



Water Governance and Community Based Water Management

Situation Analysis Report Polder: Jabusa Beel Sub Project

Mustafa Bakuluzzaman
Research Coordinator
Shushilan
September 2012



ACKNOWLEDGEMENT

This qualitative research has been carried out by the NGO Shushilan under a contract with the International Water Management Institute. I would like to thank all concerned involved in this research right from the beginning of this year to date. Specially, I am indebted to the G-3 team of the CGIAR lead by Dr. Aditi Mukharji and our main contact person Ms. Camelia Dewan.

I must thank the core team members who participated in this work including Mr. Mustafa Bakuluzzaman, Study Coordinator and Mr. Mahanambrota Das who have been my colleagues for quite long time. All team members have worked hard to complete the task. Full list of Team members is provided in this report. I should however mention a few names- Ms. Rajasree Nandi and Mr. Rabiuzzaman who worked in the field team and also prepared FGD notes and KII transcript in Bangla and English.

My good friend Dr. Osman Gani, Associate Professor of Economics, Independent University, Bangladesh was involved in the study design. I must specially thank Mr. Mustofa Nuruzzaman, Director, Shushilan who provided needed support including logistics and making advances even before the contract was finalized and funding received.

Finally I would like to thank all of about 600 FGD and KII participants who spent time with us and provided valuable information during the field work and follow up discussions.

Mustafa Bakuluzzaman
Research Coordinator
Shushilan

The Study Team

Sl no	Name	Designation
1.	Dr. M. Maniruzzaman	Team leader
2.	Dr. Mohammad Osman Gani	Academic Supervisor
3.	Mustafa Bakuluzzaman	Research Coordinator
4.	Mahanambrota Dash	Field Coordinator cum facilitator/translator
5.	Rabi-Uzzaman	Facilitator/translator
6.	Rajsree Nandi	Facilitator /note taker
7.	Md. Imtiyazur Rahman	Facilitator /note taker
8.	Sarifuddin	Facilitator /note taker
9.	Koushik Ahmed	Facilitator /note taker
10.	Sajjad Hossain	Facilitator /note taker
11.	Nurani Tasnim Tonni	Facilitator /note taker
12.	Hura Jannath Binte Azad	Facilitator /note taker
13.	Shamima Sultana	Note taker
14.	Afsana Ritee	Note taker
15.	Sanjida Akter	Note taker
16.	Atiqur Rahman	Note taker/video photographer
17.	Md. Shajalal Mohon	Translator
18.	Abir Ahamed Talukder	Translator
19.	Sayed Mahamudur Rahman	Translator
20.	S.K. Siddik Ahamed	Videographer/documentary researcher
21.	Subrata Saha	Video photographer/ documentary researcher

Table of Contents

	Page No.
1 INTRODUCTION	1
1.1. Aim of the report	1
1.2. Methodology	1
1.3. Overview of Jabusabeel Sub Project Area	2
2. FARMING SYSTEMS AND LIVELIHOODS	7
2.1. Change of cropping pattern in the past three decades	7
2.2. Present farming system	8
2.3. Change of agriculture with polder development	9
2.4. Irrigation source	10
2.5. Productivity and cost & return	10
2.6. Livestock	11
2.7. Livelihoods	11
3. PHYSICAL CHARACTERISTICS OF POLDER JABUSA BEEL SUB PROJECT	14
3.1. Condition of the embankment	14
3.2. Condition of Sluice gates	15
3.3. Condition of Canals: siltation and private control	17
3.4. Main water-related problems	20
4. LGED: ADDRESSING WATER INFRASTRUCTURE PROBLEMS	21
4.1. LGED and WMCA Pre-Project Activities	21
4.2. LGED and WMCA during project implementation	22
4.3. LGED and WMCA post-intervention	25
4.4. Appraisal and actual achievements	25
5. LABOUR CONTRACTING SOCIETIES	25
5.1. Formation and work with the WMCA	25
5.2. LCS livelihood	26
5.3. Governance and water management	27
6. MAINTENANCE OF EMBANKMENTS, CANALS AND SLUICE GATES	28
6.1. Maintenance by LGED	28
6.2. Maintenance by Union Parishad	29
6.3. Maintenance by WMCA	30
6.4. Maintenance by Gher owners and landowners	30
6.5. Institutional responsibilities in maintenance	31
7. OPERATION OF SLUICE GATES	31
7.1. Operation through WMCA and LGED	32
7.2. Operation through Union Parishad	32
7.3. Operating private gates.	32
7.4. How gate operation takes place	33
7.5. Emergency response	33
7.6. Participation, Exclusion and Gender	34

8.	CONFLICTS	30
8.1.	Conflict within WMCA	36
8.1.	Conflicts regarding paddy and shrimp farming	36
8.2.	Conflicts regarding high-low elevations	37
8.3.	Conflicts regarding control of gate	37
8.4.	Conflict mitigation	37
8.5.	Participation, Exclusion and Gender	37
9.	CONCLUSION	37
A.	ANNEX 1: INSTITUTIONS IN WATER GOVERNANCE	41
B.	ANNEX 2: INSTITUTIONS	43

1. INTRODUCTION

1.1. Aim of the report

Based on Focus Group Discussions (FGD) and Key Informant Interviews (KII), this report aims to create a detailed situation analysis of Jabusa Beel polder in RupsaUpazila, Khulna. It will do so by providing:

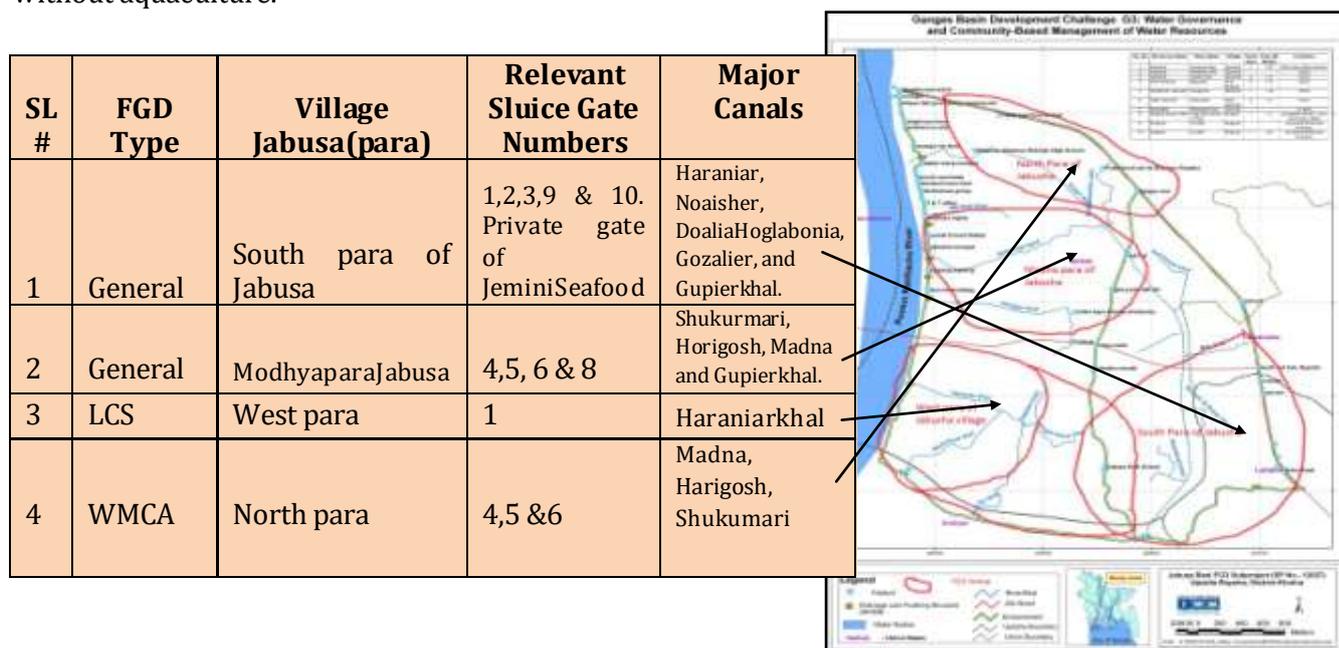
- i) A historical narrative of the polder from the time it was constructed to present;
- ii) Farming systems and livelihoods options;
- iii) Current state of the polder infrastructure;
- iv) Examining the results and process of the water management interventions of the LGED
- v) Reviewing how maintenance of water management infrastructure takes place;
- vi) Reviewing how operation of sluice gates take place; and
- vii) Discussing main conflicts.

It will then conclude by discussing the main findings and implementable policy recommendations that came from the respondents for improving water management in the JabusaBeel subproject.

1.2. Methodology

Four Focus Group Discussions and six Key Informant Interviews (KIIs) were conducted by the Shushilan research team from 29th March to 02 April, 2012. While the FGDs were held in four sub villages (para) of village Jabusa, the KIIs with farmers were held at their village home and the KIIs with officials were held at the respective offices in the UP and Upazila headquarters.

The map below describes where the FGDs have been conducted. The FGD locations and participants were selected to represent various parts of the village, distance from the sluice gates, the gate condition and concentration of various types of farming, particularly paddy cultivation with or without aquaculture.



A glance look of the FGD participants reveals the following:

- One of the two general FGD groups met at Modhyapara (middle part of the village) had six male participants, all farmers including one shrimp farmer. Two of the six were landless, but owned homestead land and the remaining four owned 0.33 to 1.15 acres land. The respondents' age varied from 32 to 50 years. All respondents are WMCA members.
- The second general FGD group was held at Jabusa High School at South Para and all eight participants were from this part of the village. Four of the eight participants had combined paddy farming (mainly Aman) and aquaculture and one was a paddy farmer, one combined business with agriculture, one had salaried service and the last one had business combined with aquaculture. The respondents are a bit older, age varying from 42 to 57 and they owned 1.5 to 5.0 acres land. All respondents are WMCA members.
- The third FGD was conducted with a group of six male LCS group members. One of the six owns 0.75 acre land and another one owns 0.15 acre. The remaining four are landless. All six are WMCA members. The participants are younger, age varying from 18 to 40.
- The last FGD group met were seven WMCA EC members, all males, all own land varying from 1.0 to 10.0 acres and all have business including one having both salaried service and business. Age of the respondents varied from 36 to 60 years.

The list of FGD and KII is provided in Table 1 and 2.

Table 1: List of FGDs conducted in polder Jabusa Sub Project

SL #	FGD Type	Numbers of Participants (Female)	Village (para)	Union Parishad	Relevant Sluice Gate Numbers	Adjoining Canals
1	General	8 males, no female	South para of Jabusa	Naihati	1,2,3,9 & 10. Private gate of Jemini sea food	Haraniarkhal, Noaishyarkhal, Doaliarkhal, Hoglaboniakhal, Gozaliarkhal, Gupierkhal.
2	General	6 males, no female	Madhya paraJabusa	Naihati	4,5, 6 & 8	Shukurmari, Horigosh, Madnar and Gupierkhal.
3	LCS	6 males, no female	West paraJabusa	Naihati	1	Haraniarkhal
4	WMCA	7 males, no female	North para	Naihati	4,5 &6	Madnar, Mujamkhali, Hari gosh, Mansurkhali, Fedurkhal, Golachipa&Shukumarikhal.

Table 2: List of KII conducted in Jsabishabeel Sub Project Polder

Sl #	Respondent Type	Village/ Venue	Date
1	UP Chairman Naihati	Naihati UP Office	29 March, 2012
2	CO, LGED	RupsaUpazila Office of LGED	02 Aril, 2012
3	UP Member	Ward no 1, Naihati UP	30 March, 2012
4	Paddy farmer	West para, Jabusa	01 Aril, 2012
5	Fish farmer	West para, Jabusa	30 March, 2012
6	WMCA Secretary	RupsaUpazila	01 April, 2012

1.3. Overview of Jabusa Beel Sub Project Area

1.3.1. Location and accessibility

Location

The Jabusa Beel Sub Project polder of LGED is located in Naihati Union Parishad of Rupsa Upazila in Khulna district. The polder area is surrounded by the old Khulna-Mongla highway in the north and east, Rupsa River in the west and Narayankhali canal in the south. Within this boundary, there is just one full village or mouza, Jabusa. However people of 13 villages around it own land inside of the Jabusa Beel. One village, Jabusa is located inside of the beel and the remaining 12 are surrounding it or have some land inside of the beel. The surrounding villages are: Bagmara, Char Rupsa, Ramnagar, Talimpur, Niklapur, Joypur, Elaiपुर, Amdabad, Machuadanga, and Kismot Khulna of Naihati UP, village Tilak of Bahirdia UP and village Khajura of Lokpur UP.

Geographical characteristics

The land in the beel area is regularly inundated by tide if not regulated by embankment and sluice gates. Again, because of inadequate drainage facility and for siltation and closing of canals, the area is often waterlogged. The area is also affected by moderate salinity during February to June. After construction of the Rupsa bridge river bank erosion increased downstream of the bridge in the left bank for protection on the right bank and which is more urbanized.

Accessibility

The sub project area is located just on the other side of Khulna City. The Rupsa River is the boundary between the sub project area and Khulna city. From the polder area people access Khulna city using the old highway and cross the river by engine boat. This is convenient for the people living in the north and east side of the polder. Further, the present Approach road to Rupsa bridge passes through the middle of the sub project area. Use of this road to Khulna city is convenient for the people lining in the middle and west side. In addition, there is a road along the left bank of the river. Because of having these roads and the river Rupsa, commercial importance of the polder area is increasing day by day.

Bus, three wheeler auto-rickshaw (baby taxi) and tempo services (like 4 wheeler human hauler) are main modes of transport. In the short distance, rickshaw and rickshaw vans are used extensively. Another mode of transport recently introduced but expanding rapidly is battery operated three wheeler auto-rickshaw, called easy bike.

Urban influence and industrialization

Because of its location very close to the country's third largest city and having good highway, waterway and railway connectivity, good number of industrial and business establishments have been located in the polder area. They are located on three sides, in the north and east beside the old Khulna-Mongla highway particularly near Rupsa ferry ghat and along the left bank of river Rupsa. Only the southern side has less concentration of industries and business establishment while the central part is mainly agriculture and aquaculture area.

About 10-15% of the area is covered by business and industrial enterprises, mainly fish and shrimp (both bagda and golda) processing factories and another 25-30% area is covered by homestead area.

1.3.2. Demographic features

As noted earlier, Jabusa Beel Sub Project area has just one full village, Jabusa but people of 12 villages surrounding it have land inside of the sub project area. Of these 12, seven villages are partly located inside of the area bounded by the outer embankments and these villages have some settlement area inside of it. The villages having land and settlement area inside of the polder are Bagmara (500 households), Char Rupsa (300 households), Joypur (100 households), Elaipur (100 households), Amidabad (5-7 households), Tilok (3-4 households) and Khajura (100 households). On the whole, about 60% of the households living in the sub project area belong to just one village, Jabusa. Since other seven villages are partly inside of the polder, census data could not be segregated. Hence, information of Jabusavillage is provided here to represent the polder.

Table 3 below provides demographic data of village Jabuisha as compared to UP Naihati and UpazilaRupsa¹. The village Jabusa is there considered to represent the polder for demographic and other information and the study was concentrated in this village.

Table- 3: Area and Population

SL	Particulars	Village Jabusa	UP Naihati	UpazilaRupsa
1	Area (Sq km)	4.11	27.18	120.21
2	Household	1,474	14,456	41,895
3	Population Total	6,195	58,299	179,519
4	Density	1,507	2,145	1,493
5	Household Size	4.2	4.0	4.3
6	Male Population	3,129	29,084	90,189
7	Female Population	3,066	29,215	89,330
8	Sex Ratio	102	100	101
9	Religion Muslim %	94.2	94.6	85.0
10	Hindu %	5.2	5.1	14.8
11	Christian and others %	0.6	0.3	0.2
12	Literacy All	55.8	59.7	58.2
13	Literacy M	58.1	62.4	60.9
14	Literacy F	53.4	57.0	55.6

Source: BBS. Population Census, Community Series, Khulna

¹Please note that village Jabusa in size is about 44% of the subproject area but have 60% of the population. Other 12 villages taken together have 56% area and 40% population, If people of other villages with house and land inside were counted, households living in the sub project area would be about 2584 and population would be about 10,852.

Table 4: Employment Status of Polder Area People (age 7+ not in school)

SL	Particulars	Village Jabusa	UP Naihati	UpazilaRupsa
1	Population age 7+ not in school	1,193	10,540	33,305
2	Male	532	4,637	14,856
3	Female	661	5,903	18,449
6	% employed Male	80.3	79.1	79.1
7	% employed Female	23.0	25.2	14.1
8	% Looking for Job Male	0.4	0.7	0.6
9	% Looking for Job Female	0.0	0.19	0.2
10	% in household work Male	1.1	1.1	1.4
11	% in household work Female	51.1	51.82	62.2
12	% not working Male	18.2	19.1	19.0
13	% not working Female	25.9	22.82	23.6

Source: Bangladesh Population Census 2011: Community Series for Khulna District

Table 4 above shows employment status of male and female population of age 7 and above not attending school. In village Jabusa, 80.3% of the males (of age 7+ not attending school) are “employed” in various income earning activities and 18.2% are reported non working. Of the female of 7+ age group (not attending school), 23% are reported to be working in various economic activities, 51% reported to be engaged in household chores only and about 26% non working. The data should however be read with caution that age 7+ not in school, is not a good definition of labor force. If adjusted for population 15+, % of both male female population working, would be much higher and non-working for both sexes would be much lower.

Table 5 below shows distribution of male and female working population by broad economic sectors. In village Jabusa, a little over one half (51.5%) of the male workers are engaged in the agriculture sector, close to one third (32.8%) in industries and only one sixth (15.7%) in the service sectors. Of the female workers, about 84% are engaged in the industries sector, about 11% in agriculture sector and only about 6% in the service sector. Most women workers employed in the industries sector reflects that the shrimp and fish processing factories are employing many women workers. Proximity of the fish and shrimp processing factories has been an advantage to the women workers.

Table 5: Employment of Working Population by Broad Sectors

SL	Particulars	Village Jabusa	UP Naihati	UpazilaRupsa
1	Agriculture % of male worker	51.5	20.1	35.2
2	Agriculture % of female worker	10.5	2.8	10.4
3	Industry % of male worker	32.8	23.7	16.82
4	Industry % of female worker	83.6	39.0	30.53
5	Services % of male worker	15.7	56.2	48.0
6	Services % of female worker	5.9	58.2	59.1

Source: Bangladesh Population Census 2011: Community Series for Khulna District

1.3.3. Basic Facilities Access

Table 6 below shows that nearly 100% people of village Jabusa have access to safe drinking water and the main source is deep tube well. Limited number of households have own deep tube well but almost all others collect drinking water from the nearby deep tube wells. The NGO BRAC provide

Deep Tube Wells (DTWs) under WASH project. Name of NGO ASA is also mentioned but there was no mention of Department of Public Health Engineering (DPHE) and UP providing DTWs for drinking water. It must be appreciated that people collect drinking water from DTWs even if they need to walk one or 1.5 kms. Most houses however have shallow tube well for but that is used more for bathing and washing. Fresh drinkable water is found at depth 600 to 900 feet or even deeper. (FGD)

Table 6: Availability of or Access to Basic Facilities

SL	Facilities	Village	UP	Upazila
1	Sanitary Toilet water sealed %	29.1	21.1	31.8
2	Sanitary not water sealed %	47.2	49.9	44.6
3	Non sanitary%	22.7	27	21.9
4	No latrine %	1.0	1.9	1.70
5	water source: TW/Tape %	99.7	98.6	98.4
6	Electricity Connected %	51.1	76.8	75.8

Source: Bangladesh Population Census 2011: Community Series for Khulna District

In village Jabusa about 29.1% households have water sealed latrines and another 47.2% have ring-slab latrine (sanitary but not water sealed). One percent do not have latrine and 22.7% use non-sanitary latrine. A little over one half of the households in village Jabusa have access to electricity (51.1%).

1.3.3. History of the Jabusa Beel Sub Project and Physical Interventions

History of polder development

Jabusa Beel area is not covered by the coastal embankment project of the BWDB. Therefore the area was inundated by two high tides and drained by two ebb-tides every day. Farmers constructed low dykes on the edge of their land to retain tide water for planting paddy. Homestead land was raised above normal tide level. Only one crop, local Aman could be produced and that too had very low yield. Due to salinity, no crop could be grown during the dry season.

Information varied about pre-LGED construction of embankment. However, if all information are combined, a history of polder development emerges as followed:

- Local people and NGO CARITAS constructed a narrow dyke in 1975 – Gen FGD Modhya Para
- CARE constructed a narrow embankment in 1982-83 – General FGD, South Para
- The Union Parishad constructed embankment with the assistance of CARE in 1991- WMCA President

All three were however minor construction and each damaged in a few years due to flood and tidal surge. Also, due to low height, the embankment was frequently overtopped, hence was not long-lasting and did not serve the purpose of protecting crops.

In 1996, the LGED constructed the embankment under the SSWRDP. In 2000, the LGED reconstructed it, made it elevated a bit higher.

Physical Components of LGED Sub Project

Under the sub project, the LGED constructed 8.42 km embankment, re-excavated 13.75 km of canals, constructed 5 sluice gates and provided fish screen in two sluice gates. Circumference of the polder area or length of the embankment is about 14.82 km of which 8.42 km is LGED embankment and the remaining 6.4 km is old Khulna Mongla highway, hence embankment construction not required. Local participants indicated that there are 11 canals with total length of 21 km in Jabusa Beel area, six of them have been re-excavated by the sub project and five sluice gate constructed.

Expectations and Objective of Sub Project Interventions

The sub project information of the LGED showed the project aimed flood control and drainage (FCD). It intended to control flooding by saline water from the Rupsa River and NarayankhaliKhal and thus secure cultivation of paddy. The drainage improvement through excavation of several canals intended to increase crop yield by removing water-logging. It was also envisaged that control of salt water entry will improve social and environmental conditions. The list of physical intervention shows construction of two fish screen which was intended to improveaquaculture by restricting entry of predator fishes.

Physical Environment

Around 1982/83 when there was no embankment, the whole area was flooded with tidal water (Gen FGD). Tide water entered the polder area from the rivers and the whole area was flooded twice a day. Entry of salt water was responsible for increased soil salinity and this continued until 1996 when LGED constructed embankment.

Although the construction of polder aimed mainly to protect crops, presently, people are building houses in the beel area due to increasing population and proximity to the city and establishment of the fish processing factories increased demand for housing and staying in the area. Use of khas land (also khas canals) for agriculture (also aquaculture, housing, business etc.) has increased due to population growth and urbanization (also, greed, linkage with power holders and poor governance). Increased price of land contributed to increased greed and grabbing of khas land and khas canals.

2. FARMING SYSTEMS AND LIVELIHOODS

2.1. Change of cropping pattern in the past three decades

Cropping pattern and aquaculture changed over the past three decades mainly due to two factors. One is the growing importance of shrimp and prawn(here prawn is meant galda and shrimp is meant bagda) farming as export opportunity enhanced and subsequently shrimp and fish processing factories established in large numbers in the city of Khulna, along the RupsaMongla highway and on both sides of river Rupsa. The shrimp and fish (mostly brackish such as bagda, vetki, but presently also Tilapia)processing plants are located both within and in close proximity of the Jabusa Beel sub project area. In the recent years, besides shrimp and prawn farming, commercial production of various fresh water as well as brackish water fish expanded also targeting the growing local market.

Another factor bringing change in crop production and aquaculture is the construction of embankment with regulators protecting the crops as well as fish, shrimp and prawn. The change of cropping pattern and aquaculture over the past three decades is briefly described below:

Before 1980s: Only local Aman paddy was cultivated. Land was regularly inundated by tides and dried in the ebb-tides. Long stem local variety paddy was planted that could sustain in adverse condition. Yield was low to medium (Aman local 600-900 kg paddy/acre). There was no aquaculture as fish were available abundantly in the river and in the canals and beel. Sesame was second crop and yield was moderate, 200 kg/acre. FGD, KIIs and Follow up discussions.

1980s to 1996: Only Aman paddy was cultivated here before constructing the embankment and crop yield was very low, 600 kg paddy/acre (sometimes even less than 240 kg per acre). Shrimp and prawn export began to expand. Saline water entered into beel area and many people used to culture bagdain one season and paddy in another season. Paddy yield was low but shrimp farming was profitable, hence expanding. There was outsider leaseholder domination who took away all fish and local landowner farmers got only paddy.

After 1996: LGED constructed embankment in 1996. As a result, entry of salt water was controlled, risk of flooding, and water-logging reduced, crop protection measures improved. With this change, in place of local Aman, HYV Aman cultivation began. HYV Boro cultivation also began. Further to this, cultivation of sesame, winter vegetables and pulses increased and crop yield increased considerably. After constructing embankment, bagda area decreased and this has been taken up by increase of HYV Boro and expansion of Golda cultivation

2.2. Present Farming System

Overall landuse

Of the total area of about 930 ha within sub project boundary, 10% is occupied by industries and business establishments, 25% by housing and 5% by homestead ponds. The remaining 60% is crop farming and aquaculture area.

Farming Systems in the Beel Area

Aus paddy is not cultivated in this polder area as HYV Boro expanded and it considerably overlaps aus season. So, one dominant farming system is keeping land fallow in Aus season, then cultivating Aman Paddy (mainly local variety) during Aug-Dec, then HYV Boro (Feb-May). This combination, Aman and HYV boro can either be mixed paddy fish cultivation in the same plot which is found in 20% of the beel area or without mixing paddy and fish which is found in about 60% of the beel area. Another important farming system is keeping land fallow in aus (Apr-July) season because of overlapping with vegetables (Year round), chili (Dec-May) and sesame (Feb-May), then cultivating Aman HYV (Aug-Dec), then sesame, winter vegetables, chili etc. This farming system is found in about 20% of the beel area.

Details of crop seasons are provided later in Table 7.

A few representative answers of the respondents concerning the types of crops produced are noted below:

- Presently bagda cultivation is restricted. Paddy is cultivated in the monsoon (Aman) season.
- People now cultivate paddy also in the dry season with ground water irrigation (HYV Boro)
- Now, (mainly) two crops are grown, Aman paddy and HYV Boro paddy.
- Earlier, almost every household of our village had 15/16 livestock (GFD)
- Now a days, 2/3 livestock might be seen in ten households together due to lack of grazing lands (GFD)
- After construction of the embankment, people started to cultivate Aman paddy in low lying lands and BR 23 & BR 11 in high lands (Gen FGD)
- Some people cultivate local varieties of Aman paddy like balam, jutabalam, moynamoti etc. in the high land. (Gen FGD)
- Some farmers cultivate morishail paddy (Local Aman) in the southern part of the polder.
- People cultivate vegetables in the high land (FGD) and on gher dykes (follow up discussion)
- Earlier (before mid 1980s) different types of vegetable and fruits e.g. sesame, mustard seed, watermelon, onion, jinga, melon etc were produced in this area (KII-Paddy farmer)
- But now these crops are not cultivated because now there is saline water (in areas Gopeirkhal in the south) where salt water still taken in for bagda farming. (KII-Paddy farmer and follow up discussion)
- After the embankment fish and Aman paddy and Boro HYV paddy are cultivated. After harvesting the Aman paddy HYV Boro paddy cultivated grows by DTW irrigation.
- Various kinds of vegetables grow throughout the years. Water melon, Mashkolai, melon etc everything grows here. (WMCA)
- Before the embankment BoroHYV paddy was not grown. But now in the rainy season Aman paddy cultivated and in the end of winter season Boro paddy is planted. (WMCA).
- Vegetable is growing well after construction of the embankment.
- Paddy and fish farming combined
- Fish is cultured here throughout the year (in the canals leased to individuals or groups). Profit Tk. 10-12 thousand per bigha

Area under various crops

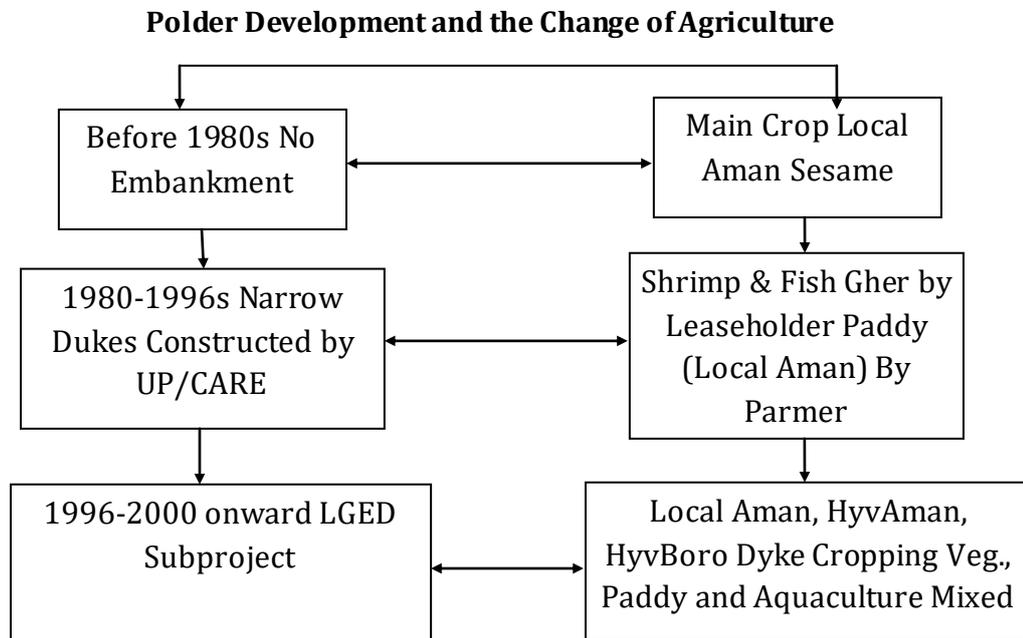
Area under various crops and aquaculture of the beel area is following:

- HYV Boro – 75% of the beel area (52% of total area)
- Aman local – 60 % of the beel area (36% of total area)
- Aman HYV – 40% of the beel area (24% of total area)
- Sesame – 20% of the beel area (12% of total area)
- Pulses, chili, winter vegetables- 5% (3% of total area)
- Dyke cropping – 5% of beel area (3% of total area)
- Mixed paddy farming with golda and fish – 20% of the beel (12% of total) area; 10 months fish (golda, parse, Tilapia)

(Source: Follow up discussion with WMCA President, a WMCA EC Member and two farmers)

2.3. Change of Agriculture with Polder Development

Figure – 1 below provides a brief note of the polder development and the change of the agricultural production comprising all three sub sectors, crops, livestock and fisheries.



2.4. Irrigation sources

Cultivation of Aman is based on irrigation by gravity flow from the river and canals. The sluice gates are opened in the month of Ashar (June-July). During this time salinity goes down and fresh water from the rivers enter the beel area through the sluice gates and the canals. Aman paddy is planted in August to mid-September and during this period enough rains fill the khal and the beel. Hence irrigation by pumps is not needed. But it requires drainage of water if there is excess rainfall. In such need, the sluice gates are opened to drain water.

HYV Boro cultivation starts with drawing fresh water from the river in January-February when river water is not yet salty. In February, the canals are filled with fresh water to irrigate adjoining area. In March river water becomes salty and the sluice gates are closed. Then Deep Tube Wells (500-600 feet deep) are used to lift ground water which is less saline. Diesel operated engine or electricity operated motors are used to run the shallow tube wells. On the whole, about one half of the water need for HYV Boro cultivation is met by fresh water taken from the river and the other half comes from the DTWs.

Bagda farming is limited to Gupier khal and adjoining land. For bagda cultivation salt water is taken from the rivers to the canal from this canal to the beel during February to May/June. Bagda farming continues up to July. The bagdagher owners bring in and drain out water throughout the period but inner part of the canal is closed converting it to private aquaculture pond.

Other canals are kept closed from February to June to prevent salt water entry. In July/Aug to early September, river water is taken in for paddy cultivation and aquaculture of golda, parse, Tilapia, Ruhi, Katla and other fresh water fish.

A few of the respondents' replies concerning irrigation reveal the following:

Farmers cultivate Amanpaddy with water from khal during rainy season but use deep tube well during the dry season to cultivate HYV Boro. Farmers use ground water for about three months during March-May when rain fall is low and the canals dry. The deep tube wells are run by diesel or electricity operated motors.

Also, the farmers preserve fresh water in the canals taken from the rivers in Dec-Jan when river water is not yet saline. Farmers use preserved water for irrigation during Jan-Feb. Farmers culture fish in gher drawing water from river through canal in rainy season starting from Bangla month Ashar (July).

In limited area farmers cultivate bagda (in the south) during Feb-Jun, when river water becomes saline. Production of other crop not possible this time In some area. So saline water from the river is used for bagda farming, said the UP Chair in the KII, but the main reason is that people like him control the gates and canals and can hence can take saline water in.

2.5. Productivity and Cost & Return

Before 1980s when bagda farming did not expand, only one major crop was cultivated, local Aman. Yield of paddy per acre was about 600-900 kg or 400-600 kg rice. This is equivalent to 1.093 to 1.324 Metric Tonriceper ha. Second important crop was sesame having yield of 200 kg per acre or 494 kg per ha. Vegetables, melon, water melon etc. were minor crops.

Between 1980s to mid 1990s, main crop was bagda shrimp grown during Feb-July and yield per ha about 600 kg. In today's market price it is worth Tk. 360,000. In addition, another 1800 kg fin fish/ha and small shrimp were produced which is worth another amount of Tk. 360,000. The fin fish species were mainly brackish water species like parse, tengra, bele, vertki, patari ect.). In that time yearly profit was above 100 percent. During this period, crop yield declined as salinity increased – (Follow up discussion). Only about 600 kg paddy or 400 kg rice was produced per acre or 988 kg rice/ha, only about one 40% yields of pre-1980s. So, paddy farming was not profitable. Interestingly, leaseholders got all fish and shrimp and the local landowner farmers got only paddy which gave negative profit.

After 1996, crop productivity increased, high yielding variety of crops expanded, bagda shrimp declined but, golda and fish farming integrated with paddy production in about 25% area.

Cost and return of HYV Boro production

Present cost of production of HYV Boro paddy per acre is estimated Tk. 14,000 (Tillage 2000, seed/sapling 1000, fertilizer and pesticide 3000, Irrigation 3000, hired labour 5000). Expected yield is 40 mounds paddy per acre or 2.6 MT rice per ha. Market value of the produce per acre is Tk. 28,000. Profit is only Tk. 14,000 per acre. If one deducts imputed value of rent, Tk. 8000 per acre for paddy season, profit comes down to Tk. 6,000 per acre. If one deducts the opportunity cost of family labor, Tk. 3000 per acre, the farmer is earning a profit of k. 3,000 per acre–Follow up discussion with WMCA president and farmers producing bagda, fish and paddy

Cost and return of producing HYV Aman

Cost of cultivation of HYV Aman paddy is estimated Tk. 6000 per acre (Tillage Tk. 2000, seed sapling 1000, fertilizer/pesticide 2000, irrigation 500 and hired labour 1500). Expected yield is

1200 kg paddy per acre or 1.96 MT rice per ha. Market value of paddy produced per acre is Tk. 24,000. Profit per acre is Tk. 16,000. If one deducts imputed rent of Tk. 4000 per acre and opportunity cost of family labour Tk, 2000 per acre, then the net profit stands at around Tk. 10,000 per acre.

Cost and return of producing Local Aman

Cost of cultivation of HYV Aman paddy is estimated Tk. 5000 per acre (Tillage Tk. 2000, seed sapling 1000, fertilizer/pesticide 1000, irrigation 00 and hired labour 1000). Expected yield is 1000 kg paddy per acre or 1.6 MT rice per ha. Market value of paddy produced per acre is Tk. 20,000. Profit per acre is Tk. 15,000. If one deducts imputed rent of Tk. 4000 per acre and opportunity cost of family labour Tk, 2000 per acre, then the net profit stands at around Tk. 9,000 per acre.

Cost and return of bagda and golda shrimp with fish

Cost of cultivation and estimated return from mixed one acre shrimp and Tilapia farming:

Shrimp fry 6,000 nos.	Tk. 4,800
Golda fries 5,000 nos.	Tk. 12,500
Dyke repair	Tk. 2,000
Lab cost (hired)	Tk. 4,000
Tilpia/ parse fish fries	Tk. 2,000
Irrigation	Tk. 1,000
Others Bamboo, fishing trap	Tk. 2,000
Rent	Tk. 4,000
Total:	<u>Tk. 32,300</u>

Value of output

Shrimp 80 kg @ 400	Tk.	32,000
Golda 50 kg @ 500	Tk.	25,000
Ruhi, katla, carp 100 kg	Tk.	12,000
Tilapia and other fish 200 kg	Tk.	12,000
Total		<u>81,000</u>
Gross return		48,700
Family lab		15,000
Net return Tk.		<u>33,000</u>

Source: (1) KII with a farmer, involved in fish, shrimp and paddy farming as well as fish business

(2) Telephone interview with WMCA President and a WMCA member

Table - 7: Cropping Pattern and Farming System

Crop/ Fish	Variety	Season	Duration	Irrigation	Yield/acre	Gross and Net Return (Tk/Acre)	Remarks
Paddy	Aman Local	Kharif 2	August-Dec	Rain+ canals	Paddy 1000 kg	Gross 15,000 Net 9,000	40% of the beel area
Paddy	Aman HYV	Kharif 2	Sep-Dec	Rain+ canals	Paddy 1200 kg	Gross 16,000 Net 10,000	60% of the beel area
Paddy	Boro HYV	Boro/Robi	Jan-May	Rivers Jan-Feb. Reserve water in canals partly: Mar-Apr DTW- March-May	1600 kg paddy	Gross 14,000 Net 3,000	70% of beel area
Shrimp	Shrimp,	Robi and	Feb-July	Salt water	Bagda 100	Gross 81,000	20% area

Bagda & Fish	Tilapia, Parse, Ruhi, Katla, small shrimp (harina)	Kharif 1		from river	kg Other fish 300 kg	Net 33,000 (6 months)	
Golda & Fish	Golda, Tilapia, Ruhi, Katla, Parse	Kharif 1 and 2 overlapped	June-Dec	Fresh water from river canal when salinity decreases after monsoon rains	Golda 100 kg, Other fish 300 kg	Gross 84,000 Net 37,000 (10 months)	20% area combined fish and paddy farming
Oil seed	Sesame	Robi	Feb-May	No irrigation	240 kg		20% area
Vegetables & Fruits	Vegetables, water melon, melon, banana, papaya, arum	Round the year	Round the year	No irrigation, partly from canal, gher	2000 kg		5-10% area (homestead, elevated land, gher dyke)

Table - 8: Cropping Seasons

Crop/ Fish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AmanLoc												
Aman HYV												
Boro HYV												
Sesame												
Fish & bagda												
Fish & Golda												
Veg/ fruits												

2.6. Livestock

All participants said that the number of livestock decreased, particularly the number of cattle and buffaloes declined substantially. Reasons stated are: decrease of grazing area, increased price of straw which the main fodder (Gen FGD). Another reason for the decrease is that; farmers use tractor for tillage rather than cattle or buffaloes. So, they have reduced cattle and buffalo rearing. One KII participant owning 17 bigha land and renting in another 15 bigha said (fish and paddy farmer and also involved in fish business) that he had 20-30 cattle in the past, now he has only 3 cattle, two bulls and a cow. During follow up discussion, the informant said that, 15-20 years ago people had many buffaloes and cattle. Now buffaloes seen very rarely and cattle declined. He has also indicated that farmers do not have enough space in the house to build cattle and buffalo sheds

big enough as they could 15-20 years ago. This happened for increased pressure on land to accommodate growing population.

2.7. Livelihoods

Besides paddy cultivation, open water fishing and livestock rearing were two main occupations before 1980s. During 1980s to 1996 shrimp and fish farming expanded but profit of aquaculture accrued to the outsider leaseholders. Local land owners had just one occupation, paddy cultivation but that was not economically rewarding. Landless people worked as wage labor in the gher and at a later stage, in the fish processing factories and shrimp depots. Shrimp fry collection emerged as an important economic activity. Men caught fries with larger net and boat while women and children caught fries in the shallow water near the shore with smaller pull nets.

During 1980s to 1996, paddy cultivation was not profitable, landowner farmers lost employing capacity (because their income declined) hence employment opportunity for the landless shrunk. Therefore, the landless, mainly men, seasonally migrated to other districts for work as agricultural wage labour, earth cutting labour, mason helper, brick field worker and rickshaw driver.

After 1996 when the embankment was constructed and local landowners, rather than outsider leaseholders took control of paddy farming themselves and started mixed aquaculture and crop farming, employment opportunity within Jabusa Beel area expanded. Now, those owning land or has financial solvency and capacity within household to operate mixed agriculture and aquaculture are in farming. The landless are working as farm labour, particularly men. Women are now working in large number in the shrimp and fish processing factories (women because they accept lower salary, and women workers prefer industry work for more regular work opportunity while earthwork opportunity is very casual).

A few representative answers of the participants concerning livelihoods are noted below:

In the past, until mid 1980s. open water capture fishery was an important sub sector. At that time, different species of fishes like bagda, patari, parshe, bele, khurkuna, horinachingri, chali were abundant in the canals and beel area. But these are not found at present due to destructive fishing and over fishing. Also fishers access to the canals and bells declined from that period when commercial farming of bagda and golda expanded.

Many people still catch fish in the river with net but catch per fisher per day (catch per unit effort) is low. In the past, fish fries and shrimp prawn fries were abundant in the rivers, but now rarely found. Many poor people are still engaged in shrimp, prawn and fish fry catching. But their number decreased as availability decreased and also income from this source decreased despite increasing price of fish and shrimp fries caught from nature (price of hatchery produced fry is lower, still natural fries preferred as hatchery fries have low survival rate and high risk of virus infection).

Before constructing embankment, only Amanpaddy was grown in the land. In other seasons employment opportunity was low. Therefore, many of the small farmers and landless went outside for the work. Now crops are cultivated in all three seasons. As a result, people's economic condition improved compared to pre-1996. Further, lots of industries have developed here. People are coming from outside to work here as the local people are not sufficient for the industries, agriculture and aquaculture taken together.

Besides increased cropping intensity, modern variety Aman paddy and HYV Boro are now cultivated that increased yield as well as demand for labour.. In the past most of the time, livestock e.g. cows died by eating grasses grown in saline water number of cattle declined but survival rate improved.

Although cattle and buffalo rearing declined, poultry rearing has not decreased. For many, it is hard to work in shrimp industry due to severe cold. Hence many women, not so poor, have increased poultry rearing as a livelihood.

To sum up, employment opportunities increased in crop farming, aquaculture and industries, mainly in frozen food (shrimp, prawn processing).

3. PHYSICAL CHARACTERISTICS OF THE JABUSA BEEL SUB PROJECT

3.1. Condition of the embankment

About 8.42 kms of embankment of the Jabusa Beel Sub Project was constructed by the LGED in 1996 along the east bank of the river Rupsa and along Narayankhali canal in the west and south. Other two sides are surrounded by the KhunaMongla old highway. The embankment was again rehabilitated four years later in 2000 but regular maintenance is lacking. Therefore the condition of the embankment is not satisfactory as evident from the FGD and KII notes.

A few of the remarks of the participants about the embankment condition are noted below:

- Two kilometers of embankment has been damaged (KII-paddy farmer)
- Often height of embankment reduces due to lack of maintenance.
- Some people put illegal dredgers and lifting sand, due to this the embankment is in vulnerable condition (KII-paddy farmer)
- Lots of pores have been created through the embankment, particularly in the southwest. (Gen FGD)
- Condition of the embankment at Nimtola (South of Jemini gate near Rupsa bridge) is very bad. (Gen FGD)
- We get fear during monsoon each year due to the high risk to be flooded by damaging the embankment (Gen FGD)
- The embankment near no. 1 sluice gate of Haraniakhal tends to be damaged during goanor fortnightly strong tides (Gen FGD)
- Saline water entered in the village by breaking the embankment adjacent to the river near Nimtola a week ago (Gen FGD)
- Embankment is constructed with loose soil hence washed away in a few years (Gen FGD)
- Salt water intrudes due to pipe causing damage to embankment (Southwest). We managed to remove 3 pipes but. (KII-Secretary).

Picture: damaged embankment in the downstream (south) of Rupsa bridge



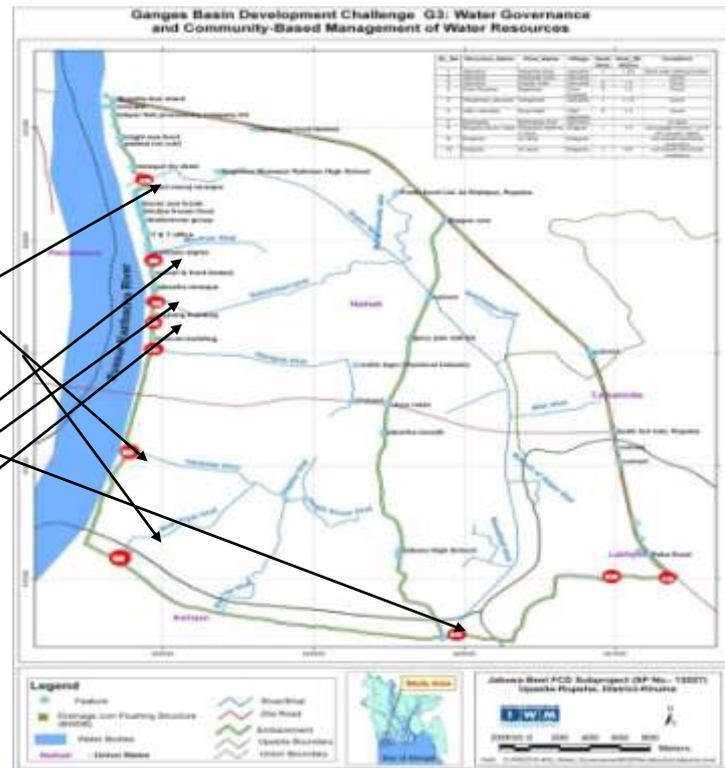
3.2. Condition of Sluice gates

LGED Gates

It is revealed from LGED sub project information that they have constructed five regulators and two fish screens. These structures are located at the meeting points of the canals to the river Rupsa and Narayankhali canal. The relevant canals having these structures are:

- Haraniakhal, gate number 1, in the southwest
- Noashiyarkhal, gate number 2, in the southwest
- Gopierkhal, gate number 3 in southeast and
- Gate number 4 in the west
- Horighoshkhal, gate number 5, in the west
- Sukurmarikhal, gate number 6, in the west
- Batargatekhal, gate number 7, in the west

In addition to the above seven, three more structures are found in the IWM map. These are: Modnarkhal, gate number 8, in the west, and Structure numbers 9 and 10 are located in the southeast. The last two gates do not have any link canal as seen in the IWM map.



The IWM map legend shows all of the above 10 structures belonging LGED/BWDB.

Of the above 10 gates, seven are one to three vent structures and the remaining three are pipe culver type regulators.

Structure information shown in the IWM map indicates that 5 of the 10 gates were in good condition and active (gates 2-6), one had broken railing but was still active (gate number 1), one was inactive as shutter was broken and canal silted (gate number 7). Two others in the extreme southeast administratively belong to a different district (FakirhatUpazila, Bagerhat) and were not surveyed by the IWM and also not covered by this study.



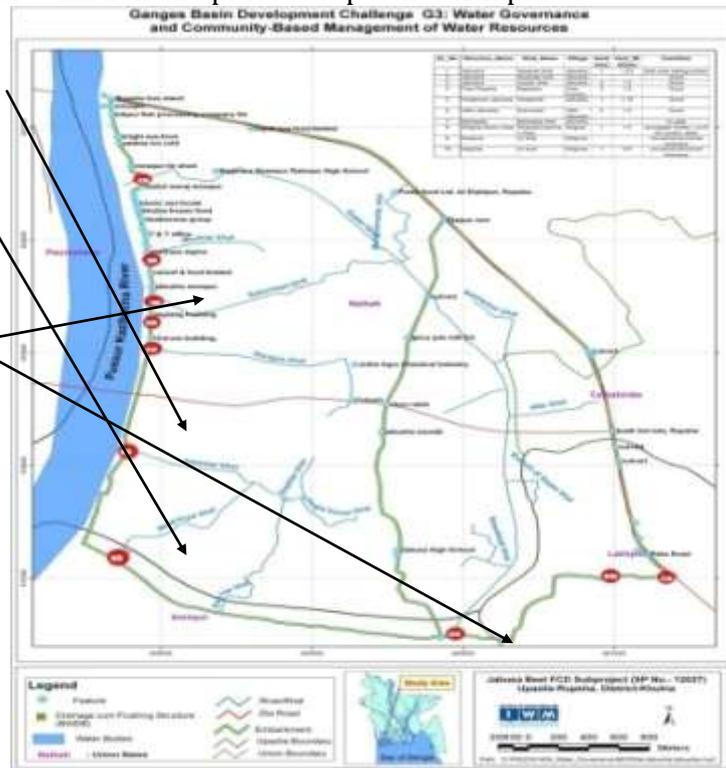


Pic: Sluice gate No 1: railing broken

Pic: Gate No 4 under repair

Information provided by the participants in the FGD and KIIs are however very different. They made a general remark that all sluice gates are in bad condition and provided specific examples as under:

- Sluice gates at Haranierkhalis not in good condition (gate number 1)
- Sluice gate at Noashierkhal is damaged (Gate number 2.
- Gupierkhal is partly open but its gate is not well. Shutter has broken. Cracks are created in the gate (gate number 3)
- Shukurmari gate is closed. (Gate number 6)
- Due to salt iron structure get damaged and eroded quickly. (KII with WMCA Secretary)



Private gates

Only two private gates could be traced and these two are Gemini Seafood private gate and Mr. Selim’s gate. The Gemini Seafood is a shrimp and fish process factory. They use the private gate to drain out waste materials and dirty water from the factory. Gemini Seafood gate is located near Rupsabridge while Mr. Jashim’s gate is located south of Horighoshkhal. These two gates are not seen in the IWM map. Mr. Jashim’s gate is used for fish and shrimp farming in his private gher. This information should however be read with caution that we know about two private gates. It is quite likely that other fish processing plants and industries, reportedly, around three dozen must also have private gate or drainage outlet for waste disposal. It is also quite likely that some other gher owners like Mr. Selim do have private gates or at least pipe inlets. These two therefore should be seen as example, not as counting by number.

The WMCA Secretary mentioned that some gher owners install pipes, he did not mention where and how many. He has however mentioned that the pipes cause damage to embankment and they have closed three such pipes. By follow up discussion with another WMCA member (the Secretary could not be reached by cell phone), it was learnt that the pipes are set in the southwest, to the south of

Rupsa bridge, because this area has only one LGED gate south of Horighoshkhal. These pipes were not listed in the IWM base maps.

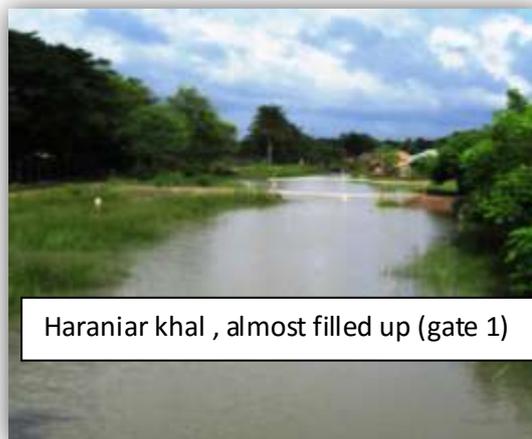
3.3. Condition of Canals

The FGD and the KIIs revealed that the canals have silted through a natural process. Although the LGED has re-excavated six canals, drainage system did not improve and whatever improvement done was short-lived as the canals silted again or influential quarters blocked them for private interest.

The general condition of the canals appeared very unsatisfactory as the UP chairman remarked that “Not a single canal in our locality is in good condition”.

The participants in the WMCA FGD provided elaboration of canal condition. Several of their comments are noted below:

- Shukurmari Canal is quite running. (WMCA) – served by gate number 6
- Noashiyer Canal- Mostis running. (WMCA) – served by gate number 2
- Harigosh Canal- little bit in running condition but in the process to die. (WMCA)- served by gate 5
- Gupier khal is partly in running condition (near the river) but the inner part closed by leaseholders and effectively divided it in to a good number of fish ponds. This is the most important canal connected to river Rupsa in the northwest and Narayankhalikhal in the south. It connects six major inner canals. – Follow up discussion – linked gates 3 & 4



Please note that all of the above five canals were re-excavated by the LGED

but they are not serving the purpose partly for natural process of siltation but more importantly for “canal grabbing”.

- Madner Canal- The mouth of this canal is blocked and front gate is damaged. -gate 8.
- Duailer Canal- Totally filled up. (WMCA)- no gate connected. Located in the south.
- Nosokhalikhal (in the east), not connected to any structure, hence comes to no use.

Canal Lease

The main issue in Jabusa Beel polder is canal lease. This came up prominently in the General FGD as well as in the KIIs. The general FGD in Modhya Para indicated that there are no private khals in Jabusa Beel area. Actually there are many (more than a dozen) khas canals. If these khas canals are effectively managed, the empolder should not face any water logging or problem of irrigation.

LGED has constructed embankment and sluice gated and also re-excavated half a dozen canals. But the drainage and irrigation problems could not be effectively managed simply because of canal grabbing by the leaseholders. Both the Upazila and district level land administration and the WMCA contributed negatively.

It seems that, in this subproject, everybody's (meaning those who can influence utilizing whatever means at hand) interest is to get lease of khal. The WMCA got lease of khal, until recently. After getting lease, they sub leased to influential gher owner or groups. From the holders of sublease, they got rent. Roughly one half of it was deposited to the government account as lease value. The other half accrued to the WMCA and this was utilized to pay for repair needed urgently in the embankment, structure or silt removal from the canals or gates.

It also happened that, influential gher owners were given sub lease not because they would manage the canal in the interest of general users, paddy and fish farmers and others, but simply because they are politically or socially more powerful and others would not be able to trouble them. Such people were simply told that they should take care of minor repair and take responsibility of operating the gate. Thus they were given sole authority to "control" the gate and the khal and utilizing this authority, they are cultivating shrimp with salt water taken in to the polder in February-May while paddy farmers would take in water in June-July when salinity goes down. Again, paddy farmers need to drain out excess water in August-September in order to plant Aman paddy but the gher owners delay drainage.



Pic: Part of leased Horigosh Canal

A few names came from the discussion but we should not disclose such names to avoid victimization of the informants. One Mr. K is in control of Noashiyarkhal who is a large shrimp gher owner. He brings in salt water and does not care negative impact on other farmers. The adjoining low lands are flooded with salt water. Another Mr. A. is entering salt water. These two are controlling substantial area near NoashiyarKhal and GopierKhal in the south.

They are allied to Mr. G. who is influential in both WMCA and a leading political party as well as to government administration. Interestingly, the informants speaking of such irregularities desired that "general people should get lease" but did not say that leasing and thus private control on khal should be stopped.

Interestingly, LGED was blamed for leasing khal which is not really LGED's job. This might have been said so, as LGED stands between the WMCA which might have got the lease from the district

administration and LGED was involved in getting the lease as per agreement with the ministry of land.

It is evident from the statement of the general FGD Modhyapara that those who get sub lease from the WMCA contribute money to WMCA for repair work. The WMCA however leases to members only. Of course, Mr. K, A and G are all WMCA members but powerful members. Powerless general members are unlikely to get lease and getting lease requires linkage with the party in power.

The general FGD participants also said that the leaseholders culture shrimp and fish in the khal and take control of adjoining beel area to make large gher. Water management is thus handed over from the WMCA to the gher owners. This is however given cover by forming subcommittee or gate committee in which such influential people get effective control. The WMCA Secretary who has strong alliance with the ruling party tended to hide conflicts but still agreed that the government, meaning DC/UNO give leases canals to influential people and remarked that the WMCA should get lease. To people like him, it is immaterial whether the WMCA or “influential people” get lease, because he will be effectively controlling either as private lease holder or as WMCA leader.

The WMCA FGD participants stated that the DC and UNO lease out canal to influential people on the plea of earning revenue for the government. This group referred to an inter-ministerial decision that the water management committee would get lease of khal at nominal lease and they will manage the khal in the common interest of local people. But the DC/UNO, in their words, the DC and UNO do not want to understand the essence of this decision. They give lease to highest bidder and getting influenced “politically”. They wanted to mean that, the WMCA cannot bid high as they would utilize resource ensuring sustainability and people’s interest. So, they are not likely to earn much. And, the earnings are meant to be spent for repair and maintenance and other expenses of the WMCA. The gher owners can bid high as they earn profit.

The above statement is partially correct. But the WMCA itself sub leased the canals to gher owners and the resource was not managed in “people’s interest” and no considering, not to mention sustainability. Further, the bureaucracy got a weapon to lease out to other party as the WMCA failed to pay lease money of the preceding year. The other party is a sort of pocket committee of Mr. A. mentioned earlier. The bureaucracy followed rule, not just leasing to highest bidder, but the bidder is a somiti (association of local fish farmers). The leaseholder who got lease of Gupierkhal has blocked it, divided it in to nine parts, now looking like several fish ponds.

The fish farmer and the CO of LGED met in the KII also said that the canals are leased by the WMCA to its members who use the canal for aquaculture without considering the interest of other farmers.

The WMCA Secretary said that its members got lease of khal in the past and this was a good source of income of the organization. But this source is now closed as government now controls lease. He has also mentioned that many of the sublease holders did not pay lease money to the WMCA, hence the WMCA was unable to deposit lease money to the government account.

The UP Chairman said in the KII that the WMCA sub leased canals to its members. Interestingly, the Chairman himself was one of the sublease holders. He stated that the sub lease holders effectively controls the canals and the gates concerned according to their wish, rather than public interest. He got sublease of 2 km of Sukurmarikhal while Mr. S got direct lease from the WMCA. He said, being

UP Chair, he had to care local people's interest and managed it not just for profit but in cooperation with local farmers. The team could not cross check which would be impolite we did not intend to spy.

One UP Member in the KII stated that the WMCA misuses money earned by subleasing canals. He mentioned clearly that the Gopierkhal and Horoghoshkhal under control of Mr. A., noted earlier. Mr. A got lease from the DC office. He opined that general people are affected for leasing canals. When general people want to close the gate to stop salt water entry, the leaseholders keep the gate open to bring in salt water even if other farmers' low lands are flooded. Also, they deny opening gate when farmers need to drain out excess water before planting Aman paddy.

The UP Member also said that, in the past, the UP had a role to lease canals. They could lease out small water bodies, each below 3 acres. For others, they were consulted. Now everything has gone to the UNO and DC.

3.4. Main water-related problems

General FGD held at JabusaModhyapara indicated that riverbank erosion, siltation of the canals and difficulty of getting water for irrigation (for HYV Boro paddy) as three main problems. They have also identified frequent power cut was a main problem as it affects irrigation. Another problem identified by the same group was inactivity of the WMCA.

The general FGD held at SouthparaJabusa riverbank erosion and siltation of the canals and water-logging as main problems. They have also identified power shortage as a main problem.

The WMCA the problems as: (1) bureaucracy works slowly, (2) many members using canal for aquaculture did not pay the lease money hence the WMCA could not deposit lease money to the government account, (3) maintenance worsened, and (4) the LGED could not fulfill their promise to support major repair while the WMCA could not carry out minor repair on regular basis due to fund shortage.

The LCS group that the embankment is not repaired regularly hence its condition deteriorated, particularly in the south of Rupsa Bridge.

The paddy farmer said that the DTW water has high iron content, hence less suitable for irrigation, but they are using it. Three main problems identified by this group were riverbank erosion, water logging and siltation. The fish farmer interviewed also identified erosion and water logging as main problem and added cyclone as one of the three main problems.

The WMCA Secretary reported that everything was managed nicely, hence there was no problem. However, he indicated that the adjoining industries are throwing waste materials and polluting soil and water that affect both fish and crop farming.

The participants indicated several causes of the problems some of them are natural such as depth of the river Rupsa is high and current is strong downstream of Khulna City and the Rupsa bridge. The result is higher riverbank erosion

While riverbank erosion is main problem in the west side of the polder along the river Rupsa, the inner canals are getting silted as silt getting in are not drained out. Also, due to closing of canals obstructing natural flow, silt deposition is not distributed over the whole beel area, rather get stuck in the canal bed. Hence the canals are dying.

Riverbank erosion has been accelerated after construction of Rupsa bridge as current diverted to village side for protecting the bridge and the urban areas. The result is increased erosion in the village side.

However, most important constraints to water management are gradual dying of the canals caused by natural process of siltation but more importantly by canal grabbing. Present condition of several canals are shown in the box. A few are still flowing but most others silted or closed.

- Sukurmari Canal is quite in running condition – served by gate number 6.
- Noashiyer Canal is in running condition – served by gate number 2.
- Harigosh Canal- little bit in running condition but is in the process to die. - served by gate 5.
- Gupier khal is partly in running condition (near the river) but the inner part is closed by leaseholders and effectively divided it in to a good number of fish ponds. This is the most important canal with several branch canals and served by gate number 3 (still open) and 4 (closed).
- Haraniar khal (gate 1) almost fully silted.
- All five were excavated by the LGED but the purpose of excavation not served.
- Gate 8 damaged and closed and its canal Modnar khal closed.

Water pollution from shrimp processing industries:

The water from the canal is polluted since industries drain their waste through the canals. The pollution is damageable for fish cultivation and the users underlined the absence of compensation for their loss. The only way to clean the water from pollution and to drain out the industrial wastage is to use the high tide to flush in clean water. (Source: field report July by Marie-Charlotte Buisson (IWMI), Arijit Das (IWMI). This can save canals but pollute larger area, the river. Ideally, and legally, the industries should have Effluent Treatment Plant.

4. LGED: ADDRESSING WATER INFRASTRUCTURE PROBLEMS

To improve water management infrastructure and manage them effectively, the LGED made some engineering interventions and helped establishing a community level Water Management Cooperative Association. The LGED activities carried out in the pre-project, during project band after project are briefly described in this section.

4.1. LGED and WMCA Pre-Project Activities

- LGED formed a committee involving all levels of people of 13 villages located in and around the Jabusa Beel area.
- The organization thus established is called Jabusa Beel Water Management Cooperative Association (WMCA)

- Member of Parliament and Whip Mr. Sujap played an important role to form the WMCA and bring the project to this area.
- Besides the WMCA, the LCS groups were formed. (LCS-M)
- The LGED facilitated formation of the cooperative and getting it registered.

WMCA Membership Composition

The cooperative has been formed with farmers and fishermen from thirteen villages. Initially, the committee had 25 founder members and it has increased to 748. The WMCA a general body of all members and an EC comprising 12 members.

The cooperative is responsible for operating and maintaining the water management infrastructure and their use for the benefit of all local people.

Number of gGeneral members of WMCA is gradually decreasing in the sense that many are inactive and not depositing monthly savings. Therefore number of active members is low.

Members are becoming inactive due to lack of transparency and public accountability of GoB meaning LGED and local administration (WMCA) but they did not mention for the poor performance of the WMCA it self .

Many people want membership to get lease of canal. Canal cannot be taken on a lease without membership of the WMCA.

Many also wanted to be enrolled as WMCA member to take loan from the WMCA.

Initially, everything went well, general members were happy seeing that the infrastructures are built, landless were happy as they could work in the LCS, and women were happy for getting access to loan as well as enrolled in the LCS, peoples' views were honored in the design and site selection and the influential ones were happy as they could get lease of canals. But when the canals were grabbed by the elite, several gates closed, WMCA investment in several enterprises an aquaculture failed to bring profit, loans fell overdue, and the committee elite captured, general members' confidence on the leaders diminished. As a result most members became inactive.

Sub Committees

The WMCA has sub committees. These are

Gate committee: formed with farmers and fishers of the command area of each gate

The Gate Committees discuss about demand of water and decide opening and closing of the gates. The loan committee disburses loan to members and recovers the loans.

The canal Committee: There is a committee to maintain the canal. People living in the canal area look after the gate and are included in the concerned canal committee. They canal committee members catch fish and for getting this right, they pay a fee as lease value. This is a sort of buying fishing right or right to aquaculture in the concerned canal. By dint of this right the canal committee effectively takes control of the canal and the gate. The WMCA deposits the income received as fee from the canal committee to the bank and the income is supposed to be spent to pay lease value to the government and part of it is supposed to be spent for repair work. But actually fees are not paid and the WMCA fails to pay lease value. Therefore, the WMCA failed to get lease of canal in the recent past. The WMCA says that the canal committee plays main role in digging canal but in reality they do very little except making occasional donation for repair on emergencies. This contribution is far below the amount what should have paid as fee, not to mention, the loss made to other users by denying their right to access the gate and canal equitably. If that were done, even nominal fee collected from the users could yield much higher revenue besides general welfare to all.

Membership Contributions

Membership Fee: Admission Fee is Tk. 200 or two shares of the WMCA contributed by each member while admitted. In addition each member deposits a monthly savings of Tk. 10. But income from both sources has diminished as no new member is admitted now and the existing members stopped depositing savings.

4.2. LGED and WMCA during project implementation

During the project period 1996-2000, the LGED implemented the following works:

Table 7: Physical Interventions of LGED in the Jabusa Beel Sub Project Area

SL	Interventions	Quantification	Cost (TK)
1	Embankment re-sectioning	5.66 km	1,663,134
2	Embankment rehabilitation	2.76 km	542,800
3	Re-excavate Gupierkhal	0.90 km	55,818
4	Re-excavate Sukurmarikhal	2.37 km	119,235
5	Re-excavate Noashiyarkhal	1.25 km	338,777
6	Re-excavate Haraniarkhal	1.50 km	183,583
7	Re-excavate Haraniarkhal branch	0.64 km	145,542
8	Rehabilitate Gopierkhal	1.0 km	197,114
9	Re-excavate Horighoshkhal	1.78 km	526,241
10	Regulator at Gupierkhal	2V (1.5m*1.8m)	4,249,288
11	Regulator at Haraniarkhal	1V (1.2m*1.5m)	1,717,884
12	Regulator at Sukurmarikhal	2V (1.5*1.8m)	4,134,0217
13	Regulator at Horighosh (Box sluice)	1V (1.2*1.2m)	1,432,961
14	Regulator at Noashiyarkhal (pipe sluice)	1V (0.9m dia)	962,981
15	Fish screen at Sukurmarikhal		51,397
16	Fish screen at Gupierkhal		51,397
	TOTAL		17,175,549

Besides implementing the abovementioned works, LGED's main role during the project implementation period was to continue support to the WMCA so that they actively participate in the project activities, their organizational capacity enhanced and become ready to take over the operation and maintenance, particularly of minor repair, re-excavation and day to day operation.

Besides WMCA, the LGED assisted formation of LCS groups and earthwork was allocated to such groups. This was to ensure quality of construction assuming that local labour will do the work better as they are also its users and it has direct impact on their life and livelihoods.

It revealed from the FGD in KII information that the WMCA was functioning well in the past but not now. This implies that, during the formation and implementation stage there was enthusiasm and initial boost up partly because having project benefit in their favour and partly because there were ongoing activities to participate and benefit from, such as employment for the LCS groups and enough work for the leaders to show up.

WMCA and ability to influence design

In the formation stage and during implementation, the WMCA was quite active. In that stage, the WMCA meetings were held fairly regularly and the LGED engineers and CO visited quite frequently. Also the WMCA had interaction with the general member. Besides the engineering surveys, the LGED held consultation with the WMCA and the local communities. Therefore, the WMCA had good opportunities to suggest alignment of embankment, location of structures, and identify canal excavation areas. The WMCA president and other members discussed over cell phone said that their opinions were valued by the LGED, hence they were able to influence site selection, design, prioritization etc.

Election and representativeness

Initially the committee comprised members taken by selection and those participated spontaneously and on a regular basis were the early members (the first 25 members who agreed to join spontaneously and accepted by the LGED). Thereafter election of Executive Committee has been held every 3 years. The last EC election was held on 25th October 2010 and this remains valid up to 24th Oct 2013. In the last election 3 women members were selected by the nine elected members. Of the nine male members, seven were elected without contest including president and two positions contested were Secretary and Joint Secretary. Out of 748 general members voter turnout was about 600 and the election was held almost like UP election. The first committee was selected and in late 1990s another committee was formed by political interference. Since 2000 election have been held every three years.

Training

During the WMCA formation and project implementation stage, the LGED provided various types of training to the WMCA members and the staff. The training comprised both organization management aspects like accounting, audit, compliance of cooperative rules and awareness about water management policy, guidelines as well as agriculture and aquaculture.

The training has been useful but change of EC member every three years require new training as well as refresher training. This is a huge task. Rotational membership, say changing one third of the members each year rather than all every three years would be a good strategy. Training programs are organized when fund is available usually from project.

4.3. LGED and WMCA post-intervention

The LGED continued support to the WMCA after completing the main construction work during 19996-2000. LGEDs regular support is provided to the WMCA through preparation of the O&M plan on yearly basis. It is LGED's policy that they take care of "major repair" while the WMCA is assigned responsibility to take care of "minor repair". This policy was acknowledged by the WMCA EC members as well as other participants met in the FGDs and KIIs.

It is evident from the LGED Sub Project information that the first O&M plan was prepared in 2000 demanding an allocation of Tk. 18610 against which the WMCA had Tk. 17025 and actual expenditure was 15825. The figures are small but for the first year, possibly need for repair was also low.

In 2003 onwards, the repair need seems to have increased as evident from the O&M plan of Tk. 260,403 but actual work done was much lower as seen by spending of Tk. 22150 only meaning that the bulk of the need was unfulfilled. In 2005, the O&M plan had shoot up to over Tk. 1.7 million but actual works done was for Tk. 61500 only. Possibly the O&M plant was ambitious and demanded some new structure. In 2008, O&M plan was prepared for Tk. 882,469 but actual spending was Tk. 120,000.

The activities of the LGED and the WMCA after project period are reflected in the following information obtained by the FGD and the KIIs:

- LGED prepares budget estimates for yearly O&M plan based on field observation.
- If any small work is needed the WMCA prepares an estimate and take get it approved by the LGED.
- If the work is implemented using the fund available in the O&M account of the WMCA (bank account operated jointly by the WMCA President and the Upazila Engineer), permission of higher authority is not needed.
- If there is need for allocating fund by the LGED then permission of Chief Engineer or Project Director is needed.
- WMCA is most powerful incase sluice gate maintenance, repair and re-excavation works as the project is handed over to the WMCA- (KI-CO, LGED)
- LGED is however responsible to provide technical support.
- LGED also provides fund for major repair. Recently, the LGED has provided a fund of Tk 292,000 for maintenance of embankment. (KI-CO, LGED)

Present financial condition of the WMCA

Financial solvency of the WMCA is very crucial as the institution has to take over the responsibility to O&M. But over the years their financial condition is deteriorating. Members' savings of Tk. 10 per month is not paid by members hence not regularly coming to the WMCA. Water management fee of Tk. 20 per bigha is also not collected and paid. The sub lease holder are not paying rent to the WMCA and new members entry is saturated as landless are not interested and also not encouraged to become members and most landowners are members already. So, admission fee is not coming and old member are not buying new shares, as the WMCA could not make profit, hence must not have paid dividends which could attract members to buy more shares.

Financial condition of WMCA is very bad. This is because it has collected Tk. 172,000share saving and Tk. 160,000 regular monthly savings. But this amount of money does not exist in reality, only a small amount of Tk. 19,000 is available at bank.

The WMCA invested Tk. 172,000 in Sonali Fish Hatchery but the company showed loss in project, so the WMCA money is blocked. Besides Tk. 130,000 is invested as loan (to members) but this is hard to recover. Tk. 30,000 spent to purchase furniture which was not very essential.

Sub lease holders of canals are not paying regularly and not the full amounts. The WMCA was supposed to earn substantial amount from this source. Now the canals are grabbed by influential members who are making profit at the cost of general farmers who are denied fair access to canals and structures.

The WMCA has no cash but deficit of Tk. 48,000.

Further to these, the WMCA has entered litigation with two of its members and now have to incur expenses on litigation.

Over the last two years lease value against canals could not be deposited to government account and therefore could not get lease of Gopier khal in the recent past.

It should be noted here that there is conflict in the WMCA, one faction is lead by the Secretary who blamed the present President for all irregularities or failure while President and some others blamed the Secretary for capitalizing his political and administrative connection for personal benefit, such as by taking lease of the Gopierkhal.

Interestingly, the secretary found everything running smoothly and everybody getting and draining water without facing any problem. But he is the person who mentioned of financial irregularities and fund crisis.

Participants' view of the WMCA performance

The above points answer why they remarked that:

The management of this cooperative has become very weak

The WMCA is also not working well currently.

In the past, WMCA cultured fish in Gupierkhal through the cooperative for the sake of WMCA. It was supposed to create a fund for the cooperative from this income. But the WMCA showed loss by false accounting as stated by the general FGD participants.

People became angry with this and the aquaculture project had to be closed within two years. As a result, general members lost confidence on the leaders although they have elected them by voting or did not challenge their leadership by nomination better candidates.

The power structure works against people's wish and therefore good people do not find interest to contest.

It is interesting that the WMCA EC members and other participants indicated that canal digging, gate construction and maintenance of polder etc can be done with the earning from khal if WMCA gets lease. This was a motivational statement. The WMCA was in control of all khal, They sub leased the khals, used them for aquaculture even depriving general farmers but it could not bring solvency to the WMCA and even the WMCA could not deposit lease money to government account.

Participants' view of the LGED performance

Participants' evaluation of the LGED performance was rather negative. They felt that the LGED always keeps the work half done. They also felt that the was doing well in the past (when there was project) but its performance was seen to have deteriorated. This remark is understandable. When there was project LGED was able to provide more support to build infrastructure but they cannot provide enough support for repair and maintenance.

One serious observation however concerns misappropriation of fund. The participants remarked that from an allocation of Tk. 300,000 only one third is utilized for real benefits to farmers.

4.4. Appraisal and actual achievements

Expected change of crop productivity

The sub project appraisal indicated that production of cereal crops, mainly rice, will increase from 2271 MT to 2920 MT. This is only about 29% increase. Actually cropping pattern has changed substantially. In the pre project period, only Aman paddy was produced now Aman is cultivated in nearly 100% area and HYV boro is cultivated in about 70% area. So, cropping intensity has increased. As fish and shrimp are combined with paddy and sesame and vegetables cover another 25-30% area, overall cropping intensity should be around 250 percent, very high in deed.

The appraised production level 2920 MT assuming 700 ha Aman area and 500 ha HYV Boro area requires average yield of 2.42 MT/ha. Boro HYV yield is already achieved is 3.3 MT and Aman yield achieved is 2.0. Therefore the appraised production level should have surpassed already and rice production in the Jabusa Beel area now should be about 3050 MT.

Environmental and institutional change

It was assumed that fish and shrimp farming will be stopped but it has rather integrated with paddy farming. Sustainable and pro poor water management was expected and the WMCA was expected to be taking over O&M responsibility. This objective however has not been achieved.

5. LABOUR CONTRACTING SOCIETIES

5.1. Formation and work with the WMCA

Formation of the LCS

One Labour Contracting Society (LCS) consisting of six landless men was interviewed at West para of Jabusa village of Naihati Union Parishad. The LCS is linked to the WMCA working in the Jabusa Sub Project area of LGED. It comprises 25 members. Six of them were present in the FGD. It was said that then MP of the area and Whip Mr. Suja helped formation of the WMCA and the LCS and he had a strong role to bring the LGED project to this area. The LGED facilitated formation of the LCS and the LCS was organized by the WMCA.

Information about number of LCS was confusing. The WMCA Secretary said in the KII that 12 LCSs were formed a few years back when they had an allocation of Tk. 22 lac. Of these 12, there were 3 LCSs comprising women members. It seems that these no longer exist as such huge works are not available now to the WMCA.

Currently there is no women LCS group, at least no active women LCS. The participants said that the women of Jabusa do not work outside as earthwork labour. Land less and poor however work in the processing factories. This is more secure employment and monthly salary based. Two of the six LCS members own 0.15 and 0.75 acres land. Others are reportedly landless owning no agricultural land.

LCS work

The LCS group is engaged in earthwork both under the LGED project through the WMCA when project work, such as repair of embankment or re-excavation of canal.

LCS Payment

The LCS members get payment on daily basis. Daily wage is reported Tk. 200. When work is ongoing, each worker gets an advance of Tk. 100 per day to meet up food expenses called khoraki. On completing the work, a full wage bill is made and after deducting advance the remaining amount is paid. In comparison to prevailing wage rate in Khulna and Rupsa, this is not an attractive wage. Market wage rate is 350 for men and 250 for women. But LCS workers actually works five hours and this is accepted as the local authority cannot pay higher wage.

5.2 LCS Livelihoods

LCS work is available only occasionally when some repair work is implemented by the WMCA and when LGED can provide fund. In a year, each LCS member finds work for only about two months. In the recent months, the LCS group interviewed had only 20 days work in one assignment. They were expecting another contract. In the rest of the year, they will have to find work elsewhere.

The six LCS members interviewed are engaged in a variety of work. One sprayed pesticides in the mango trees, one worked in the fish processing plant, one painted trees in the city street in festivals and all worked occasionally as agricultural wage labour. Two have own agricultural land and one invested money in shrimp gher as a partner. One respondent said that whatever work is available, they accept; be it work in the LCS when LGED gives work order or do other work when LCS work is not available. He said, he works there where money is available for a work. Actually, the LCS is not currently active because they do not have ongoing work. It is very clear, if one gets

employment for only 20 days or two months there is no reason to stay in the LCS. Still they accept the work when it is available as they are somehow compensated by relaxed work, 5 hours instead of usual 8 to 10 hours.

Standard of living

After joining LCS the LCS members' income increased as they have an additional income source. With this extra income their standard of living improved. Now they can make some investment in crop farming and aquaculture. A couple of LCS members said that they have invested in crop farming and one has Tk. 20,000 worth share in a large shrimp gher.

Agriculture and Irrigation

Two of the six LCS members interviewed own land and cultivate paddy. Others work as agricultural labour more often than LCS work. One has share in shrimp gher. The crops cultivated include Aman and HYV Boro paddy. Aman paddy is rain-fed but farmers also get water from canals during monsoon. For shrimp and fish farming, salt water is taken from rivers. For HYV boro freshwater is stored in the canals before salinity is increased and at a later stage DTW water is utilized.

Training

The LCS group met received no training from the LGED. The reason is that the group has no stability of membership as work availability is uncertain.

Source of drinking water

DTW is the main source of water for drinking. For other domestic use STW and ponds are used. Fifteen households combined applied for DTW and contributed Tk. 12,000 to BRAC and got DTW.

Specific problems

The LCS group members mentioned of a few problems. Firstly, the LCS work is available occasionally, not regularly. Hence the LCS members have to search work elsewhere. Therefore the groups do not last long. Whenever some new work assigned, the groups have to be formed again. The result is that, effectively, the LCS groups are gangs of earthwork labour.

5.3. Governance and water management

Accessible institution for complaints and problems

Both paddy farmers and aquaculture farmers face problem of water management for varying land elevation. When the high lands need more water, the low land has excess water already. So, problem arises. UP Chairman and members do not come to solve such conflicts. When farmers approach them, they simply instruct to solve mutually.

Role of Union Parishad in water management

The participants remarked that the UP does not have any role in water management. As they do not have any project, they can't take up any repair or re-excavation work. Also, they do not work cordially with WMCA. The political power holders do not support, rather create problem by grabbing canals and even by intervening election process. In the late 1990s, election was stopped and politically selected leaders were nominated and declare elected without contest.

Role of WMCA

The WMCA functions through sub committees. The most important one is gate committee relevant to each gate and khal. The Gate Committee members are taken from the nearest village from the gate and this coincides with the owners of the adjoining land. The large

landowners and gher owners get the key positions. It was said that the WMCA gives responsibility of localized water management to the gate specific committees in specific villagers. For example, most of the land in the south belongs to the villagers of south and eastern part of Gupierkhal. So, they are given responsibility to take care of the gate. Similarly inhabitants of North para are given responsible for Horigoshkhal Thus different communities in different areas play roles of gate operation Villagers of Elaipur and Bagmara take care of Shukurmari and Modonarkhal because most of the lands surrounding these khals belong to people of these two villages People of this area together take decision about opening the gate Repair work of polder done by WMCA through LCS.

The above means that the gate committee effectively take control of the gate rather than managing it for the benefit of all, not even all farmers or even not all land owners.

Participation

Very often when embankment breaks, government assistance are not available but local people have to repair. UP Members, Chairman, officers visit but do little. LGED helps but inadequately. The WMCA collects money from the land owners, gher owners and from various industrial and business enterprises, called “companies” having establishments in Jabusa Beel area.

Emergency response

Embankment is vulnerable particularly in the west and southwest along the river Rupsa. If embankment breaks, the LCS is engaged by the WMCA to repair although fund not available immediately.

Concerns and Suggestions of the LCS group

Sluice gates are damaged, like one at Haraniarkhal and the canals silted like Horigoshkhal. If this process continues and embankment breaks, the informant felt that their lands will be submerged it will not be possible to grow crops. This apprehension was expressed by saying that they will be “drowned”. Already during fortnightly high tides, embankment becomes very risky.

The LCS group suggested repairing the gates and the embankment. They suggested that the LGED should execute the works and they should have increased funding. Interestingly, while participants in general were very critical of the LGED’s present role (much low compared to project period) and performance, they still suggested that the LGED should execute future project. This is contradictory but not unexpected as they might have a feeling that LGED will come up with new project which will benefit them like before, so, let them come.

6. MAINTENANCE OF EMBANKMENTS, CANALS AND SLUICE GATES

6.1. Maintenance by LGED

The LGED has overall responsibility to maintain the polder infrastructure in Jabusa Beel area as the sub project is implemented by them. But the LGED carries out this responsibility in partnership with the WMCA. The CO, LGED, grassroots LGED staff working with the community felt that Since the LGED has handed over improved infrastructure for maintenance to the WMCA, the WMCA should take care of maintenance. However, the LGED has established a maintenance fund (to be operated jointly by the Upazila Engineer and the WMCA President) and the LGED helped WMCA to get lease of khal (which could be a good resource to the WMCA for effective water management and also earning substantial amount of money to become organizationally self-reliant, but this could not be achieved for mismanagement and land grabbing attitude of some of the influential people).

But the maintenance remains weak and repair works are not properly implemented. It was mentioned that some parts of Horigosh and Shukurmari canals have been re-excavated but not very effectively. Informants said that re-excavation of 500/600 meters was planned but actual work done was only about 200 meters. This is why the respondents felt that only one third of actual allocation is meaningfully utilized and two thirds are misused or even misappropriated.

The participants' view of the LGED support in maintenance revealed that the LGED listens and gives hope but do nothing". Actually the LGED tries to help but this is not enough. The LCS group felt that, if budget could be increased they would get more help from the LGED. Regular operation and maintenance were particularly lacking as there was not enough provision of regular maintenance. Due to lack of maintenance, height of embankment is reduced. The participants remarked that, despite repeated request, the Gopierkhal regulator was not repaired in ti

6.2. Maintenance by Union Parishad

The role of UP did not appear prominently in the general FGDs and KIIs. The general statement was that UP has no role in the water management, they do not have any project funding for this purpose. UP Member interviewed said that when approached UNO for funding as 250 meters of embankment was eroded, it was denied as LGED is working in the area concerning water management. However, the UP utilized 20% of its fund for WM, Also they have occasionally utilized 40 days employment support fund for such activities. The LCS group said that UP provided 6 MT wheat for LCS work. The fish farmer interviewed said that UP can have strong role to mobilize people. The CO of LGED said that the UP Chairman comes to attend WM related meetings. He has also informed that in 1997-98, the UP was involved in the WMCA. The UP Member said that he chairs maintenance subcommittee of the WMCA of which women UP member is another member.

The above information indicates that, although the informants said that the UP has no role, the UP does play some role although not much. Allocating food for works fund and 40 days employment support fund are good examples. Actually, the UP feels that the LGED if funding WMCA then why should they duplicate efforts in the same activity. Also the bureaucracy (UNO) denied allocating fund to the UP for repair of embankment as the WMCA is assisted for this purpose. There is a need for integration and coordination. The UP should not be dissociated from the water management activities of the WMCA.

6.3. Maintenance by WMCA

One main responsibility of the WMCA is to maintain the polder infrastructure for maximum benefits to the local people, particularly the farmers who are the main users of water of the canals entering the polder area from the rivers through the LGED gates. The maintenance is also needed for drainage.

If the WMCA falls in great trouble LGED is there to help them and provides fund for major repair and yearly O&M. Very recently the LGED made a budget of Tk. 292,000 for maintenance of embankment.

The Secretary of the WMCA felt that the responsibility of the WMCA includes Repair of embankment and gate,

Preserving water in the canals for irrigation, and re-excavation of canals. Few years earlier the WMCA got an allocation of Tk. 22 lac for canal excavation. A total of 12 LCS worked at that time including 3 women LCS.

. During that time, 7 km embankment was repaired by the LCS teams besides canal excavation.

Besides maintenance under O&M plan, the WMCA has another role (rather negative role) in maintenance. The WMCA leases the khals among the members. The members culture fish in the khals after having the sublease. In return, the sublease holders do some maintenance in their interest such as they repair sluice gates as and when necessary and when it is needed in their interest rather than benefit to all.

It is important to note that the WMCA does not properly serve the interest of the general people in the polder. Instead, they are engaged in counter productive activities like sub leasing canals to the so called gate committees.

6.4. Maintenance by gher owners. Landowners and the community

The WMCA sub leases canals to gher owners in the name of assigning management responsibility to area based gate committee or canal committee. By this process, the people adjacent to khal (example Noyasiarkhal and Goperkhal) drain and take in saline water in the gher (KII-paddy farmer). They control the canal and gate for private gains. The WMCA assigns them some responsibility to minor repair and operation of the gate.

Interestingly one such sub leaseholder is UP Chairman who said:

“I cultivate fish by taking lease of some portion of the canal (meaning Sukurmarikhal)”. Jabusa people took lease of the remaining part of the canal. “We are responsible for supervision of gate. It costs taka 25/30 thousand to repair a Pata (shutter) and we, leaseholder/ gher owner have to pay this money”.

There are instances of maintenance by community in the interest of the landowners. The gate with Gopierkhal (Gate 4) became inactive last year. Now, only the frame of the gate exists. Local people and WMCA repeatedly took it to the notice of the LGED but nothing happened. Then the villagers spent Tk. 70-80 thousands to replace the shutter.

It was also reported that the intrusion of saline water through the gate takes place only due to the negligence of LGED and WMCA. None of them give importance on this issue. As an alternative of these organizations, the villagers did this repair activity to protect paddy from saline water.

There are two private gates in the area, one gate is constructed and used by Jemini Seafood Company and another one is Mr. Salim's gate located beside the Horighosh canal. The second one is used by gher owner Mr. Selim privately.

The gher owners take some responsibility to repair in their own interest. Otherwise their gher will be flooded. They spend some money for this purpose but stop paying fee against the sub lease of canals. It should be better institutionalized that the gates and canals will be used as public property in the interest of all, rather than some. Then each user be charged a fee say X taka per acre paddy land and Y taka per acre shrimp farm.

6.5. Institutional responsibilities in maintenance

Table 9 below provides a glance look of the institutional responsibilities in maintenance related to water management in the Jabusa Beel area.

Table – 9: Institutional responsibilities or roles played by various actors in maintenance, Jabusa

Tasks	Who implements	Whose mandate	Comment
Minor maintenance	WMCA through gate committee, gher owner, landowner,	WMCA	Not regularly and not adequately.
Major maintenance	LGED	LGED	Not adequately. Need more serious effort, higher allocation and prompt action
Emergency maintenance	WMCA through the gate committee, landowners, gher owners. UP, MP, LGED supports with funding	UP, WMCA	UNO denied allocating fund to UP as LGED is working in the area
Excavation of canals	WMCA rarely, LGED usually and UP occasionally	LGED and WMCA	Limited efforts compared to need

Table 9 above shows four different types of maintenance. As per agreement with the LGED, the WMCA is supposed to take care of minor repair and maintenance. The informants tended to use the term repair rather than maintenance. By minor repair of gate they meant replacement of small things like screw, nuts, bolts and tar painting. These were seen as responsibility of the WMCA, actually task assigned to the local gate committees and eventually to the gher owners. And, they repair to serve their interest and not in the interest of all farmers.

The main responsibility for gates, embankment and canals is seen as belonging to the LGED. Major repair in particular such as replacement of wooden shutter, repair of structure, major earth filling, etc. are seen as responsibility of the LGED. Most maintenance work in any case took place under the LGED through the WMCA. LGED appears to be implementing maintenance activities quite regularly, almost every year, although not adequately and particularly, not in time. However, maintenance seems to be suffering for factionalism within the WMCA. One faction seems to have higher political and administrative linkage.

Emergency maintenance is what actually done by the WMCA through gate committee with initial money coming from the gher owners, and private donation givers like Jemini Sea Food Company. For such work UP provides fund under food for works or 40 days employment support allocation. The MP provides grant received from the government and LGED supports from emergency fund or project fund.

Canal excavation work is not generally implemented by the WMCA unless LGED provides fund to them. LGED does it with allocations received from the government. The UP also executes canal re-excavation if fund is made available. In the recent past re-excavation work was implemented after cyclone sidr as fund was available from the government for rehabilitation after disaster.

The Union Parishad was said to have no role but they were involved in canal excavation after sidr and minor repair of embankment. Their involvement is quite low presently as no fund is available.

vi. The community in some instance contributes to urgent repair if support is not coming from LGED or WMCA.

7. OPERATION OF SLUICE GATES

7.1. Operation through WMCA and LGED

LGED has effectively handed over the responsibility of operating gates to the WMCA. The UP Chairman however stated that deciding on the operation of gates is LGED's business. We take their permission to open. In the same breath he said that opening and closing of gates and the adjoining canals depend "on wish" of the leaseholders. Both cannot be true. May be, if they need, then take permission of the LGED or simply tell others that LGED has given permission to open or close some gate and thus protect self interest.

The CO of LGED said that canal committee comprising farmers of the adjoining area (actually elite farmers and gher owners) decides on canal/gate opening or closing.

The general FGD participants of ModhyaparaJabusa said that gates are opened in Ashar (June-July) to make seed bed of Aman paddy. Then it is kept open until Kartik (October). Canals kept closed in late autumn to until the start of monsoon. This group also said that the gate committee decides on opening and closing.

The general FGD participants in SouthparaJabusa said that the opening closing decisions are made by the gate committee depending on farmers' needs and in consultation with them. This is not so simple as there was a difference of opinion in the same group which revealed that "there are people who control gates".

The FGD with the WMCA stated that each gate has a gate committee decide on operation of gates. But some canals and gates are closed any way for damaged structures and leaseholder control (most part of Gopierkhal for example).

Presently, there is no gateman. The gate committees were supposed to engage gateman but that could not be implemented. Those given responsibility did not get any remuneration and responsibility was loosely assigned to a group of six persons in each gate but none was recruited as gateman.

If there is any need to drain out water from the beel, the gateman in consultation with farmers of the village opens and closes the gate. Canal Committee was asked to pay gateman from the income of the canal but this did not materialize.

The fish farmer said that the gates were opened in Jaishta (May-June) and closed in Kartik (October-Nov). Specific time and duration is decided by the gate committee.

All these taken together implies that the canals and gates are actually operated by the wish of the leaseholders as stated by the Chairman himself. This statement of the chairman fits well with other information received from many participant and this should be correct.

7.2. Operation through Union Parishad

The Union Parishad has no role in operating sluice gates, deciding on their opening or closing or keeping canals open or closed. However, UP Chair has control on particular canal and gate as he got lease of that and he has gher in that area (Sukurmarikhal). Also the UP member interviewed chairs a subcommittee and by dint of this position he has influence on deciding canal and gate operation. The UP Member further said that elite people like him can instruct gateman to open or close certain gate as per need. But the need means influential people's need and not the need of common people. These imply that, although the UP is not involved as an institution in the operation of gates, the Chairman and members are personally involved as local persons. Institution belonging could provide UP a positive role to play rather than personally benefiting from it. Of course the people like Chairman and member must have equitable access like other people.

7.3. Operating private gates.

Only two private gates were identified during the FGD and KII. One is owned by Jemini Seafood, a private company running a shrimp and fish processing plant in the area. This gate is used for waste disposal from the factory. Another gate is owned by large gher owner Mr. Selim and this one is used for aquaculture, mixed bagda, golda and fish both brackish and Tilapia.

7.4. How gate operation takes place

Table 10 below provides a description of gate operation in Jabusa Sub Project area.

Table 10: Operation of sluice gates in Jabusa Sub Project Area

Type of Gate	Formal authority as stated by respondent	Effective control	Gateman	Gateman's pay/ Cost & how paid	Operator's interest stated vs real
LGED	WMCA, LGED, Gate Committee	Leaseholder, elite	None, Committee member	Nothing paid.	Capitalize it to control water in own interest. Can fish in the adjoining khal
Private	Owner	Owner	None	None	Waste disposal in one case and aquaculture in another case

7.5. Emergency response

The General FGD participants at Modhyapara, Jabusa said the riverbank erosion increased after construction of Rupsa Bridge. The risk of breach has therefore increased and emergencies may occur more frequently. In emergencies people respond instantly for repair work by voluntary work and contributions in cash and kind. FGD participants in Southpara said that a section of about 300 feet embankment eroded south of Haraniakhal.

The FGD participants in the LCS group elaborated that, The embankment 1500 ft south of Harania sluice gate was damaged four and half years ago. This occurred at night and the village was flooded by saline water. Three people including LCS President Monirul went to the damaged part of the embankment. It was observed that about 300 ft of the embankment was eroded to the river. An announcement was made from the loudspeaker of the mosque.

People met instantly. It was emphasized that they would not get support from LGED at that moment and support from other sources may not come immediately. Then villagers instantly stepped forward and repaired it by self labour.

A small amount of Tk. 8000 could be collected from local people..

Besides cash, some people gave materials like bamboo and most others worked voluntarily. The UP and the were informed. They could not did not respond immediately.

This local repaired 1000 ft of the embankment. Cost involved was about Tk. 3 lac.

Later the LGED provided Tk. 70,000. Rich people contributed Tk. 10,000 to 50,000.

UP provided 36 tons of wheat at a later stage for better repair and the .

MP provided some cash support.

Various companies like Jemini Seafood helped us with cash donation.

Later on, LGED took initiative to repair the embankment.

60 labors were engaged to do the work through "Food for Work" programme of the government.

The LCS group suggested that LGED must respond more quickly and act effectively to better manage such disasters. The WMCA recognized that they must improve financial capability to respond in such emergencies.

7.6. Participation, Exclusion and Gender

Discourse on participation

To the participants, People's participation meant participation of all levels of people in public welfare activities but the felt that people's participation is not always ensured.

Participation was linked to project. It was said that, if there is any large project or emergency situation, then opinions of all classes of people are sought and received. Otherwise people are not usually consulted.

It was suggested that, if government wants to ensure our participation, they can invite farmers, imam, UP Chairman and UP Members to give opinion.

It was also suggested that all occupational groups should have opportunity to participate and express their . It was claimed that, whether rich or poor, everyone can express their views in the WMCA which is however not a fact.

And, it was felt that the representatives of ruling party play more active role in decision making of water management and control over khals.

The Southpara general FGD participants suggested that, for improving participation, the concerned organizations must Give emphasis to all opinions regarding water management like gate reconstruction, that membership should be open to all including various groups of people like landless, fish farmers, low cast community can also be member of this WMA but unfortunately did not mention women. .

○

Reality of participation in the polder

It revealed from the discussion that what is said above are desires. The reality is however very different. The CO of LGED said in the KII that generally landowners participate and become WMCA members. The LGED does not discourage but the landless do not show interest to join WMCA. To

him participation means people from all profession are involved. In his assessment, people are now aware and they prevent salt water entry to polder. The last statement is not fully reflective of the fact.

Secretary of the, WMCA said that the committee was formed with the participation of 5 to 7 thousand people. This must have been a grand rally addressed by high level political leader. He said that all beneficiaries are members, the landless, women, men, farmers and fishers. To him, participation means involving general people. He remarked that when embankment breaks, all come united to repair. This is participation.

The UP Chairman said that participation means presence of mass people from all class, even cobbler and cleaner. The UP Member interviewed opined that the landowners must participate and then work will be good.

The WMCA in the FGD said that they have formed sub committees- the gate committee, canal committee, agriculture committee and loan committee to enhance participation. To the participation meant engaging LCS, electing the EC members by the general body, having discussion with people and involving various categories of people.

The LCS members interviewed felt that the WMCA be formed by “people” and the committee “represents” the people. The LCS group further said that “respected people are taken in the committee” such as chairman, land owners, members, teachers, contractors, influential and powerful people from this area. Sometimes the committee leaders have to be rude to manage others, people like imam are not good in the WMCA as they can’t speak harshly.

Gender

Unfortunately, none of the four FGDs had any female informant and no FGD was conducted with women groups like women LCS groups. Also, none of the seven KII participants was woman. No woman household head or even woman UP member or woman WMCA member was interviewed.

It was learnt during follow up discussion that there is no women LCS group. All LCS members in Jabusa are male as women of this area do not work as earth cutting labour, hence not interested to join LCS.

Due to above reasons, gender relation information are missing in both FGDs and KIIS. However, two staff members of IWMI while visiting the area were able to meet a woman EC member of the WMCA. This is the lone women member of the WMCA who is very vocal and active. Other two women EC members are inactive and rarely attend meeting and give opinion. It is also noted that the WMCA is supposed to have four women members in the EC if one third quota is to be fulfilled (as per Guidelines for Participatory Water Management). It was learnt that the fourth woman could not be identified. Possibly, no serious effort was made by the WMCA and probably there was weak follow up from the LGED and also from the registration authority, the Cooperatives Department in the Upazila level. It also revealed that the WMCA was rather happy with three women members and to them three were enough and they were actually unaware of this specific requirement and did not see it seriously. However, one more inactive member won’t make any difference. But they should have understood the essence not quota of having women in the WMCA so that the issues relevant to women are properly addressed not bypassed, ignored or forgotten.

Women are not interested to work in the LCS, may be correct. But this does not imply that women have nothing to say about water management. To them, water for drinking, cooking, bathing are important and water entry or drainage by sluice gates and canals do affect such use of water. Further, the women household heads and other women may also be involved in homestead agriculture that need irrigation and some may be involved in crop farming and even fish farming.

It is important to note that, while drinking water problem did not appear in the FGD and KIIs, the woman WMCA mentioned arsenic problem as many poor people drink water from STW. Also due to long distance of DTWs and muddy road in the monsoon, poor people cannot always access DTWs. She has also indicated that the arsenic contamination of STW water used for irrigation may affect human health by food chain.

8. CONFLICTS

8.1 Conflict within the WMCA

Most serious conflict in Jabusa is factionalism. Two top leaders in the committee fight each other. Both have allies and opponents. One blames the other for various irregularities, like canal grabbing and misuse of fund. General FGD participants mentioned of it.

The CO of LGED indicated that the WMCA leaders have personal, social and political rivalries and conflict.

8.2. Conflicts regarding paddy and shrimp farming

One important conflict in the polder concerns paddy and shrimp farming. The shrimp farmers are canal leaseholders and gate committee leaders. They take control of the canal and the gate and take in salt water to the gher. Other farmers are denied access to the gate and the canals. So, if the canals are blocked, the paddy farmers can not drain water when paddy must be planted. This year, until about end August farmers could not plant paddy as gher owners were taking time for two more weeks to harvest fish and shrimp. This happens in Aman planting season (Follow up discussion).

In the HYV Boro season, paddy farmers want to store fresh water in the canal in Dec-Jan before water become salty. But the shrimp farmers do not allow fresh water storage in the canals. Instead, they take salt water in to the canal in Feb-March to May-June and this water cannot be used for paddy cultivation.

The UP Chairman himself stated in the KII that there are problems related to sweet and saline water. He found conflict between gher owner and paddy farmers. He continued to say that

The villagers demanded to drain out water from the beel. Mustakin (local influential people) was engaged in Gher cultivation by taking lease of canal from DC office. In that time there was no polder. As a result paddy was not grown. Villagers used to protest but never succeeded. Saline water came to the canal. For this reason legal steps were also taken. But still the paddy farmers are suffering.

The Chairman added that, still some people lift saline water. Some local land owners are involved with this activity. If someone lifts saline water in his own land then nothing can be said (Chairman seems to favor gher owner). He could say that owner can choose paddy or shrimp farming but without adversely affecting others. The Chairman remarked that, Saline water can't be stopped by movement (or agitation). Higher authority puts pressure if steps are taken to stop saline water. They say he is lifting saline water in his own land, so what is your problem? But it is not always gher owners' land. The canals are public property and the private lease area

is often taken by forcible entry of salt water flooding the adjoining area. This compels other farmers to lease out.

If saline water is lifted then it causes damage to adjacent lands, conflicting situation arises. Chairman and members act to resolve conflict but the gher owners tend to win.

Once problem was created in my union related to Gher. Land owner was interested to Gher as paddy was not grown. For Gher cultivation water had to be taken through adjacent land. Then =the Chairman intervened to solved the problem. The gher owner was told to that paddy has to be cultivated instead of Gher to protect other farmers' interest. This was the statement of the Chairman, if true he resolved at least one conflict.

Some local people cut the LGED embankment adjacent to Narankhalikhal and made gher. Some influential people drain in saline water in their land by installing pipes. They do not listen to LGED. Farmers should beat them as they made gher in this khal, said a paddy farmer in the vKII..The LCS group also indicated that conflicts arise when shrimp/ fish farmers set pipe under the embankment to lift water. The paddy farmers protest. Then it turnsd into quarreling.

8.3. Conflicts regarding high-low elevations

The WMCA Secretary tended to hide problems but he too indicated that problem arises between owners/users of high vs low land. When highlanders still need to take water in, the low land is flooded. This issue also came up from paddy farmers as said by paddy farmer in the KII.

8.4. Conflicts regarding control of gate

The UP Chairman said in the KII that there are conflicts regarding sluice gate operation, meaning control on the sluice gate in this area. The hard reality in Jabusa is that the power holders take control of gate and khal while the powerless are deprived of fair access to gate and khal.

The WMCA FGD indicated that "few people" occupied Gopierkhal by taking lease from and the DC. They cultivated shrimp and fish. The leaseholders blocked the canal in nine places. Other farmers can't take in water for irrigation and can't drain excess water. A section of the WMCA executives is involved in it.

8.5. Conflict mitigation

The Secretary said that problems such as high low land are resolved by "us" meaning WMCA or elite by "discussion". If big problem arise, we cut embankment. The KII however did not mention whether such cutting of embankment ever happened in Jabusa. This is however not so simple. What happens really is that the right is established by might, not "by discussion" (Teams's analysis)-

9. CONCLUSION

Findings in brief

Jabusa Beel Sub Project area is located in Naihati Union of RupsaUpazila, Khulna. It is very close to Khulna city, hence has considerable urban influence. In its area about three dozen industrial and business enterprise, mainly fish and shrimp processing factories. About 10-15% area is urbanized, another 15% occupied by homestead area and remaining 70% are mixed agriculture and aquaculture area. Total area of the polder as per IWM map is 1211 ha but the LGED SP information shows net area

930 ha. The largest village Jabusa has 1474 HH and including other villages the SP area has about 2500 HH.

Jabusa Beel sub project embankment and the sluice gate were constructed in 1996-2000. LGED constructed about 8.5 kms embankment, re-excavated 14 kms canals and built 5 sluice gates and 2 fish screening gates. These interventions aimed to protect crops and prevent salt water entry.

Before constructing the embankment only one crop (Aman paddy was grown) during Aug-Dec. Then, the area had extensive shrimp farming by outsider leaseholder who built temporary dykes to produce paddy by local the farmers and shrimp/ fish by leaseholders. The leaseholders got 100% fish and shrimp which was highly profitable while farmers got only paddy which was economically unprofitable to grow.

Before, rice yield was only about 1000 kg/ha. Now cropping intensity increased, Aman produced in almost whole beel while Boro HYV cultivated in about 70% area. Sesame and vegetables are grown in about 20% area and dyke cropping covered 5-10% area. HYV Aman rice yield increased to 1,960 kg/ha, HYV Boro rice yield now 2,600 kg/ha and local Aman rice 1,600 kg/ha (Team estimate based on respondent interviews).

Main agricultural crops and fishes cultivated in the Jabusa Beel area are: local or HYV Aman paddy during Aug-Dec, HYV Bro paddy during Jan-May, Sesame during Feb-May, bagda shrimp during Feb-July, Golda or prawn during April-Dec, brackish water small shrimp and fishes like parse harinaetc mixed with bagda and Tilapia during Feb-July, brackish water fish and small shrimp mixed with Tilapia, ruhi, katla, mrigel, carp mixed with golda during April-Dec.

Farmers in Jabusa Beel area combine the abovementioned mixed aquaculture with Aman paddy in the same land during monsoon. The same land is again used for Boro HYV cultivation during Jan-May. Again, the farmers practice a unique system of digging ditch inside paddy land and building dyke surrounding the ditch. Thus in same piece of land they have three land levels. The dykes are used to produce vegetables, papaya and banana etc. round the year. The four side ditch is used to stock fish and shrimp fries and in the main middle part, paddy saplings are planted. The whole area then becomes a mixed agricultural and aquaculture farm. This has improved production of both fish and crops.

Irrigation sources are quite diversified. Aman paddy is basically rain-fed but farmers store water in the canals to preparing seedbed and supplementary irrigation. The sluice gates are opened to take water to Aman paddy area and in Aug-Sep excess water drained to plant Aman paddy. For Boro HYV cultivation, water is stored in the canals during Dec-Jan before river water get salted. If water from the canal is not available or inadequate depending on time and location of land, farmers use STW for irrigation. Some also use DTWs.

For bagda farming, water is taken from the rivers to canals and beel during Feb-Apr/May. Later, river water and canal water combined irrigate mixed crop and aquaculture system until Dec/Jan.

Livestock, particularly cattle and buffalo rearing decreased due to loss of grazing area, scarcity of feed and fodder, inadequate space in the homestead area to accommodate cattle shed and increased farm mechanization reducing the need for cattle and buffalo rearing for tillage.

In the past open water fishing was a main occupation. It has now declined for low availability of fish in the rivers and gradual increase of aquaculture. Until mid 1990s, outsider leaseholders dominated aquaculture. Now most farmers practice both crop farming and aquaculture and most farmers are owner-operator small and medium farmers. Interestingly, only about 20% households in the area are landless and most others are small and medium farmers.

Apart from agriculture and aquaculture, business, industry work, salaried services are all important occupations for male workers. Many of the poor and landless women of the area work in the fish processing plants and other industries.

In the absence of regular and effective maintenance, the condition of embankment is unsatisfactory and in several parts vulnerable. Although the IWM map shows most canals in good condition and active the reality is different, most gates are in bad condition, again for poor maintenance.

Although the LGED re-excavated half a dozen canals, they have again silted and only a couple of canals are in running condition. Apart from siltation, canal lease and canal grabbing made water management extremely difficult. Surprisingly, the WMCA itself has been involved in canal leasing business, but this business could not make the WMCA financially solvent.

The main water related problems are riverbank erosion, siltation of canals and damaged structures.

The WMCA is not functioning well. It is financially weak, has conflict between top leaders and tremendous mistrust. Loan given to members are not coming back, collection of monthly savings practically stopped and the investment made in hatchery business is lost.

The LCS too is not working as work opportunity is rare. One LCS group got work for 20 days only. Women LCS group is actually nonexistent now, partly because there is not much work hence no interest and partly because the landless of this area can find work in the processing plants and other activities.

The Union Parishad has least involved in water partly because LGED is doing this and partly because they lack resources in the absence of "project".

The sluice gates and canals are very nicely mismanaged by the relevant sub committees. Whoever got some authority misused it for private benefit. The canals and gates turned into private property of the power holders.

The WMCA suggested give them canals at nominal lease value which is consistent with the policy but the WMCA failed to manage them for sustainable and equitable benefits.

Concerns

The participants were asked to explain what will happen if present trend continues 10 years. The expressed concerns are following:

- One general FGD group remarked that “we shall not have to wait 10 year, long before that the embankment will get destroyed hence paddy production will fall drastically”. – Modhyapara
- Another general FGD group remarked that “We shall not be able to live here. Jabusa embankment is 3 feet lower than Batitaghata embankment on the other side of the river. So, we shall be drowned (if any strong cyclone hits).
- Within 3-4 years the WMCA will collapse- an EC member
- Crop and fish production increased after having the polder. But the WMCA is not functioning well. – another EC member
- The WMCA will not sustain if government does not help. – WMCA Secretary
- Embankment will become weaker – LCS
- If polder maintained production will increase- CO, LGED
- Even the river Rupsa will be silted after 10 years. – UP Chairman
- The embankment will be washed away

Suggestions

The participants gave following suggestions to improve polder management:

Engineering

1. Protect embankment by piling in the riverside.
2. Need to build embankment stronger
3. Need to excavate canals deeper
4. Need strong embankment like BWDB ones – KII farmer
5. Dredging of rivers

Social/ Institutional

1. Need transparent management of the WMCA
2. LGED to be more active
3. NGOs to help polder development and maintenance
4. UP to take responsibility

Closing remark

The participants’ suggestions are mainly related to engineering interventions which are of course very important. However, in the discussion the social, environmental, institutional and management issues came very prominently but not adequately reflected in their suggestions. Four suggestions however fall in this side.

It is interesting that although the local government is not much involved in the water management, it was felt important to involve them rather than keeping them away. The last

four suggestions are indeed very strong. Need for transparent management is a key element where the WMCA is suffering from inner conflict, financial insolvency, mismanagement of the canals and structures, canal grabbing and structure grabbing – all entails the need for ensuring transparent management. This polder and its WMCA seems to provide a good case think that community management is a necessary condition to improve water governance but it is definitely, not a sufficient condition. The participants suggestion of transparent management of the WMCA is a very important suggestion.

A. ANNEX 1: INSTITUTIONS IN WATER GOVERNANCE

This section introduces the main actors in the polder relevant to the multiple uses of water and the polder infrastructure. Water management is defined mainly by water for agriculture, including aquaculture, through operation, i.e. the opening and closing of sluice gates, and maintenance of the infrastructure (polder, gates and canals).

i) Government Agencies

Bangladesh Water Development Board (BWDB)

The Bangladesh Water Development Board (BWDB) is the main implementing agency of water infrastructure projects in Bangladesh. As per the National Water Policy (Ministry of Water Resources, 1999) it is responsible for polders larger than 1000 ha. For this purpose, BWDB has special wing in the district level headed by senior engineer called Executive Engineer (Operation and Maintenance).

JaushaBeel Sub Project polder however do not belong the BWDB and they are not involved in its maintenance.

Local Government Engineering Department (LGED)

Jabusa Beelpolder was constructed by the LGED and they are now responsible to maintain it in cooperation with the WMCA.

Union Parishad: Grassroots Local Government Institution

Rural local governance in Bangladesh comprises of a three tier local government system of which Union Parishad is the grassroots local government institution and its immediate upper tier is UpazilaParishad. ZilaParishad is practically non-existent. Jabusa Beel Sub Project Polder is under the jurisdiction of Naihati Union Parishad in RupsaUpazila, district Khulna. The UP is not involved in water management in this polder as the LGED is doing it. In this polder UP involvement did not appear prominently in the discussion even on conflict mitigation, drinking water, sanitation, minor repair of embankment, canal re-excavation and emergency repair which are traditionally done by UP. This happens so, because the LGED and the WMCA are responsible for water management and the UP feels that they should do this. Another reason is that the UP does not receive any funding from the LGED for water management related works. So, they feel discouraged to do this.

Despite the fact that the UP does not play any important role in water management in Jabusa Beel Sub Project, participants, including the LCS members still desired that they should have a strong role here and they should be enabled to play such role.

Role of UpazilaNirbahi Officer and District Committee/MP

The role of the upper level local government institutions of Upazilas and Districts is to coordinate between different government agencies and projects active in their areas. They are also to assist the Union Parishad for issues they cannot handle alone, as for instance funding required for various development activities (drinking water, emergency, roads maintenance) and coordination at the higher levels. Since the Jabusa Polder falls in just one UP hence there is no issue of inter Union coordination by the UNO. The role of UNO did not come up in the FGD and KII discussions. But UNO can play an important role to resolve conflict between the outsider leaseholder and local farmers on drainage, should local farmers seek his assistance. The role of UNO and DC however came up in the discussion regarding canal lease and this is very importantAs recruited centrally and placed in the specific district and Upazila, the officers like DC and UNO work as directed from above and they tend to disregard local organizations, even the grassroots local government. WMCA is not very important to them. Only the MPs and ministers are important and the central bureaucracy.

Department of Agricultural Extension (DAE)

The Department of Agricultural Extension (DAE) is responsible for the dissemination of agricultural technology, information and relevant services to farmers and other stakeholders down to village level. It is the largest department under the Ministry of Agriculture having their extension officer down to village level (one extension officer called Sub Assistant Agriculture Officer for a cluster of villages called Block). In Jabusa Beel Sub Project area the participants did not mention of any assistance from the DAE. Despite located very close to the city, DAE officers may have very little interaction in the field level and the farmers may not find interest even to consult them. The DAE could help farmer to resolve shrimp-paddy conflict on drainage and irrigation access. any role?

Department of Fisheries (DoF)

The Department of Fisheries (DoF) is responsible for the dissemination of fisheries resource conservation and aquaculture technology and is placed under the Ministry of Fisheries and Livestock. DoF provides training on fisheries and teaches how to do combined cultivation of paddy and fish. They provide support to fish cultivators in the area and assist them if there are any problems. The DoF role did not appear prominently in the discussion. But they are supposed have strong role to provide farmer training, extension service, technology dissemination, assistance to access better input supply such as virus-free shrimp fry, water and soil quality testing, and quality of the produce. The DoF has extension, training and laboratory facilities in Khulna, hence can play an important role in aquaculture in this varea.

Department of Public Health Engineering (DPHE)

The Department of Public Health Engineering (DPHE) is the national lead agency for provision of drinking water supply and waste management throughout the rural areas. Drinking water was identified as the most important use of water, yet respondents were not able to give any information of interactions with the DPHE. Rather, they would contact the BRAC and Union Parishad and request for deep tube wells or piped water supply systems to access safe drinking water.

ii) NGOs

About a dozen NGOs are working in the Jabusa Beel area. They are Apurva, BRAC, ASA, TMSS, HEED, CSS, Nobalok, Uttaran and JSS. This is a very small area with less than 1500 households. Presence of ten or 12 NGOs is more than enough, without overlapping, each won't find more than 15 clients to cover 100% just one small group to meet weekly or monthly.

All were reported to be providing micro credit. In addition, BRAC is providing tube well and sanitation support with the resources under WASH programme. Besides microfinance, some NGOs are running training and awareness programmes related to prevention of child marriage, atrocities on women, and managing social safety net assistance by the UP.

Role of NGOs in water management: NGOs did not play any role in water management in Jabusa Beel sub project area.

iii) Private actors:

The private sector had some role in water management. They helped the WMCA when emergency repair of embankment was needed.

B. ANNEX 2: INSTITUTIONS

Authority/ Organization	Concerned Ministry	Field Presence	Relevant Functions	Constraints	Suggested remedial measures
Upazila Bureaucracy: UNO office headed by the UNO	Ministry of Establishment	Up to Upazila level.	* General administration * Development coordination * Conflict resolution	* Inadequate manpower * Low skills of staff * Bureaucratic orientation * Lacks public accountability * Political interference	* Reorientation * Freedom to act professionally, neutrally, guided by law * Enhanced public accountability
Bangladesh Water Development Board (BWDB) Not involved in this polder	Ministry of Water Resources	Effectively up to district level	* Develop and maintain polder infrastructure * Implement national water policy in the field level	* Upazilla level office non-functional * Gateman recruitment stopped but alternative measure to O&M by communities not yet functioning effectively	* Repair, reconstruct polder * Transform BWDB from just line ministry control to a people oriented institution
Local Government Engineering Department (LGED) Main agency relevant to Sub Project	Ministry of Local Government Rural Development and Cooperatives	Up to Upazila level.	* Plan, implement and maintain rural infrastructure (rural roads, bridge, culvert market, ghatetc) * Plan and implement small water sector projects up to 1000 ha in cooperation with local bodies and communities * Provide technical support (design, supervision, accounting) to local government bodies to develop, operate and maintain local infrastructure)	* Inadequate manpower if no project on-going * Political interference	* Freedom to act professionally, neutrally, guided by law * Enhanced public accountability * Local government strengthening
Upazila Land Office headed by the Assistant Commissioner, Land	Ministry of Land	Up to Upazila and Union level.	* Khas land and khasjalmohal management * Leasing out of khas land, khasjalmohal	* Inadequate manpower * Low skills of staff * Bureaucratic orientation * Lacks public accountability * Political interference	* Reorientation * Freedom to act professionally, neutrally, guided by law * Enhanced public accountability
Department of Agriculture Extension (DAE)	Ministry of Agriculture	Effectively up to Upazila level. Officially multi village	* Provide technical advice * Assist distribution of input subsidies, agr loan etc.	* Sub Assistant Agriculture Officer rarely seen in the village/ UP * Low skills of employees * Political interference * Assigned many work by the	* Establish Union based farmers information and service centre (FIAC) * Ensure presence of SAAOs at least in the UP on a regular basis

Authority/ Organization	Concerned Ministry	Field Presence	Relevant Functions	Constraints	Suggested remedial measures
		block level below UP		government which are not related to agriculture sector	* Ensure public accountability through reporting to UP and Upazila Chairmen & UNO
Department of Fisheries (DoF)	Ministry of Fisheries and Livestock	Up to Upazila level	* Provide technical advice to fish/ shrimp farmers * Conserve fisheries resources * Inspect quality of shrimp fry supplied to farmers, * Promote hygienic condition of fish/shrimp landing centre/depots, quality of shrimp going to processing centre * Regulate shrimp farming so that it is not damaging environment * Khasjalmohal lease, management. * Report on fisheries/ shrimp area production etc	* Lack of manpower * Political interference * Lack transparency and public accountability	* Introduce local extension agent in fisheries (LEAF) as recommended by the Fourth Fisheries Project (as a community managed but government supported extension system) * Ensure public accountability where UAO and SAAO must report to Upazilla and UP chair respectively
Department of Public Health Engineering (DPHE)	Ministry of Local Government Rural Development and Cooperatives	Up to Upazila level.	Support water supply and sanitation - Tube Well - Pond sand filters - Rain water harvest - Ring slab latrine - piped water supply	* Political interference * Lack transparency and public accountability * Low coordination with other departments	* Inter agency coordination * Better interaction with the communities
Union Parishad (UP)	Ministry of Local Government	Nearest to people	38 functions - provision and maintenance of rural infrastructure include roads, canals, dykes, small scale water management) - provision and maintenance of water supply sources - prevent contamination of water sources - village police - village court, salish	- Bureaucratic and political interference by DC/UNO and MP/minister -Lacks support of the government (financial & logistic) -Inability to mobilize financial resources internally - Elite domination	- Local government strengthening by the government - Government to support not control local government. - Involve civil society organizations/NGOs to buildup capacity of the UP and raise public awareness