupational Groups

Stakeholders View on Expected Impact

Stakeholder	Expected Impact
Farmers	▪ After implementation of the subproject single cropped are will tern to double crops ▪ If irrigation provide timely farmers can grow triple crops in a year from the same land. ▪ Rabi crops cultivation will be more. ▪ Total production will increase in subproject area
Businessmen	▪ Employment scope for the day laborers and earth workers will be created during implemention of the subproject interventions and post-interventions as more land will be under cultivation.

Day Laborers	▪ Socio-economic condition of the people will be improved for increased crop and fish production ▪ Scope of work will be created for day labors in earthwork.
Service holders	▪ Socio-economic condition of the stakeholders will be improved.
Women	▪ Nutritional status of the people is expected to be improved for increasing of crops and fish production ▪ Scope of work will be created in earthwork and crop processing work.

5.1.6 Project Affected People and Mitigation Measures

None of the people of households will be adversly affected due to implementation of the subproject, except acquisition of some land for digging the canal for drainage .

5.1.6 History of Cooperation

The villagers have no other history of cooperation for developing water resources.

5.1.7 Description of Social Conflict

No major social conflict in the Baro Raghunathpur Drainage Sub-project area.

5.1.8 Description of Existing Organizations/Groups

11 : Number of household members involved in different NGOs

Sl	Name of NGO	Number of Members			%
		Male	Female	**Total**	
1	BRAC	20	120	140	*40.58*
2	ASA	10	90	100	*28.99*
3	Grameen Bank	0	80	80	*23.19*
4	Pulli Gono Unnayan	5	20	25	*7.25*
Total		**35**	**310**	**345**	**100.00**

Microfinance Activities or Microfinance Institutes

Table-12 presents the number loan receiver households and amount of loan as per sources of loan. Survey findings reveal that one household also took loan from more than one source. In totality, there are 161 household loans under different sources. Most of the households received loan from NGOs (86.21%,,highest) with an interest rate of 15%. About 4.93% (2nd highest) of the respondent households took loan from their relatives without interest. It was also seen that that 2.46% households received loan from bank with 12% interest.

Graph- 4

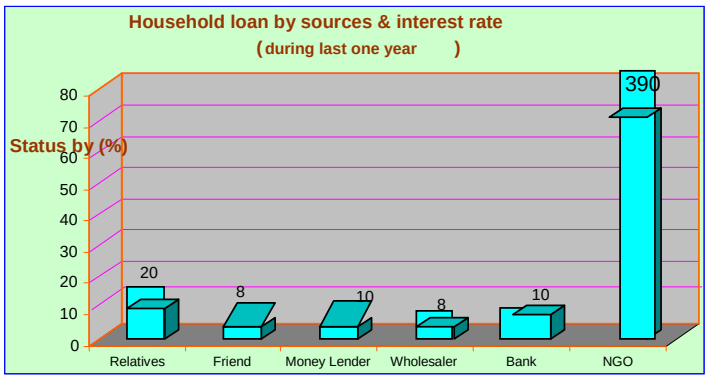


Table-12: Household Loan by sources (during last one year)

Sl.	Source (s)	Number of Households received loan	%	Total amount of Loan (Principal) Tk.	%	Average Loan (Principal) per household (Tk.)	*Interest Rate (%)*
01.	Relatives	20	4.93	140,000	5.42	7000	-
02.	Friend	8	1.97	64,000	2.48	8000	15
03.	Money Lender	10	2.46	80,000	3.10	8000	30
04.	Wholesaler/Distributor	8	1.97	48,000	1.86	6000	10
05.	Bank	10	2.46	150,000	5.81	15000	12
06.	NGO	350	86.21	2,100,000	81.33	6000	15
Total		**406**	**100**	**2,582,000**	**100**		

By providing loan to vulnerable households particular attention is given to most vulnerable household to establish small-scale business within the community. The training focuses on how to save money; how to start business; how to use money efficiently; how to feed children etc. This can reduce poverty and increase food accessibility at household level. Eventually they may develop skill on how to manage the limited resource when flood and water logging problems affect their livelihood.

5.1.9 Indigenous People/Groups

There are no indigenous people/groups in the Baro Ragunathpur Drainage Subproject area

Stakeholders Draw Map

Focus group discussion on social issues

Focus group discussion on social issues

5.2 Gender Aspects

5.2.1 Demographic Data

There are various stakeholders groups of women in the subproject area who are housewives, earth workers, day laborers, service holders, students, midwife, tailor, etc. About 4,210 women reside in the villages of the subproject area **Table – 5.2.1.**

Table- 5.2.1 Demographic Data.

Name of proposed sub project	Women	Population		Women headed HHs	Literacy rate %	Only can sign %
		No	%			
Kafila Subproject	Poor, landless and destitute women	996	34.58	25	40	75
	Marginal and small	987	34.27			
	Meddle income	698	24.24			
	Rich	199	6.91			
	Total	**2880**	**100**			

Source: Discussion with local women.

5.2.2 Non-Water Related Problems and Needs

Women face some problem in t he area, these problems and their proposed solutions are as follows.

Sl. No.	Problems	Solutions
1	About 4% have no toilets in the proposed subproject area. Among the user 62% using non-hygienic toilet and 34% is hygienic. They dispose their excreta on bushes, road side and fields which is very harmful for health and environment.	They suggested for the improved sanitation facilities and awareness to the toilets use that could be provided by the Gov't and Non- Gov't organization, which will be helpful for the women
2	In the proposed subproject area there is no hospital or community clinic, family welfare center and mother / childcare center in the area. The local women get medical treatment from Bakerganj Upazila health complex. For emergency treatment they go to Barisal Medical College and hospital and Dhaka.	They expressed their opinion, if Govt. or Non-Govt. organization establish community clinic and health centre in the proposed subproject area then they will get the proper health service.

3	People of the area are less educated. Especially women are less educated in the proposed subproject area. There is no sufficient primary School and high school in the area.	Govt. or Non-Govt initiative should be taken to establish school and college and Ministry of education should take responsibility for building awareness among the people of the area. The steps from the authority will encourage the people of this area to be educated.
4	The women of he proposed subproject area expect employment opportunity. But they do not have work facilities as there are no mills / factories and IGA programme or training facilities.	The poor, landless and destitute women urged for the provision / opportunity of work by Govt, or Non-Govt organization to maintain their livelihood.
5	92% roads in the proposed subproject area are pucca, 8% katcha. Therefore, the people are facing immense difficulties.	The local people suggested constructing of Katcha and pucca roads in the subproject area. So the local people will be benefited.

5.2.3 Water Related Problems and needs

Sl. No.	**Problems**	**Solutions**
1	There is drinking water problem in the proposed subproject area. Women fetch drinking water from far distance (in the dry season it is about 0.50 k.m (to walk) due to lack of sufficient tube-well and shallow in their locality.	Local people informed that if Govt. / Non-Govt. organization install sufficient tube-well in every house drinking water would be available to the villagers.
2	Women of the proposed subproject area are use in unhygienic water of khals for household purpose. Such as bathing, cooking, washing cloth, cleaning vegetable and fish.	Women of proposed subproject area are suggested that establishment of tubewell and partially supply of water from Pourasava may solve the problem partially.

5.2.4 Activities, Workload and Source of Livelihood:

Women are normally involved in household activities than the others. Occupation of women labors shown in the **Table:5.2.4**

Table 5.2.4: Occupation of women laborers

Activities	Male	Female (%)
Paddy winnowing	00	100
Paddy collection for seed	85	15
Paddy boiling	04	94
Paddy storing	80	20
Seed storing	92	8
Homestead vegetable cultivation	05	95
Crop harvesting	70	30
Poultry/ Livestock	05	95

Source: Discussion with different men and women groups.

Through FGD it is also observed that women are also involved in decision-making and responsibilities of field work. They are also involved in household responsibilities and decision making which is analyzed and shown in the **Table 5.2.5.**

Table: 5.2.5 Analysis of work load and decision making and responsibility.

Name of the proposed sub project	Activities	Work done by (%)	
		Male	Female
Baroraghunathpur Drainage Subproject	Field work responsibility	98	02
	Field work decision making	98	02
	Household work responsibility	02	98
	Household work decision making	98	02

Source: Male and Female interview

5.2.5 Mobility of Women Outside the House

Women's mobility in the Baroraghunathpur Drainage Subproject area is an important indicator of their social status. Women's increased mobility, particularly in a male dominated society reduces their dependence on male kin as mediators. Women also gain access to independent sources of knowledge and are exposed to modernizing influences and associations, which many have impact upon their self-perception and status in the family.

Table- 5.2.5 presents the percentage distribution of adult women according to their movement outside their houses. To know the exact situation, it was decided to have data for the last six months from the date of interview. It has been possible for the respondent women and other household members to remember the frequency and

place of visits. Data shows that from highest 46% households women visited their parents' /relative's houses followed by 35% households from where women visited NGO offices. From 30% houses women joined in social works, which indicated a very positive trend of women's mobility and participation in community development work. Another remarkable situation in this area is women's access to market. Women from 25% households went to market for purchasing their necessary commodities. Women from 30% households visited clinics /health centers with in last six months. But very few women had opportunities to visits places like: UP office, local government offices, training centers and markets (for selling purpose).

Table-5.2.5 : Mobility of women outside the House *(During The Last Six Month)*

Sl.	Places of Movement	Frequency (# of visits)	Number of households from where women visited this place	*% (Compared to total study households)*	Average # of visits per household
01.	NGO Office	120	65	*35*	2
02.	UP Office	32	24	*12*	4
03.	Govt. Office	50	25	*14*	2
04.	Clinic / Health Care Centre	124	50	*30*	3
05.	School	250	32	*20*	7
06.	Training Centre	45	10	*6*	5
07.	Market (for Purchasing)	445	45	*25*	8
08.	Market (For Selling)	55	4	*2*	10
09.	Social work	80	55	*30*	2
10.	Town/City/Historical Place	50	35	*12*	2
11.	Relatives/Parents House	290	70	*46*	3

Women Stakeholders explaining their problems

Women Stakeholders explaining their different issues

CHAPTER – 6:

CHAPTER – 6:

6.a PRA Team's Overall Conclusions, Analysis and Recommendation

1. **Is there broad, popular support for the proposed subproject? (Quantify in percentage)**

   People of the subproject area broadly supported the subproject as they perceived that re-excavation of the khal (s) will be beneficial for agricultural development.

2. **Is there any opposition to the proposed subproject, and if so, by whom, why and how many (number and %) people are against it?**

   There is no opposition to the proposed sub project for taking the benefits of facilitated drainage and flood control through re-excavation of khals.

3. **Is the proposed subproject technically feasible?**

   The subproject is technically feasible, economically viable, socially acceptable and environment friendly.

4. **What are the likely environmental impacts and what possible measures can be taken to mitigate negative impacts?**
   The project does not have any significant environmentally negative impact. The probable impact of use of high amount of fertilizers and insecticides/ pesticides for crop intensification. HYV cultivation could be mitigated by use of organic manure, judicious use of fertilizer and introduction of IPM technology. On the other hand the economic return of the project will be very high. The other adverse impact is reduction of catch fisher which will also be adequately mitigated by increased culture fishery.

5. **Are the beneficiaries willing to pay the first year's operation and maintenance cost (3% of earthwork, 1.5% of structures) before start of construction, form a Water Management Association, assist in land acquisition activity, and take full responsibility for operation and maintenance?**
   The beneficiaries are willing to pay the first year's operation and maintenance cost (3% of earth work and 1.5% of structures) before start of construction provided guarantee of project execution is given. The project includes the structures required for water management which will fulfill the expectations of the community people. Stakeholders are well aware about the problems and agree on the intervention proposed. WMCA has already been formed and it seems to be very active. It has already collected about Tk.25,000 as a part of their contribution to project implementation. Most of the people are very much ready to pay 3% of earthwork cost and 1.5% of structural cost if the project is implemented. They will also shoulder the land acquisition problems by involving the PAP's in O & M, canal fishery, tree plantation etc. The WMCA will take the responsibility of O & M of the project.

6.b PRA Team Analysis and Recommendations:

The proposed subproject is intended to solve water logging problem, improve drainage by re-excavating canals, increase availability of irrigation water in the dry season., allowing timely cultivation of rabi crops in increased area and relieve khals from disgusting water congestion. The subproject will not be detrimental to existing environment and employment scope of any community.

The issue of spoil earth deposition of re-excavated khal should be given due attention so that the activity doesn't unnecessarily affect agricultural land adjacent to khal banks and heaped earth would serve as a road from inhabited area to middle of canal..

PRA Team understood the proposed subproject is technically viable and socially acceptable. The proposed subproject is also technically viable for cultivating boro crops . Subproject inhabitants widely nominated the subproject for implementation and agreed to form WMCA and thereby showed positive attitude for taking full responsibility of operation and maintenance. Nobody opposed the subproject. There is also no social conflict regarding implementation of the proposed interventions. Therfore, the subproject could socially be viable and institutionally sustainable.

Social-Mapping

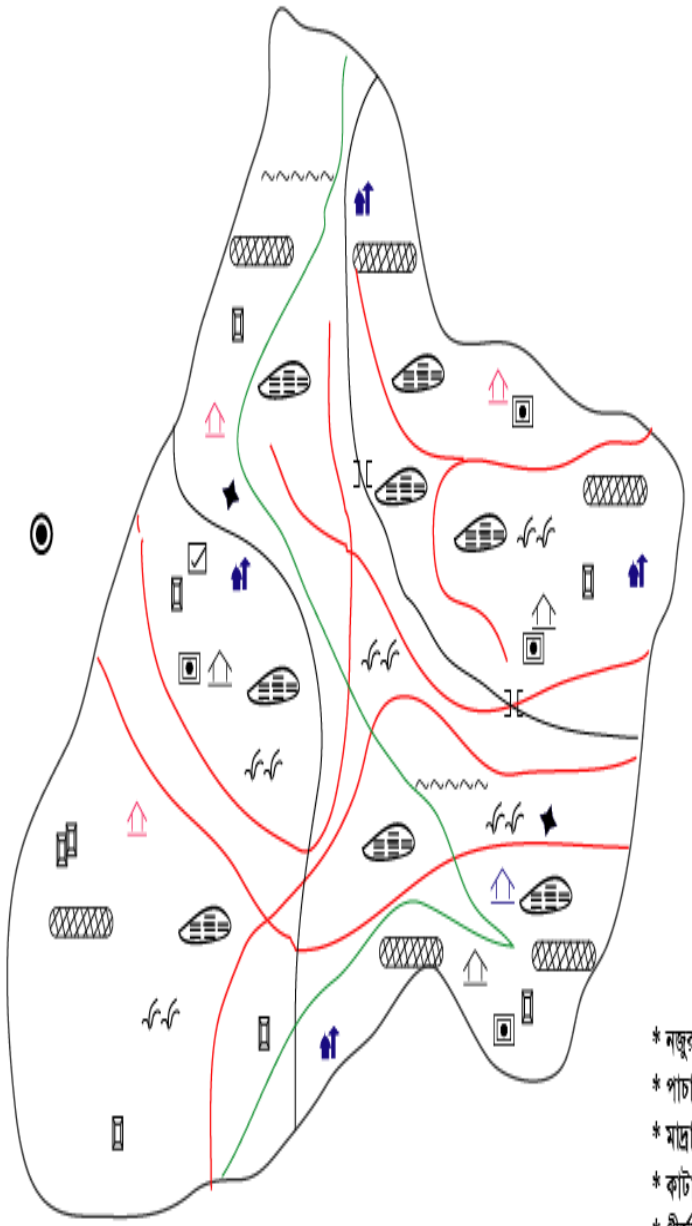
বড়রঘুরামপুর ড্রেনেইজ উপ-প্রকল্প- এর সামাজিক ম্যাপ

গ্রামঃ বড় রঘুনাথপুর, ডাকঘরঃ রঘুনাথপুর, ইউনিয়ন ঃ পাদ্রীশিবপুর

উপজেলা ঃ বাকেরগঞ্জ, জেলা ঃ বরিশাল।

সাংকেতিক চিহ্ন

বিষয়	চিহ্ন
প্রকল্প সীমানা	
মৌজা সীমানা	
ইউনিয়ন পরিষদ	
জলাবদ্ধ বিল	
আবেদনকৃত খাল	
পুকুর	
চিংড়ি ঘের	
নলকূপ	
পাঁকা রাস্তা	
কাচা রাস্তা	
ইট বিছানো রাস্তা	
স্কুল	
মাদ্রাসা	
মসজিদ	
মন্দির	
গীর্জা	
সেবা কেন্দ্র	
এনজিও	
হাট/ বাজার	
খেলার মাঠ	
কালভাট	
স্লুইচ গেট	
কৃষি জমি	
খাস জমি	
বসতি	
কলেজ	



* নজুরহুতা খাল।
* পাচা চিরার খাল।
* মাদ্রার বুনিয়ার খাল।
* কাটা খালির খাল।
* গীর্জার খাল
* তুলাতলির খাল।
* নজুর হুতা পশ্চিম বিল

কালিকা বাড়ীর বিল।

Seasonal Calendar of Sub-Project Area (Processed & Merged Result Table):

Sl. No	Problem	Januar y	Februa ry	March	April	May	June	July	August	Sept.	Octobe r	Nov.	Dec.
01.	Flood												
02.	Water Logging												
03.	Draught												
04.	Storm												
05.	Over Rainfall												
06.	Hail Storm												
08	Canal Fill up												
09	Fish Virus												
10	Tronedo												

Seasonal Calendar of livlihood (Processed & Merged Result Table):

Sl. No	Livlihood type	January	Februar	March	April	May	June	July	August	Sept.	October	Nov.	Dec.
01.	Agriculture												
02.	Day Labour												
03.	Fish Cultivation												
04.	Fishery												
05.	Handicrafts (Bamboo, Cane, Straw, Leaf)												
06.	Van Labour												
08	Service												

Lands of Sub-projects are generally single crop-276 hectare, double crop-237 hectare, wetland-36 hectare,Garden/ Homestead land -154 hectare, Medium high land- 105 hectre, Medium low land-786 hectre and low land-29 hectre. Malnutrition has been shown within Day labour who lead thier livlihood hardly due to lack of Agricultural work.

Damage situation & possibility of project area (Venn Diagram results):

Venn diagram shows the symbol of damage spot at near project side was happened at each year & continously & the symbol of damage at distance from project side was happened lately. Big round spot show big damage. Small round spot show low damage

Annex 1
Report Format for PRA Engineering Findings

Proposed Subproject: Baro Raghunathpur Drainage Sub-project **Union (s):** Padrishibpur **Upazila:** Bakerganj **, District:** Barisal

1. Describe the history of water related interventions (hydraulic structures, khal re-excavations, embankment, roads, etc.) Particularly mention details of BWDB interventions inside and outside (vicinity) of subproject area.

   The history of water related interventions has been described in chapter one Para 1.2, page 5 of main report .

2. Indicate on the map (subproject/physical map) using arrows the directions of flood flows and drainage flows.
   Physical map/Resource map in page-33

3. Indicate on the map (subproject/physical map) by shading, flood inundated areas and waterlogged areas, and in the report itself give dates and depth of inundation.

   Shown in the Resource map in page-33

4. How often is the area flooded (once every 1,2,3,4,5 or more years), what is the source of the flooding, depth of flooding and what is the highest flood level (local mark)?

   N/A, There is a embankment to control flood.

5. In case of a proposed water conservation project, what is the soil condition (clayey/sandy/etc.) of the khals and/or beels, which might be used to store water? Check if there is a potential water sharing issue.

   By re-excavation of khals water conservation will be done by storing water for irrigation during Rabi crops. The soils are predominantly silty clay loam to silt loam.

6. If the proposed subproject is implemented, what will be the impacts on the water environment?
   The project is aimed to provide ideal water environment in the area with the project implementation excess water in monsoon will be removed, water storage in winter/Summer will be supplemented as such there is no negative impact of the project on the water environment rather the project is water environment enhancing one.

Annex 2
PRA Report Format for Agriculture Findings

Proposed Subproject: Baro Raghunathpur Drainage Sub-project **Union (s):** Padrishibpur **Upazila:** Bakerganj **, District:** Barisal

1. Land Types:

Land Types	Area (hectare)	Major Crops			Major Limitations to Crop Production (Late planting, crop damage, use of local variety, low yield, low productivity, etc.)	Average Cost of Land (Tk/ha)
		Kharif 1	Kharif 2	Rabi		
Drainage free	180	Aus	Aman	Pulse, Vegetables	Water Shortage	6,00,000
Flood free	160	Aus	Aman	Pulse, Vegetables	Water Shortage	9,00,000
Irrigated: Full Supplement						
Flooded: Shallow Moderate Deep Very Deep	 470 250 100	Aus	Aman	Pulse, Vegetables	Water Congestion and flood damage in monsoon	6,50,000 6,00,000
Poor drainage	720	Aus	Aman	Pulse, Vegetables	Water Congestion and flood damage in monsoon, water shortage in Rabi, tidal flood in Kharif-2	6,00,000
Drought						
Unirrigated						

2. **Flood Related** Crop Production Limitations: N/A

Flood Characteristics (circle types)	Flash flood/ Seasonal flood/ Local rainfall Shallow/ Moderately deep/ Deep/Very deep
Average number of floods per year	4 nos
Period of floods; from-to (month)	April to July
Yield loss per crop	Name of Crop : Aman & Aus loss:(kg/ha or %): 50% Name of Crop :Pulse & Vegetables loss:(kg/ha or %) : 60%
Farmers' suggestions on how to protect crop from flood damage	Local public opinion the Re-excavation of khals to protect crop from flood damage

3. **Water Logging** Related Crop Production Limitation

Drainage pattern (circle applicable one)	**Slow** / Delayed / Late Pre-monsoon **/ Monsoon** / Post-monsoon
Type of land where water logging occurs (circle applicable one)	High / Medium High / **Medium Low / Low / Very Low**
Period of water logging; from-to (month)	June to December
Yield loss per crop	Name of Crop :Aus & Aman Rice loss(kg/ha or %): 80% Name of Crop : Water Melon, Pulse, betel-leaf & Sugarcane loss (kg/ha or %) : 98%
Farmers' suggestions for improvement *(Categorise suggestions coming from highland, medium land, low land and farmers)*	1 High & Medium high land- Excavation of canals & drainage improvement 2. Low Land- Flood protection, drainage, water retention in Summer. 3. Fisherman- Flood Protection, fish habitat area development allowing brooding fish to enter, controlling fish migration.

4. **Drought Related Crop Production Limitations: N/A**

Characteristics of drought	Extensive / Short / Before rainy season / After rainy season / Before dry season / After dry season
Period of drought (months/season)	
Type of land affected by drought	High / Medium High / Medium Low / Low / Very Low
Area of land affected by drought (ha)	
Yield loss per crop	Name of Crop: loss: kg/ha or % Name of Crop: loss: kg/ha or %
Farmers' suggestions on how to protect crop from drought	

5. Expected Impact of Subproject on Crop Production

Reduce crop damage (name of crop and area)	Aman , Aus & Vegetable -750 ha
Increase in area under modern variety (name of crop and area)	HYV Aman-330 ha, HYV Boro- 310 ha, winter vegetable-120 ha, oil seeds-75 ha, potato-70 ha
Increase in crop area (name of crop and area)	Rabi crops-3200 ha, Kharif-1 Crops-140 ha
Change in cropping patterns (specify cropping patterns)	HYV T. Aman-Boro-Chili/Pulse/vegetables LT Aman-Potato-Groundnut HYV T. Aman- Winter Vegetables-Chili/Vegetables
Increase in crop yield (name of crop and yield increase in percent)	Aman Crops-65%, Aus Crops-40%, Potato-65%
Others	Use of Excess Fertilizer and insecticides, Reduction of Catch fishery
No impact	

Annex 3
PRA Report Format for Fisheries Findings

Proposed Subproject: Baro Raghunathpur Drainage Sub-project **Union (s):** Padrishibpur **Upazila:** Bakerganj **, District:** Barisal

1. Fisheries Resource Base and Production

Type of Water Body	Total Area (Hectare)	Khas Area (Hectare)	Tidal Effect (Yes/No)	Annual Production (Kg)			
				Fish	Galda	Bagda	Total
A. Seasonal Water Body (at least 0.5 m water standing for almost 4 months)							
☐ Floodplain Ricefields	750		No	3500	--		3500
☐ Pond, Dighi, Ditch	50		No	5500	--		5500
☐ Khal	17	17	No	2000	--		2000
☐ Beel					--		
☐ Borrow pit		-		-	-		
Sub-Total	817	17		11,000			11,000
B. Perennial Water Body (at least 0.8 m water retained throughout the year)							
☐ Pond, Dighi, Ditch	40	--	No	4500	--	--	4500
☐ Khal		12		--			--
☐ Beel	--						
☐ Baor							
☐ River, Haor							
Sub-Total	40	12		4500			4500
Total (Sub-total A + B)	857	29		16500			16500

2. **Fish Migration Routes (for in and out migration of fish to and from the subproject area. indicate on the map)**

Name of the Channel/Khal	Period of Major Migration					
	Early Monsoon		Middle Monsoon		Late Monsoon	
	In	Out	In	Out	In	Out
Nazurhuta Khal	April-May		July-Aug			Oct
Pacha Cira's Khal	May-June		Aug			Sept
Madrar Buniar's Khal	May-June		Aug			Sept
Kata Khali's Khal	June		Aug			Sept
Tulatuli's Khal	April-May		July-Aug			Sept
Nazurhuta West Beel	April-May		July-Aug			Sept
Kalika Bari's Beel	April-May		July-Aug			Sept
Girzar's Khal	April-May		July-Aug			Sept

2.**Fishing Communities**

Type of Household (HH)	Total HHs	Female Headed HHs
a. Genuine/Ethnic Fisher		
b. Subsistence Fisher/ Part time Fisher		
c. Genuine Fish Farmer	59	9
d. Subsistence Fish Farmer/ Part time Fish Farmer	259	39
Total		

3. **Involvement of women in fisheries activities**

Fisheries Activities	Number
Feeding fish	48
Pond culture	40
Fish nursery	48
Others:	-
• Caretaking	
• Pond Repair	
Total	

4. **Expected Impact of Proposed Subproject Interventions on Fisheries (*Male and female responses to be segregated if significantly different*)**

Expected Impact	Suggested Mitigating Measures
Reduction of fish habitat (area, depth of water, period of inundation)	Catch fishery area will be reduced but culture fishery in the project ponds and khals will significantly increase. As a whole fishery activity will increase
Reduction in the entry of brood fish and fish seeds	Can be solved by allowing to enter few high tides in brooding season through the sluice. This will bring brooding fish and fish fries to enter in the project khal.
Reduction in fish production	
Reduction in the inflow of water	
Reduction in community consumption of fish	
Deterioration of livelihood condition of fisher folks	Fisher folk could be engaged in canal fishery through cooperative under WMCA
Others:	
•	
•	
•	

Annex 4
PRA Report Format for Environmental Findings

Proposed Subproject: Baro Raghunathpur Drainage Sub-project **Union (s):** Padrishibpur **Upazila:** Bakerganj **, District:** Barisal

Villages/Moujas (Study Areas): Poiavita, Purba Krisnanagar, Purachina, Kafila & Ramnagar

1. Is there any conserved wetland like Tanguar Haor or conserved forest like Sundarban in the proposed subproject area? If so, give details and show location on the map. No

2. Is there any historical/archaeological site, which may be threatened or may have to be demolished for subproject construction? If so, indicate in the map and give details. No

3. Indicate on the map and give names of the water bodies which may be drained partially or completely if the proposed subproject is implemented

None of the existing water bodies will be negatively effected by the project intervention as because all the existing water bodies will remain functioning in an efficient water management system.

Water bodies not affected by proposed subproject	
Water bodies partially drained by proposed subproject	
Water bodies completely drained by proposed subproject	

4. Land Acquisition Issue and/or Agricultural Land Loss. Mention here the type and approximate area of land to be acquired/lost as well as the number of households likely to be affected, if any. Also mention mitigation demand by affected households.

Type and Approximate Area of Land (in hectare)	Number of Affected Households	Mitigation Demands from Affected Households
N/A	N/A	N/A

5. Indicate on the map and give names and the number of boats passing through khals/rivers/channels, which may be closed with a structure if the subproject is implemented.

Average number and types of boats passing proposed structure site per day: N/A

Site/Khal Name	Pre-monsoon	Monsoon	Post-monsoon

6. Indicate on the map and provide names of villages/areas outside the subproject boundary, which may experience higher risk of flooding if the subproject is implemented.

The subproject is bounded by the Roads & Highways embankment along the Bishkhali River on the west Flood is not a big problem in the subproject area because the subproject is within the Roads & Highways embankment. In normal flood, homestead is not submerged. But land in the low laying areas remains fallow during monsoon due to water logging. As such there is no chance of any higher risk outside is the project implementation.

7. Types and amount of chemical fertilizer and pesticides presently used by farmers

Crop	Name of Fertilizer and Pesticide	Amount Used per Acre
Local T.Aman-350ha	Urea	55 kg
B.Aman- 73 ha	Urea	30kg
Vegetables—25 ha	N-P-K Furadan, Malathion	50-40-20 As required
Water Melon—8ha	N—P Carbofuran, Organo Phosphorus	100-8-45 As required
Chili- 44 ha	N-- -- Dicrotophos, Malathion	70-- -- As required
Ground Nut- 35 ha	N-- -- Dicrotophos, Malathion	70—4--- As required
Summer Vegetables-- 30 ha	N—P-- Malathion	70—20-- occasional
HYV.T Aman—32 ha	N—P—K Malathion, Furadan	60—40—30 as required
Sweet Potato—33 ha	--	--
Pulses-- 50 ha	--	

8. Will the subproject construction require destruction of natural or planted vegetation? If so, give detail. No

1. Give the approximate percentage of people in favor and/or against the proposed subproject (with week arguments)
   Favour -100% Against-0%

2. Expected environmental impacts and possible mitigation measures if proposed subproject is implemented

Type of Intervention	Expected Impacts and Affected People		Possible Mitigation Measures
	Positive	Negative	
Khal re-excavation	Provide ideal water environment in the area with the project implementation excess water in monsoon will be removed, water storage in winter/Summer will be supplemented	Water availability in Fo, F1 land will be reduced	Cropping pattern could be appropriated
Construction of sluices, regulators, WRS			
Embankments			
Other interventions			

3. Summary Table of Project Affected People (PAP): N/A

Sl.	Type of Stakeholder Group Affected	Number of Affected People	Negative Impacts	Mitigation Measures
1.				
2.				
3.				
4.				

Note 1: If new impact issues other than those described above are identified during field visits and discussions with sub-project beneficiaries, affected groups and other stakeholders, these issues are to be recorded in separate sheets along with mitigation options suggested by them.

Note 2: If any environmental impact has serious adverse effects as per assessment of the beneficiaries, affected groups and other stakeholders, the PRA Team should recommend a detailed field investigation and should indicate this in its overall conclusions.

Annex 5.1
PRA Report Format for Social Aspect

Proposed Subproject: Baro Raghunathpur Drainage Sub-project **Union (s):** Padrishibpur **Upazila:** Bakerganj **, District:** Barisal
No. of Village: 1

1.a Problems and Solutions Identified by Male Stakeholders

Stakeholder Group	No. of Individuals Consulted	Stakeholders' Response/Comments	
		Present Problems (highest and second highest priority)	Proposed Solutions(for each problem mentioned)
Landless (operating less than 0.5 acres). Livelihood mainly depends on manual labor.	82	Limited Scope of work	Increase of Agriculture activities & Community Development Activities in order to increase additional opportunities.
		Food Security	Improved Drainage and irrigation scope within the project will increase agricultural production significantly
Small and Marginal Farmers (operating <2.5 acres) Medium-Large Farmers (operating 2.5 or more acres)	65 30	Water logging	Drainage Improvement
		Water logging	Drainage Improvement
Fishers and Boatmen	20	Flooding	Drainage Improvement
		Tidal flooding of ponds	Good water management
Service holders and others	3	Non availability of fish in canals	Water control system allowing tides in breeding season.
		Communication	Improvement of water management

b Problems and Solutions Identified by Female Stakeholders

Stakeholder Group	No. of Individuals Consulted	Stakeholders' Response/Comments	
		Present Problems (highest and second highest priority)	Proposed Solutions(for each problem mentioned)
Landless (operating less than 0.5 acres). Livelihood mainly depends on manual labor.	23	Limited Scope of work	Scope of work needs be created
		Lack of fund for income generation	Loan to be provided
Small and Marginal Farmers (operating <2.5 acres)	7	Limited scope for income generation	Physical facilities to be created
		Lack of training for IGA	Training for various trade.
Medium-Large Farmers (operating 2.5 or more acres)	6	No scope of work due to water congestion	Income generating activities scope needs to be improved.
		Lack of training	Training needed
Fishers and Boatmen	14	Insecurity in nurser y establishment & fish culture	Water Management Improvement
		Lack of training	Fishery Training needed
Service holders and others	5	Communication	Road communication needs to be improved.
		Lack of scope of work	Income generation & credit opportunity.

2. Expected impact and reaction to the proposed subproject by stakeholders

Stakeholder Group	No. of Individuals Consulted	Male Response	Female Response
Landless (operating less than 0.5 acres) Livelihood mainly depends on manual labor.	30	With improved drainage and irrigation facility in the area, cropping intensity and crop yield will increase, fish culture will improve, community activity will increase, Employment scope, poultry farming will increase.	Scope of post harvest processing will increase, poultry, goat & livestock rearing scope will be created. Homestead plantation, kitchen gardening scope will increase.
Small and Marginal Farmers (operating <2.5 acres)	20	With improved drainage and irrigation facility in the area, cropping intensity and crop yield will increase, fish culture will improve, community activity will increase, Employment scope, poultry farming will increase.	Poultry, goat & livestock rearing scope will be created. Homestead plantation, kitchen gardening scope will increase.
Medium-Large Farmers (operating 2.5 or more acres)	12	With improved drainage and irrigation facility in the area, cropping intensity and crop yield will increase, fish culture will improve, community activity will increase, Employment scope, poultry farming will increase.	Scope of post harvest processing will increase, poultry, goat & livestock rearing scope will be created. Homestead plantation, kitchen gardening scope will increase.
Fishers and Boatmen	12	Though capture fishery will decrease but pond and canal fish culture will increase many times, Nursery establishment will be possible. But boat movement will decrease but road communication will improve.	Nursery establishment will be possible, fish production security will improve.
Service holders and Others	2	Commercial activity will improve, marketing network will improve, small industrialization will be promoted, employment sope will increase.	Employment scope will be improved.

3.a Problems and Solutions Identified by Indigenous People: N/A

Indigenous Groups	No. of Individuals Consulted	Stakeholders' Response/Comments	
		Present Problems (highest and second highest priority)	Proposed Solutions (for each problem mentioned)

3.b Expected impact and reaction to the proposed subproject by Indigenous People: N/A

Indigenous Groups	No. of Individuals Consulted	Male Response	Female Response

4. History of cooperation among the people in the subproject area. Whether or not they have implemented any project/program (e.g. water resource, health and sanitation, etc.) using mainly their own resources. Or if they have contributed their resources (money, labor) to any government/private projects or programs. Give details : N/A

5. Major social conflicts in the area (within last 3 years): No major social conflict in the area.

Nature of Conflict (describe)	People/Groups Involved	Describe how it was resolved	Not yet resolved
a.			
b.			
c.			

6. Existing Groups or Organizations (government sponsored/voluntary/self help groups, women groups, youth groups, etc.) in Subproject Area. If any, mention name of group/organization, its objectives and activities

BRAC	Providing loan facilities to the poor people, forming group for the upliftment to the community, Education development, undertaking sanitation and solving drinking water problems.
ASA	Provide loans to the individual groups formed by them and about the small traders, Education support service.
Grameen Bank	Provide loans to the individual groups formed by them and about the small traders, Education support service.
Unnesha	Provide loans to the individual groups formed by them and about the small traders, Impart training to the people.
Dak Deya Jai	Provide loans to the individual groups formed by them and about the small traders,
Uddipan	Provide loans to the individual groups formed by them and about the small traders. Impart training to the people

Annex 6
Overall Conclusions of the PRA Team

Proposed Subproject: Baro Raghunathpur Drainage Sub-project **Union (s):** Padrishibpur **Upazila:** Bakerganj **, District:** Barisal

1. Is there broad, popular support for the proposed subproject? (Quantify in percentage)
   Yes , There is board popular support for the project
2. Is there any opposition to the proposed subproject, and if so, by whom, why and how many (number and %) people are against it?
   There is no opposition to the proposed sub project
3. Is the proposed subproject technically feasible?
   The subproject is technically feasible, economically viable, socially acceptable and environment friendly.

4. What are the likely environmental impacts and what possible measures can be taken to mitigate negative impacts?
   The project do not have any significant environmentally negative impact. The probable impact of use of high amount of fertilizers and insecticides/ pesticides for crop intensification. HYV cultivation could be mitigated by use of organic manure, judicious fertilization and introduction of IPM technology. On the other hand the economic return of the project will be very high. The other adverse impact is reduction of catch fisher which will also be adequately mitigated by increased culture fishery.
5. Are the beneficiaries willing to pay the first year's operation and maintenance cost (3% of earthwork, 1.5% of structures) before start of construction, form a Water Management Association, assist in land acquisition activity, and take full responsibility for operation and maintenance?
   The beneficiaries willing to pay the first years operation and maintenance cost (3% of earth work and 1.5% of structures) before start of construction provided guarantee of project execution is given. The project includes the structures required for water management which will fulfill the expectations of the community people. Stakeholders are well aware about the problems and do agree the intervention proposed. WMCA has already been formed and it seems to be very active. It has already collected about Tk.25,000 as part of their participation in project implementation. Most of the peoples are very much ready to pay 3% of earthwork cost and 1.5% of structural cost if the project is implemented. They will also shoulder the land acquisition problems by involving the PAP's in O & M, canal fishery, tree plantation etc. The WMCA will take the responsibility of O & M of the project.

Date: __10/11/2011_____ Names and Signature of PRA Team Members

Fakrun Nahar	Shah Riaur Rahman	Md. Zahidul Islam	Md. Eusouf Ali	Afifa Khatu
(PRA Team Leader)	(Water Resource Engineer)	(Agriculturalist)	(Environmental Specialist)	(Gender Specialist)