



Water Governance and Community Based Water Management

Situation Analysis Report Polder: 43/2F Upazila Amtali, Barguna

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1. INTRODUCTION

1.1. Aim of the report

This report aspires to generate a detailed situation analysis report of Polder 43/2F located at Amtali Upazila of Barguna district, Bangladesh, based on Focus Group Discussions (FGD), Key Informant Interviews (KII), follow up discussion and field level validation workshops. It will do so by providing:

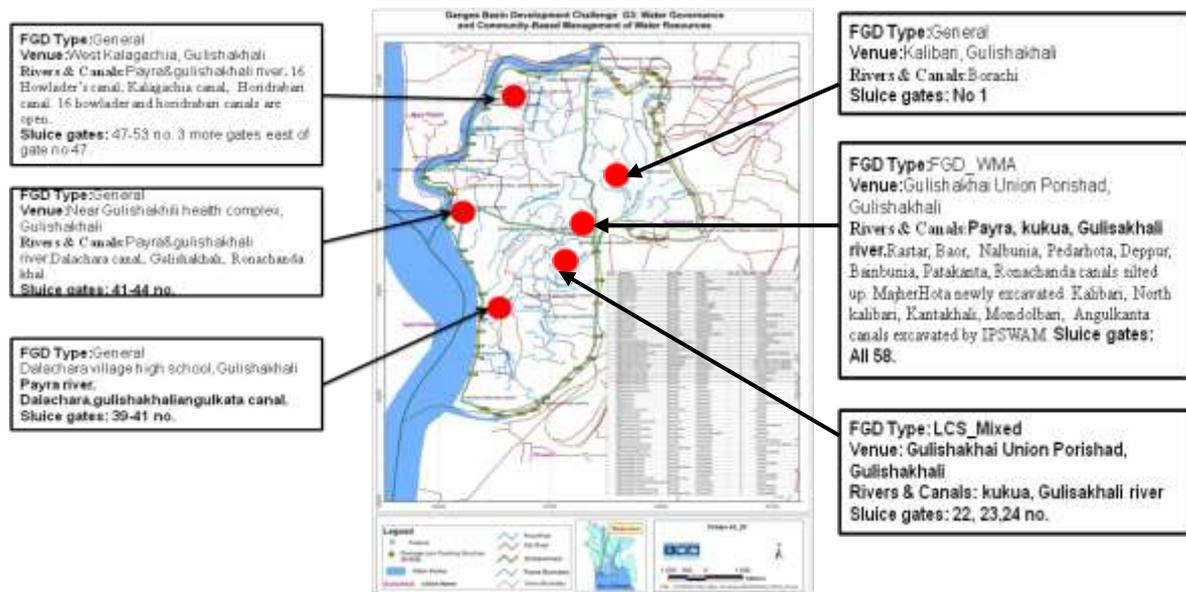
- i) A historical narrative of the polder from the time it was constructed to present;
- ii) Farming systems and livelihoods options;
- iii) Current state of the polder infrastructure;
- iv) Examining the results and process of the water management interventions of the BWDB
- v) Reviewing how maintenance 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 polder 43/2F.

1.2. Methodology

Six Focus Group Discussions and eight Key Informant Interviews (KIIs) were conducted by the Shushilan research team from 10th April to 12th April, 2012. The FGDs were held in six villages of Gulishakhali Union. The venue of the FGDs were selected after a glance look of the polder area in the IWM map, a transect walk and consultation with the local people by considering various features of the union like distance from the main rivers and sluice gates, the situation of the rivers, canals, gates and concentration of various types of farming activities; in particular paddy cultivation with or without aquaculture.

The KIIs were selected through snowball process and availability of the respondents. The KIIs with farmers, women headed households and woman LCS representatives were held at their village home and the KIIs with UP and BWDB officials were held at the respective offices in the UP and Upazila headquarters. The map below describes where the FGDs have been conducted.



A glance look of the FGD venues and participants reveals the following:

- One of the four general FGD groups was met at West Kalagachia (North-west part of the union), on the bank of Gulishakhali river. The nearby canals like Kalagachia, Horidrabari were open, but silted up. A one vent sluice gate and pipe inlet were located there were good but there was problem for having a single shutter. The FGD group comprised seven male participants including farmers, businessmen and salaried service holders. Five of them were farmers owning 1.00 to 3.50 acres land. All of the respondents were Muslim, age varied from 43 to 60 years. One of the respondents was vice president of WMA.
- The second general FGD group was met near Gulishakhali health complex of the Union, situated by the east side of the River Payra. The main canals include Dalachara, Gulishakhali and Ronachanda. Canal condition was not good and the Dalachara gate (gate no 43) was inactive and shutter was broken. Six out of eleven participants were farmers, four were businessmen, and one was salaried service holder and the last one was driver. The respondents' age differed from 25 to 50 and they owned 0.50 to 5.00 acres land.
- The third general FGD group was met at Dalachara high school of Angulkata village of Gulishakhali Union in the South part of the polder, situated by the east side of the River Payra. The connecting canals include Gulishakhali and Angulkata. Canals condition was not good and the Angulkata gate (gate no 39) was inactive and shutter was broken. All fourteen participants were from this part of the village. Nine of the fourteen participants were farmers, two were businessmen, one combined business with aquaculture, one was salaried service holder and the last one was driver. The respondents' age varied from 26 to 44 and they owned 0.72 to 4.00 acres land.
- The fourth general FGD was conducted at Kalibari village in the east side of the polder with twelve male participants. The main canal was Borachi and one sluice gate was inactive. All of the participants were farmers with owned land varied from 0.33 to 4.00 acre. The respondents' age varied from 29 to 60 years.
- The fifth FGD group met comprised seven WMA EC members, all had own land varying from 1.0 to 4.0 acres. Three out of seven participants were farmers, two were

businessmen and two were housewife. Age of the respondents varied from 32 to 58 years.

- The last FGD was conducted with a group of five female LCS group members. One of the five participants owned no land and others owned 0.05 to 1.00 acre land. Majority of them sharecropped land from large farmers. All of the participants were day labour and their age varied from 30 to 50 years.

The study also conducted eight KIIs including paddy farmers, women household head, LCS woman member, WMA chairperson, UP representative and BWDB officials. All KIIs were held from 10th to 12th April, 2012.

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

Table 1: List of FGDs conducted in polder 43/2F

SL #	FGD Type	Numbers of Participants (Female)	Village (para)	Union Parishad	Relevant Sluice Gate Numbers	Adjoining Canals
1	General	7 male, no female	West Kalagachia	Gulishakhali	47-53 no.	Howlader, Kalagachia, Horidrabari.
2	General	6 male, no female	Dalachara	Gulishakhali	41-44 no	Dalachara canal, Gulishakhali, Ronachandakhal.
3	General	14 male, no female	Angulkata	Gulishakhali	39-41 no	Dalachara, Gulishakhali Angulkata
4	General	12 male, no female	Kalibari	Gulishakhali	01	Borachi and Kalibari
5	WMCA	5 males, 2 female	Gulishakhali, UP complex	Gulishakhali	All 58	RasterBoar, Albania, Pedarhota, Deppur, Bainbunia, Patakanta, Ronachanda canals silted up. MajherHota newly excavated. Kalibari, North kalibari, Kantakhali, Mondolbari, Angulkata
6	LCS	5 female	Gulishakhali, UP complex	Gulishakhali	22, 23, 24	kukua

Table 2: List of KII conducted in Polder 43/2F

Sl #	Respondent Type	Village/ Venue	Date
1	WMA Chairperson	Gulishakhali Union Parishad	12 th April, 2012
2	UP Member (Male)	Kalagachia	12 th April, 2012
3	Paddy Farmer (Mixed)	Dalachara (In his house)	10 th April, 2012
4	Paddy Farmer	Gulishakhali Union Parishad Moor	10 th April, 2012
5	Women UP Member	Gulishakhali Union Parishad	10 th April, 2012
6	Women Headed Household	Near Gulishakhali Health Complex	10 th April, 2012
7	LCS Women Member	Near Gulishakhali Health Complex	11 th April, 2012
8	Section Officer-BWDB	Bargunasadder office, BWDB	12 th April, 2012

1.3. Overview of Polder 43/2F

1.3.1. Location and accessibility

Location

Polder 43/2F is located in Amtali Upazila of Barguna District, about 30 kms south of Patuakhali town and 10 kms north of Amtali Upazila town. It comprises only one Union Parishad, Gulishakhali comprising about 56.22 sqkms. The polder is encircled by about 32.5 kms embankment along the rivers Payra in the West and Gulishakhali in the North-west and Chawrakhal in the east and south. Within this boundary, there are six mouzas (village as per land revenue map) such as Gulishakhali, Kalagachia, Fakirkhali, Kalibari, Gozekhali and Khekuani. The polder has other villages which are considered village by the community but treated part of the relevant mouza by the land revenue department. A few examples of villages but not mouza are Dalachara, Bazarkhali, Bainbunia, Deppur, and Horidrabari. In total the polder has more than two dozen villages and roughly one village has a WMG.

Geographical characteristics

About 5,000 hectares of agriculture land are benefited by this polder out of total area of 5,622 ha gross area. The polder is surrounded by rivers. The main river Payra River is navigable round the year but the Gulishakhali River and the Chawra canal are silted in most parts. The land profile of the polder is saucer shaped and further, because of silt deposit, the area outside the embankment is 6-8 feet higher elevated than land level inside the polder. Hence the land in the beel area is waterlogged once tide water enters the polder. Also the monsoon water cannot be properly drained out. The inner canals have mostly silted or have been closed by influential people further aggravating waterlogged condition.

Accessibility

The middle of the polder, Gulishakhali UP is connected to Amtali Upazila and Patuakhali Amtali Kuakata highway by an Upazila road in the East side to Chunakhali point and in the south to Kukua point. Amtali Upazila is located about 10 kms south of and Patuakhali town about 30 kms north. District town Barguna is located about 20 kms southwest on the other side of the river Payra which requires crossing of the river by ferry from Amtali Upazila or by motor launch from Gulishakhali then 10 kms by bus and rickshaw. There are frequent mode of transport like bus, motorbikes, trucks, rickshaw, rickshaw van are available. Country boat and launch are also seen as a local and inter-district waterway transport. Launch is also available from Amtali to Dhaka and time is required 16 hours while by bus, Dhaka can be reached in about 12 hours. Beside motorbike service in the local roads, another type of transport now expanding is diesel operated three wheeler vans. Another mode of transport recently introduced but not huge is a battery operated three wheeler auto-rickshaws called easy bike. In the river, the main long distance transport is motor launch and short distance transport is mechanized boat.

1.3.2. Demographic features

Table 3 below provides demographic data of Gulishakhali Union of polder 43/2F and is compared with Upazila Amtali. Since the polder comprises one Union and the polder boundary and Upazila boundary are same, the information obtained for the Union Gulishakhali well represents that data for the polder.

Total population of the polder 43/2F (Gulishakhali UP) is 28,458 with average household size 4.4 but population density much lower (506) compared to the country (1000+). Compare to male population female population is higher as evident from the sex ratio, 92 males for 100 females. Most people (about 95%) are Muslim by religion. Literacy rate of this polder is only 53.4% about the same of literacy rate of the country.

Table 3: Area and population

SL	Particulars	AmtaliUpazila	Polder 43/2F (Gulishakhali UP)
1	Area (Sq km)	721.06	56.22
2	Household	63,212	6,457
3	Population Total	270,802	28,458
4	Density	376	506
5	Household Size	4.3	4.4
6	Male	132,168	13,624
7	Female	138,634	14,834
8	Sex Ratio	95	92
9	Religion Muslim %	93.70	94.92
10	Hindu %	5.92	5.08
11	Buddhist/Rakhain Others %	0.38	-
12	Literacy All	52.8	53.4
13	Literacy M	54.9	56.8
14	Literacy F	50.8	50.3
Source: BBS, Population Census 2011, Community Series for Barguna District			

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

SL	Particulars	AmtaliUpazila	Polder 43/2F (Gulishakhali UP)
1	Population age 7+ not in school	49,200	5,783
2	Male	21,742	2,446
3	Female	27,458	3,337
4	% employed Male	76.2	80.7
5	% employed Female	4.3	4.7
6	% Looking for Job Male	2.1	1.7
7	% Looking for Job Female	0.5	0.7
8	% in household work Male	4.4	0.9
9	% in household work Female	75.1	73.9
10	% not working Male	17.2	16.6
11	% not working Female	19.3	20.7
Source: BBS, Population Census 2011, Community Series for Barguna District			

Table 4 above shows employment status of male and female population of age 7 and above not attending school. In Union Gulishakhali, 80.7% of the males (of age 7+ not attending

school) are “employed” in various income earning activities and 16.6% are reported not working. Of the female of 7+ age group (not attending school), 4.7% are reported to be working in various economic activities, 73.9% reported to be engaged in household chores only and about 20.7% non working. The data should however be read with caution that age 7+ not in school, is not a good definition of labour force and only about 5% women working for income earning must have been grossly undercounted or misunderstood.

Table 5 below shows distribution of male and female working population by broad economic sectors. In Gulishakhali UP, about 87.1% of the male workers are engaged in the agriculture sector, only 4.2% in industries and only 8.7% in the service sectors. In contrast, 50% of the 5% female workers, one half are engaged in the agriculture sector, about 16% in the industries sector and 34% in the service sector.

Table 5: Employment of Working Population by Broad Sectors

SL	Particulars	AmtaliUpazila	Polder 43/2F (Gulishakhali UP)
1	Agriculture % of male worker	85.5	87.1
2	Agriculture % of female worker	56.5	50.0
3	Industry % of male worker	3.2	4.2
4	Industry % of female worker	7.5	16.0
5	Services % of male worker	11.8	8.7
6	Services % of female worker	35.9	34.0
Source: BBS, Population Census 2011, Community Series for Barguna District			

1.3.3. Basic Facilities Access

Table 6 below shows that nearly 100% people of Gulishakhali UP have access to safe drinking water and the main source is deep tube well. Moreover, near about one fifth (18.3%) of the households of Gulishakhali UP have access electricity connection compared to 21% in AmtaliUpazila. In this polder shallow tube-well is not successful. However, the NGO BRAC, World Vision, Dhaka Ahasania Mission provided Deep Tube Wells for safe drinking water after cyclone Sidr and Aila besides the Department of Public Health Engineering (DPHE) and UP. Fresh drinking water is found at depth 700 to 1000 feet or even deeper. Electricity connection is provided by the PolliBiddutSomiti under the Rural Electrification Board.

Table 6: Availability of or Access to Basic Facilities

SL	Facilities	AmtaliUpazila	Polder 43/2F (Gulishakhali UP)
1	Sanitary Toilet water sealed %	22.3	22.3
2	Sanitary not water sealed %	46.6	48.5
3	Non sanitary%	28.7	25.1
4	No latrine %	4.4	4.1
5	water source: TW/Tape %	97.1	100
6	Electricity Connected %	21.1	18.3
Source: BBS, Population Census 2011, Community Series for Barguna District			

In Gulishakhali UP about 22.3% households have water sealed latrines and near about half (48.5%) have ring-slab latrine (sanitary but not water sealed). About one fourth (25.1%) use non sanitary latrine and four percent do not have latrine.

1.3.3. History of the 43/2F polder and Physical Interventions

The BWDB Embankment

Polder development has been a long process. In Pakistan period there was a narrow dyke and it could not resist high tidal surges caused by cyclone. As a result, the crop land was flooded. To face this problem, the East Pakistan government built a small ring embankment at 50 feet distance of the river in 1965. It was too narrow and its low height was inadequate to resist the tide. So, local people could not intensify crop production. Farmers used to cultivate one crop (local *Aman* paddy) and for that too yield was low due to salinity. All canals were opened and the area flooded by two high tides each day. At that time, fishing was a major livelihood.

The BWDB constructed embankment of polder 43/2F during 1989-1995 (Ahamed Mainuddin of Amtali 2008). Based on observations from several focus group participants, it seems that BWDB constructed the polder in various locations during 1980s and completed in 1990s. Majority of the construction work was conducted in the first half of 1990s. The reason for constructing the polder was to protect crops as well as the villages from tidal surge.

Before constructing the embankment the land was suitable to grow local *aman* paddy only as it could be planted in 2 feet deep water and could survive in water for several weeks. By this time water receded in September-October. In the extreme low land area (beel area), no crop was grown and fishing was common and popular.

After the construction of the embankment in 1995, the cropping system steadily moved from mono crop to two crops and in some areas three crops. Aus (Apr-Jul) and local variety Aman paddy (Aug-Dec) and robi crops (Dec-Apr) increased. Chili, pulses, oil seeds, vegetables, water melon cultivation also increased as crops were protected from tide water and minor irrigation was possible. Buffaloes decreased and cattle rearing increased and aquaculture (carp, golda, Tilapia) started both on homestead pond and in canals. But the participants also said that water-logging developed after constructing the embankment due to poor drainage system, deposition of silt and blocked canals at a later stage.

Apart from agriculture, new economic activities geared up after the embankment construction: haat/bazaar, shops, brick kiln, poultry, betel leaf production etc. increased. Opportunities in daily based wage employment, contractual work such as in earthwork, driving rickshaw vans, trucks and motorbikes etc expanded. Previously, only Aman paddy

was cultivated or fish caught in the rivers and canals for self-consumption and livelihoods. Later commercial aquaculture began and became popular. Some people are also culturing fish in the canals by leasing or illegally occupying. Aquaculture in the canals benefited few people but increased conflicts in the area.

Women and marginalized people like landless collected shrimp and prawn fry from river. They are still doing this in fewer numbers and catch reduced substantially. The fries go to the gher areas of Bagherhat, Khulna and Satkhira districts. Majority of the focus group respondents emphasized the reduced availability of fishes such as Tengra, Boal, Ruhi Katla and Vetki etc. Hilshais still caught in Payra River but catch sharply reduced due to over fishing and the use of destructive gears. Once buffalo was huge, now it has tremendously reduced due to shortage of feed and grazing area. Number of cattle and goat reduced but is increasing again for higher demand for meat. After Sidr and Aila cattle and poultry increased because many NGOs donated cows, goats and poultry to women and vulnerable groups to increase their earning.

Participants said that this polder was severely affected during cyclone Sidr in 2007 and cyclone Aila in 2009. Ten people died in this polder during devastating cyclone Sidr in 2007 and it happened due to poor maintenance of embankment and unawareness of people. The embankment was severely damaged by the side of the River Payra and Gulishakhali in 2007 and 2009. The disasters caused damage to embankment, roads, houses, crops, and sanitation facilities. In the next two years after Sidr, crops were affected due to salinity. At that time, the World Food Programme (WFP) supported rehabilitation in this polder to re-construct it through food for work.

IPSWAM Project

Polder 43/2F was selected for improvement under the Integrated Planning for Sustainable Water Management (IPSWAM) project implemented by the BWDB. The project was implemented during 2004-2008. The project followed the Guidelines for Participatory Water Management (Ministry of Water Resources, 2001) that incorporated local stakeholder participation in water management. During this project IPSWAM helped to establish 27 village level Water Management Groups (WMGs) and a polder level organization, the Water Management Association (WMA). WMGs are locally known as water Somiti and the WMA is called polder committee. These two together comprise water management organizations (WMOs). The WMOs are meant to represent the interests to local stakeholders, provide feedback on engineering design, location of the infrastructure as well as mobilize labour for earthwork through Labour Contracting Societies and take over the responsibility of operation of sluice gates and minor maintenance after the project has completed.

The IPSWAM project formed Water Management Groups (WMGs) and Water Management Association (WMA) and helped institutionalization of the organizations. Further to institutional support, the IPSWAM project supported improvement of infrastructure including repair of embankment, re-excavation of canals, and construction and repair of sluice gates, culverts and pipe inlets. The project aimed to handover the O&M responsibility to the WMA but due to late start and slow progress the IPSWAM could not hand over the project O&M responsibility to the WMA.

Physical Components of 4/2F polder

The Section Officer of BWDB informed that the length of the polder is 32.5 kms it has 11 sluice gates and 55 inlets but the IWM map and structure list showed a total of 58 structures. The SO informed that all of the sluice gates are in running condition but in reality, some are non functional. The SO however informed that 22 of the 55 pipe inlets are active and the inlets built without connection to canals are inactive. Of the 125 km canals, 53 kms is under

the control of the BWDB. At the beginning, the target of BWDB was to cover land only 1,500 hectares for drainage system, latter it was increased about 5,000 hectars which is too ambitious.

Physical Environment

Around 1982/90 when there was small and low height dyke, 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 1995 when BWDB constructed the embankment. Although the construction of polder aimed mainly to protect crops, presently, people are building houses in the beel area (low land area) due to increasing population pressure. Furthermore, the polder area is now connected to national highway system while it was accessible by boat only in the 1990s. The access to road network contributed to increasing number of shops, haat and bazaars and also the demand for housing increased. Use of khas land (also khas canals) for agriculture (also aquaculture, business etc.) has increased. Presently price of land increased due to increased productivity of land and this has accelerated increase of greed and grabbing of khas land and khas canals in the absence of good governance.

2. FARMING SYSTEMS AND LIVELIHOODS

2.1. Cropping pattern and aquaculture

Information varied as to whether the area produced just one crop (local aman) or two crops (local aus and aman). FGD participant Sobahan at village Kalagachia said that only aman paddy was produced before constructing the embankment and for that too, yield was low. Some robi crop was however produced. But the WMA participant Moyna said two crops were produced (local aus and aman) and some robi crops were produced. The fact is that the polder has land of varying elevation. In the low land one crop was produced and in the medium land two crops could be grown. In the relatively high land robi crops could be grown. Another problem of crop production was sand deposit on fertile agricultural land along the riverbank. Now this problem is reduced but the consequence is higher silt deposit outside of the embankment causing drainage problem inside of the polder.

The cropping system has changed after constructing the embankment. Now, two crops are grown aus and aman and in place of local varieties only, in majority of the areas, high yielding varieties of crops are cultivated. Local varieties of paddy cultivated include lalmota, maulota, kutigani, shyamfuli, balam and dudhkolam in aman season and GuriSylati and chikon mala in aus season. These are late aus varieties, planted in May and harvested in Jul-Aug. Several other local aus varieties got extinct more than 10 years ago such as Holo and Girmi as yield is very low but they survived in adverse condition. Aus HYVs are MansurIrri and A. Hai, Teppu, Mala Irri, motaIrri, and vojan. The HYV Ausvarieties noted here are planted in April and harvested in June, hence in the early aus season but this is called Boro. In actual Boro season (Jan-May, paddy cultivation is rare as water get saline in March canals dried for silt deposits and fresh water reservation capacity declined. Farmers wait until March April to prepare seedbed for aus when water can be lifted to canals or there is some norwester rainfall or there is fresh water in the pond.

Important robi crops are mung bean, khesari, oil seeds (mustard and sunflower), chili, bitter gourd, sweet gourd, melon, water melon, potato, sweet potato, groundnut, water gourd, dnata and leafy vegetables. The robi crops and vegetables are not cultivated on large scale and on commercial basis. These are produced mainly to meet household consumption need and to some extent sell in the market for buying other day to day necessary goods and services. Respondent Moyna in the WMA FGD said that cultivation of robi crops (including water melon and vegetables) is now increasing for increased demand and better market linkage. Vegetables are cultivated round the year on the pond dykes and homestead land.

In addition to crops, fish and prawn culture in ponds as well as in the closed is practiced and increasing but still remained low-scale, non commercial. One reason for not commercializing aquaculture is low salinity for which bagda shrimp is not grown here. Another reason is, until recently, high availability of fish on open water area; rivers, canals and beel for which aquaculture was not profitable.

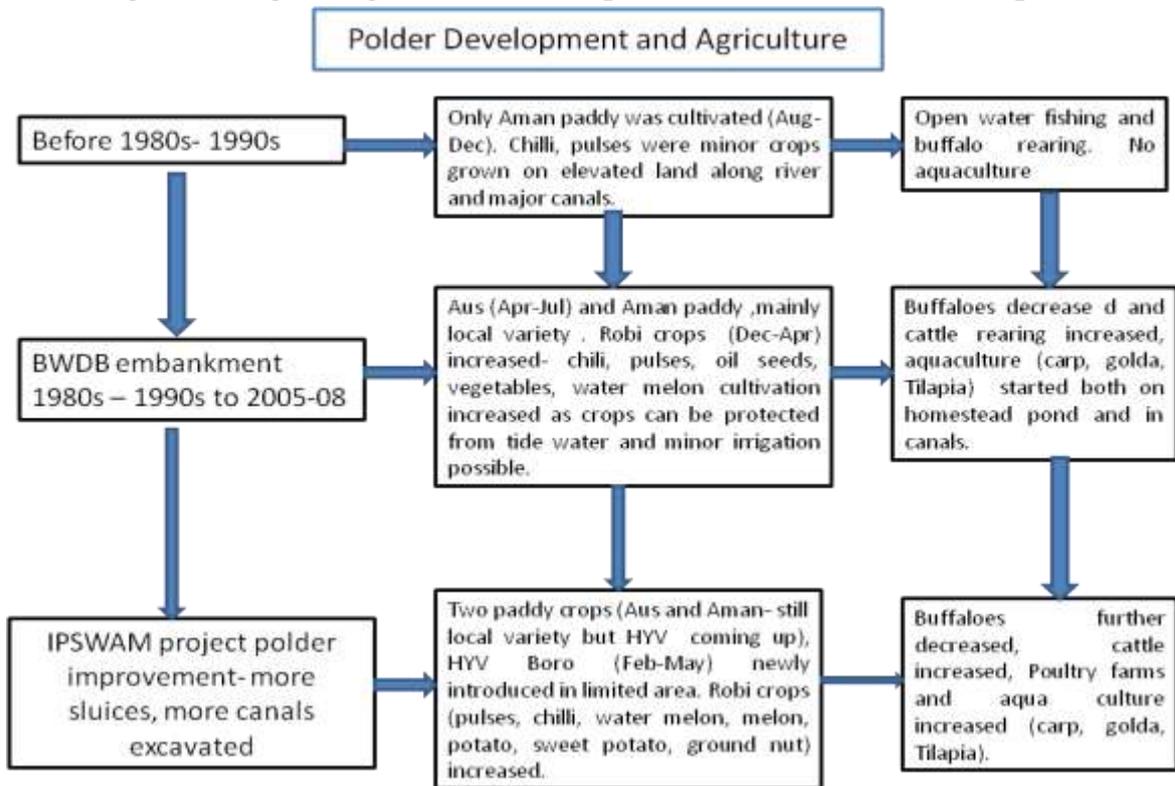
Before constructing the embankment, plenty of fish species like shing, cheng, soil, datina, vetki, magur, pangas, boal, bele, koi, kainmagur, bain, kakila and wide varieties of shrimp and prawn were available in the rivers, beel and canals. Now only cultured fish are seen in the

market like ruhi, katla, mrigel, silver carp, mirror carp, grass carp, Tilapia, Thai Pangas, China shorputi and African Magur. Plenty of Hilsha were caught in the river Payra. Now very little is caught. Respondent of village Kalagachia said that availability of fish in the nature has reduced by 75% in one and half decades. Use of destructive is the main cause as stated by the respondents. FGD participant Rustam of village Dalachara said that aquaculture was not practiced before constructing embankment as the pond dykes submerged by tides and often destroyed.

Crops are grown in all three seasons. The main crop is aman paddy from August to December and second important crop is aus paddy grown during April to July. Third important crop is Boro paddy from Jan-Feb to April-May. In addition, several winter crops are grown during Nov-Dec to April-May, called robi crops. The robi crops include pulses (lentils, khesari, mung bean), oil seed (mustard, sunflower) and spices (chili) and spinach, vegetables and watermelon etc.

Figure 1 below shows change of agriculture in Gulishakhali Union Parishad area with the evolution of polder development.

Fig. 1: Change of Agriculture and Aquaculture with Polder Development



2.2. Irrigation

The main two paddy crops, aman and aus cultivation is dependent on rainwater and fresh water taken in to the polder through the sluice gates. Aus seed beds are prepared in April with irrigation from the canals or ponds that store fresh water in December January or with new rains in April. Aman seedbeds are prepared in June when monsoon already starts. Aus and Aman are planted in May and August respectively and during this period fresh rain

water is available and particularly before planting of aman, river water becomes free of salinity.

Cultivation of Boro is limited and reserve water of the canals and Tube Wells are used for irrigation of HYV Boro paddy. March-May is a critical period when canals dry and river water becomes salty. Therefore, lack of water for irrigation in this period constrains cultivation of HYV Boro. Some wealthier farmers install Tube Well for irrigation and installation of each Tube Well costs Tk. 70-80 thousands that poor farmers cannot afford. Therefore, farmers cultivate early aus instead of Boro. However, water need of robi crop is minimal and reserve water in the canals and ponds can support robi crops and vegetables cultivation.

Respondent Moyna in the WMA FGD said that they reserve fresh water in the canals for irrigation in the summer. FGD respondents at Kalagachia gave similar opinion that water is reserved in the canals and from April with new rains, water level increases and gets in to the canals. But the problem remains that the canals are silted, so their capacity to hold water reduced drastically.

FGD respondents at village Kalagachia said that the sluice gates connected to Sixteen Howlader and Horidrabari canals are opened at the beginning of monsoon (June) when aman seedbeds are prepared in about six to eight weeks aman seedlings are planted. The sluice gates remain open until November-December and then closed again before the start of harvesting aman paddy. The gates are then closed for six months to prevent entry of salt water and cultivate robi crops. Presently, farmers are using flexible pipe of about 200-300 feet length to irrigate land with pumping of water from the canals or ponds.

Owners of high land face difficulty to irrigation as canals adjoining the high land area do not hold water. They have to wait for monsoon when water level in the rivers and canals goes up or they can install Tube Wells.

As ponds dry in March April, farmers owning such seasonal pond have to wait until the beginning of monsoon (June) to stock fingerling. For aquaculture in the pond, mainly rain water is used but for aquaculture in the canals, water from the sluice gates also taken in. This polder is located in the low salinity zone; hence bagda shrimp is not grown. But mixed farming of golda and finfish along with carps is becoming popular.

2.3. Yield and Profitability

Table 7 below provides a list of major crops produced by season, duration of the cultivation when the crop stands in the land from planting to harvest, approximate yield and estimated cost and benefit to owner cultivator and sharecropper. Please note that the per acre paddy yields shown by weight and the equivalent yields per ha are by weight of clean rice where paddy rice conversion ratio is 3:2. In the cost and profit column, V means value of output, C means cost of production, OP means gross operating profit to owner cultivator who need not pay rent, R is the imputed value of rent (paid by sharecropper/ tenant to the owner of land) and SC means operating profit accrued to sharecropper or tenant farmer. The cost includes expenditure on seed, seedling, tillage, irrigation and hired labour but excludes the cost of family labour. If one accounts for imputed value of family labour cost, most crops will show negative profit to sharecropper except probably sun flower, chilli and water melon which are minor crops cultivated in limited area.

The Table 7 below indicates quite high cropping intensity, about 215 percent. This happens so because the area produces both aus and aman paddy and substantial area is under robi crops.

Table - 7: Cost of cultivation and profitability of various crops

Season: Crop	Variety	Duration	Irrigation	Yield	Value of output, Cost & Profit (Tk)/ a cre	Remarks (% of a rea covered)
Paddy Early Aus but locally called Boro	Mota IRRI Mala IRRI Vojan, Monsoor, A Hai	Apr-June	Canal, rain	Paddy 2200 kg/ a cre = 3.6 MT rice/ha	V= 27,500 C= 15,000 OP= 11,500 R= 7,000 SC= 4,500	40% a rea
Paddy Aus (late)	Guri Syloti, Chikon mala	May-July	Canal, rain	Paddy 1500 kg/a cre = rice 2.5 MT/ha	V= 18,750 C= 9,000 OP= 9,750 R= 6,000 SC= 3,750	10% a rea
Aman local late	Kutiani	Sept-Dec	River, canal, rain	Paddy 1600 kg/ a cre = rice 2.6 MT/ha	V= 20,000 C= 8,000 OP=12,000 R=7,000 SC= 5,000	20% a rea
Aman HYV early	BR 11, 39, 53	Aug to Nov/Dec	River, canal, rain	Paddy 2000 kg/a cre = 3.3 MT/ha	V=25,000 C= 10,000 OP=15,000 R=8,000 SC= 7,000	60% a rea
Khesari relay crop with a man paddy	Local Khesari	Nov/Dec- March	No irrigation, natural moisture residue from monsoon	300 Kg/a cre = 0.5 MT/ha	V= 6,000 C= 1,000 OP= 5,000 R= 2,000 SC= 3,000	50% a rea
Mustard		Dec-Feb	No irrigation natural moisture residue from monsoon	Seed 250 kg/a cre = oil 250 lit/ha	V=7,500 C= 2,000 OP= 5,500 R= 2,500 SC=3,000	5% a rea
Sesame		Feb- May	No irrigation natural moisture residue from monsoon	Seed 500 kg/a cre =oil 0.5 MT/ha	V=10,000 C=3,000 OP=7,000 R=3,000 SC= 4,000	5% a rea
Sunflower		Feb-May	Minor irrigation	Seed 1.0 MT/a cre = oil 1,000 lit/ ha	V=20,000 C=8,000 OP=12,000 R=6,000 SC=6,000	5% a rea
Mug bean		Dec-Apr	No irrigation natural moisture residue from monsoon	300 kg/a cre = 750n kg/ha	V=7,500 C=3,000 OP=5,000 R=2,500 SC=2,500	5% a rea
Chilli		Oct-May	Minor irrigation canal & rain & natural moisture residue from monsoon	1000 kg dry/ a cre = 3.75 MT/ ha	V=60,000 C= 30,000 OP=30,000 R=10,000 SC=20,000	10% a rea
Water melon		Dec-May	Minor irrigation canal & rain natural moisture residue from monsoon	4500 kg/a cre = 11.0 MT/ha	V=45,000 C=24,000 OP=21,000 R=8,000 SC=13,000	5% a rea

Fig 2 below shows cropping seasons observed in polder 43/2 F. Difference from conventional crop season is early aus, which is called boro in the locality but starts and end waiting conventional aus season, April to August. This is called boro because high yielding varieties of paddy are grown popularly known as IRRI (because the HYVs initially came from the IRRI in the 1960s) and then IRRI varieties were cultivated during the Boro season. Another important difference is the cultivation of sunflower seed to produce edible oil.

Fig 2: Cropping Seasons

Crop/ Fish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aus (Early)				■	■	■						
Aus (Late)					■	■	■					
AmanLoc									■	■	■	■
Aman HYV								■	■	■	■	■
Khesari	■	■									■	■
Mustard	■										■	■
Sunflower/ Sesame		■	■	■	■							
Mug bean	■	■	■	■								■
Chilli	■	■	■	■	■						■	■
Water melon	■	■	■	■	■							■
Boro Negligible												
Fish/ Golda				■	■	■	■	■	■	■	■	■
Vegetables (on homestead land)	■	■	■	■	■	■	■	■	■	■	■	■

2.4. Livestock

Before construction of the embankment, the polder area had many buffaloes, cattle, goat and sheep. In the situation of high risk of crop production, livestock provided an alternative source of livelihoods along with open water fisheries. It was a survival strategy of the farmers. In the crisis period, farmers sold part of the animal stock to buy food and meet other expenses and in good time they would buy some livestock and allow the existing stock to multiply by reproduction. At that time seasonal fallow land was grazing area. More importantly, rearing of bullocks and buffaloes was essential for tillage of land which is now replaced by diesel operated power tiller.

In the past, each farm household had several pairs of buffaloes and bullocks and a few cows, goats and sheep. Now, only about 10% households have buffaloes, 15-20% have bullocks, 10-15% have goat/sheep and 90% have poultry and duck. However, about 40-50% of the farm households have cow. Usually, a farm household has one or two pair of buffaloes (medium of large farms) or bullocks (small-medium farms) and one or two cows. Rearing of cow is more common among all categories but the marginal farms do not rear buffaloes and bullocks. They rear cow, goat and sheep. Rearing of poultry and duck is nearly universal across farm holding groups.

Scarcity of grazing area, feed and fodder was reported as the main cause of decreasing cattle, particularly of buffalo population. The WMA participants also said that drying of canals reduced natural production of grass and environment to rear buffaloes in particular. FGD participants of village Gulishakhali however said that the number of cattle, particularly cow is increasing again due to increased purchasing power of people to buy milk or afford to maintain cow for consuming milk in the household. Further, improved access to veterinary services has contributed to reduced mortality of animals. However, the scarcity of feed, fodder and grass remains a problem.

2.5. Livelihoods and standard of living

Over the last couple of decades there has been rapid transformation of the economy and the society in the polder area. It transformed from a mono crop subsistence farmer community to a more farm and non-farm rural mixed community, still agriculture retaining dominant position but the non-farm rural sectors increasingly contributing larger shares. The transport sector in particular changed most, from country boat and motor launch to bus service, motor bikes, easy bikes and a variety of smaller road transport vehicles. Now people need not wait for next motor launch several hours to a day depending on route of a day-long country boat journey to the nearest town, Patuakhali. Now people can reach nearest bus station in a few minutes and avail bus or other road transport in another few minutes. The development of polder has particularly contributed to intensification of agriculture and expansion of the nonfarm rural sectors.

The improved mobility has contributed a lot to expanding trade and commercial cultivation. The polder itself has a positive role to serve as a road and improve road connectivity. Also the canal banks became roads and small bridges made the whole area accessible by road transport. Number of transport operators and small traders increased tremendously. The mobility has improved access to urban areas for various trades, services and even day laboring. The labor market is now very wide, to a great extent, nationwide.

With these positive changes, access to education has improved. In the past, people could not enroll children to primary and secondary schools, now many are enrolled in the university level in Patuakhali, Barisal or Dhaka. In the past, students used to go to school wearing gamcha, now everybody has pant shirt. Particularly girls had little access to school as it was difficult for them to walk miles on muddy road or submerged roads. There was a tradition to close school for the day before the next high tide or if the sky became cloudy.

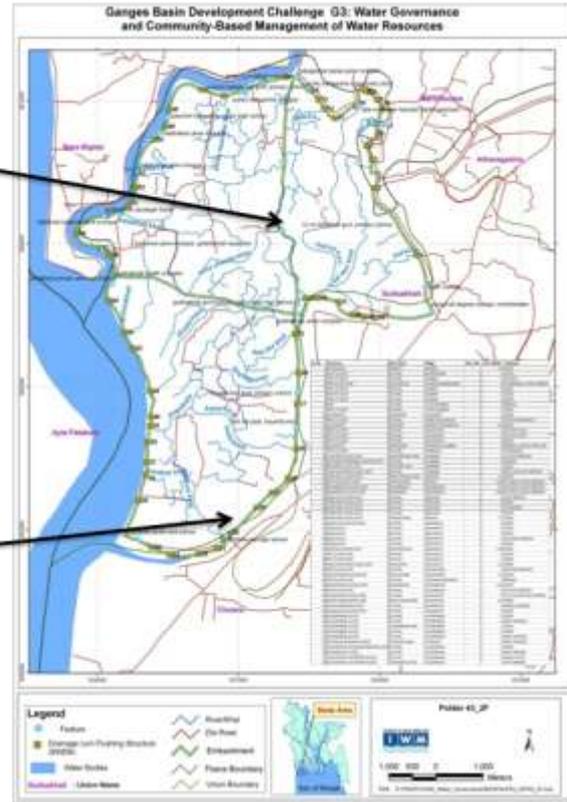
Other Livelihoods



Cattle rearing, still a second occupation of many households



Not a forest. A view of Village, Khekunia, South Gulishakhali. Cattle and buffaloes grazing although their number now decreasing.



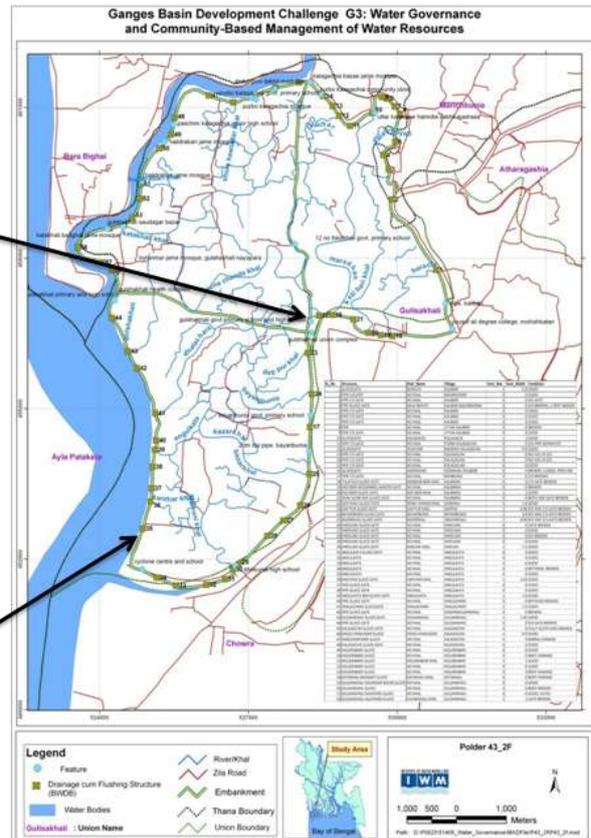
Other Livelihoods



Gulishakhali UP Office and Bazaar with electricity. Some trading opportunities coming up.



Fishing in the river, still a main occupation of many households living along the river Paira.



2.6. Drinking water

Although there is difficulty to fetch water, 100% use water of deep tube well for drinking (Census Report 2011). The WMA participants said that deep tube well water is good in this area as there no report of arsenic contamination. The Deep Tube Wells are sunk up to 900-950 feet to get fresh arsenic free water. Respondents of village Kalagachia said that there was problem of water 12-15 years ago when the polder was just constructed. At that time there were very few DTWs and canals were all closed. Women had walk long to fetch water. Bathing of people as well as of cattle was difficult. Now we have DTWs, ten in this village which can serve 50% of the need. Others walk longer distance but fetch water of DTW for drinking purpose.

Respondents at village Gulishakhali said that people have to walk about 200 meters to fetch water. Government and NGOs provide Tube Well where beneficiaries apply to the government through the UP. Each applicant households have to contribute Tk. 10,000 to 12,000 as share of investment cost and has to share 100% of the maintenance cost. But poor people fail to contribute hence do not get DTW near their house. They have to walk longer distance.

In the past the polder area had many reserve ponds to collect fresh drinking water. Now all ponds are under aquaculture or are unprotected, hence water polluted. Some households store rain water but that is very limited. It was reported that a few years ago arsenic test detected low contamination. Several old DTWs sunk up to 1200-1300 feet depth are revising good quality water but now depth reduced to 700 to 800 feet and water quality is not very good as reported by the participants at village Gulishakhali.

3. PHYSICAL CHARACTERISTICS OF POLDER

3.1. Condition of the embankment

The embankment was constructed in the first half of 1990s including the main sluice gates, hence about 16 years old. However, the infrastructure was severely affected by the Sidr in 2007 about 12 years after construction. During 2005-08 the polder rehabilitation was going on but the works interrupted by the Sidr. Mainly due to the Sidr, but also for poor maintenance and destructive activities by some of the influential elite, the condition of the embankment is “very bad” as reported by the WMA FGD participants. They remarked that, if some more disaster occurs like Sidr and AILA, the embankment may overflow or get damaged. They have reported that the embankment broke near South Gulishakhali, Dalachara, Nayarpar, Horidrabari and Kalibari. They gave one instance of the devastation that the Sidr pushed a motor launch up the embankment at Amtali as the strong current overflowed the embankment. It had to be taken back to the river by cutting the embankment. The Sidr damaged many trees and crops. It was also informed that the embankment is vulnerable near Sixteen Howladar gate and it breaks every year (FGD Kalagachia).

Respondents at Gulishakhali said that the Sidr broke the embankment at several locations and the BWDB repaired them. Respondents at Kalibari said that the embankment along the river Kukua is very bad. An UP Member in the KII said that the “unauthorized” cuts have weakened the embankment and made it vulnerable while the SO of the BWDB reported that many cuts are not “visible” as they are installed at low elevation, most of the times are under tide water and are covered by grass on both sides. Finding them is his responsibility but he seems to have failed to identify them. To him such pipes are “not very harmful”.

The embankment is not only damaged by disasters like Sidr or unauthorized cuts. There are instances that very influential and rich people like owner of brick field cuts the whole embankment to make underpass to allow passage of big trucks from one side of the embankment to the other side. If some disaster like Sidr happens the entire polder area can be flooded making crores of Taka worth damage to the farmers. But the brick field owner damaged the embankment simply to save transport cost in brick business (see picture below, second map from here).

FGD respondents at Dalachara said that LGED constructed 2 kms bituminous road using the BWDB embankment. This part is fine and well maintained. Other parts of the embankment near Dalachara have problems. Some part south of Angulkata gate has riverbank erosion. It was not repaired properly after Sidr.

3.2. Condition of Sluice gates

Only a few gates are in good condition. But the general condition of the sluice gates is that the shutters are often broken and gates cannot be operated comfortably. The broken shutters are often fastened by rope with timber logs. This prevents falling down of the shutter for some time but opening and closing are hampered and ultimately the gates closed.

The IWM map and structure list showed a total of 58 structures of which 16 are sluice gates and 42 are pipes. In total 30 structures are reported to be in good condition of which 11 are gates and 19 are pipes. The remaining 28 are reported broken, damaged or silted. Interestingly, 16 structures are reported inactive and 42 active. It means that 12 damaged structures are somehow operated but it remains a question how long they can be kept operational without major repair and renovation or even reconstruction.

It is also important to note that 38 of the 58 structures do not have any link canal. These structures, mostly pipes must be benefiting only an individual farmer or a few farmers and not many farmers.

A number of examples of gate conditions are described below:

- Gozekhali 3-vent gate is a big one. Its shutter was broken for long time and the BWDB repaired it recently. Now problem somehow reduced but not fully solved. It took three years to convince BWDB to repair it. - (FGD, WMA)
- Shutter of Horidrabari gate is broken and embankment beside it damaged. – WMA FGD.
- Pipe gates are very small with 18 inch dia pipes that flush in water but cannot drain out. However, farmers use them also to drain out when water level inside of the polder rises very high. – FGD Dalachara
- Steel shutter of Dalachara gate is broken. This is a two vent-gate, one vent is still used. It is difficult to operate. Thirty to forty people are needed to pull the gate. While operating the gate one child died by accident two years ago but the gate is not yet repaired. – FGD Dalachara
- Another gate at Dalachara is fully damaged, even the base concrete. It is very risky to open the gate. The steel shutter is fastened with tree with ropes. Four to five people sometimes open the gate but it may cause accident any time. – FGD Dalachara
- There is one culvert near Mr. Anwar's house but it is useless for having no pipes. It cannot drain water. Last rain damaged all crops and farmers lost crops worth Tk. 200,000. – FGD Gulishakhali
- All gates near Gulishakhali are damaged and then closed. – FGD Gulishakhali.
- Gulishakhali gate and Gozekhali gate are in good condition but Naiyapara gate is in miserable condition. – FGD, Gulishakhali.

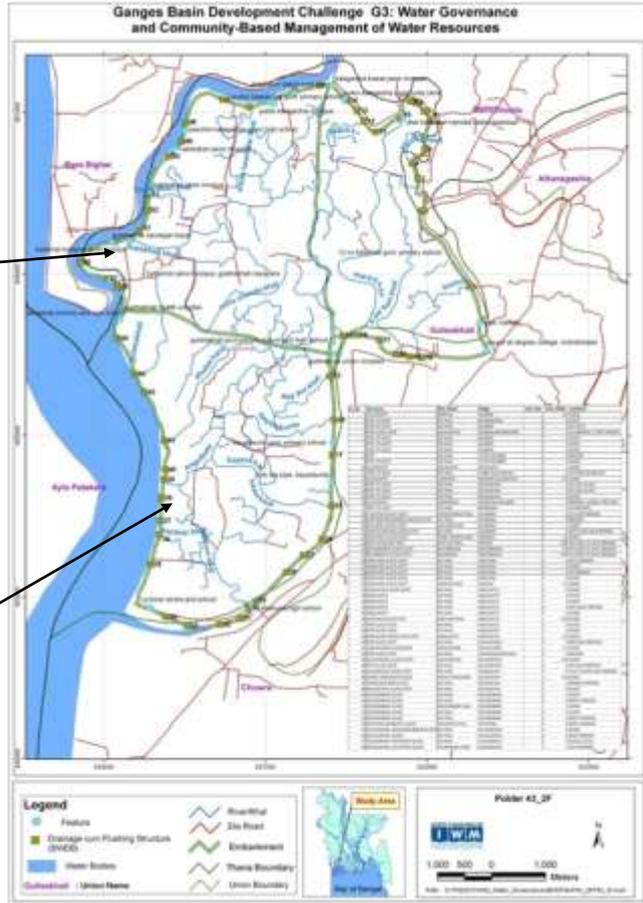
Sluice gate Condition



Sluice gate no 54, functional



Sluice gate no 36, rotator broken but still people kept it functional



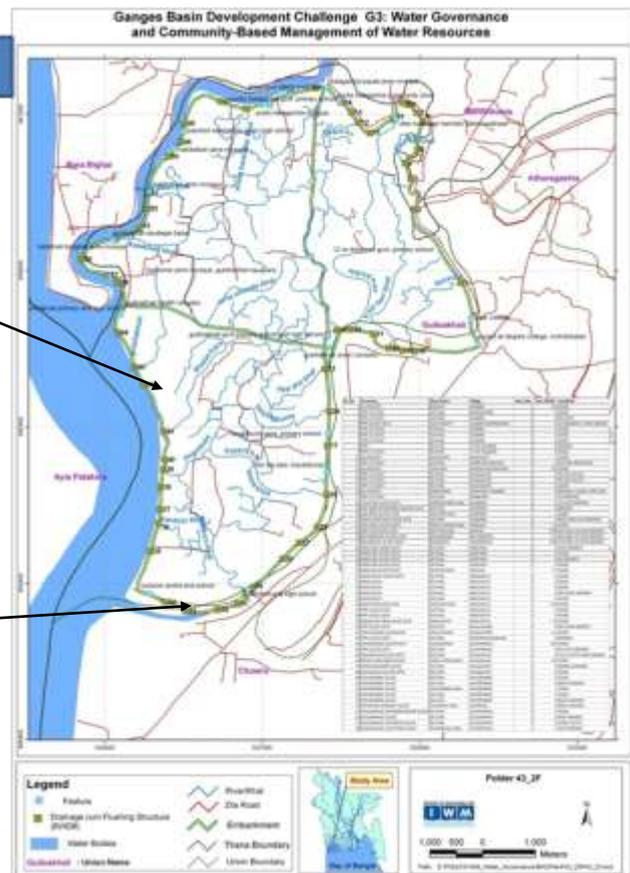
Sluice/polder Condition



Sluice gate no 43, iron rope missing, shutter hangs on the tree



Brickfield owner made underpass by cutting embankment near gate no 35



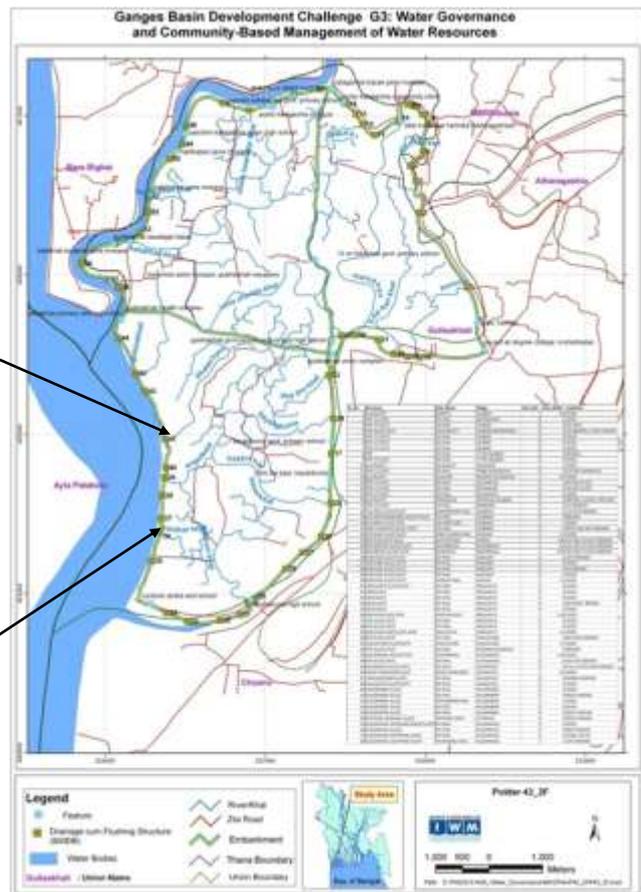
Sluice gate Condition



Canal flowing, one side of shutter joint broken. So, hanged by rope (gate no 41)



Sluice gate no 36, iron rope missing, shutter tied by jute rope



3.3. Condition of Canals

Polder 43/2F Gulishakhali UP is fully surrounded by rivers, the river Payra in the west, river Gulishakhali in the north and river Kukua in the east and south. River Payra is very wide and also the river Gulishakhali is wide. River Kukua is quite narrow. All rivers are getting silted.

The polder has about 40-50 canals of total 125 kms length of which 53 kms under the management of the BWDB (officially) but actually not managed. Most canals are silted and for many of them the canal bed is at about the same level of the adjoining plain land and below the level of the interior beel area. Hence water cannot be drained out properly.

The WMA FGD participants informed that the Majherhotakhal has been re-excavated recently while Rastarkhal (roadside canal), Baorerkhal, Nolbuniakhal, Pedarhotakhal, Deppurkhal, Bainbuniakhal, Patakatakhal and Ronachondakhal have been silted. The IPSWAM project re-excavated Kalibarikhal, North Kalibarikhal, Katakhalikhal, Mondalbarikhal and Angulkatakhal. The IPSWAM constructed six structures including two sluice gates.

FGD participants at village Dalachara said that Angulkatacanal is silted after 1.5 kms east of the sluice gate. Some influential people got lease of the canal from the Government and closed the canal. The leaseholder built a house closing the canal then tried to make more houses but village people stopped them. The leaseholder made four dams at different

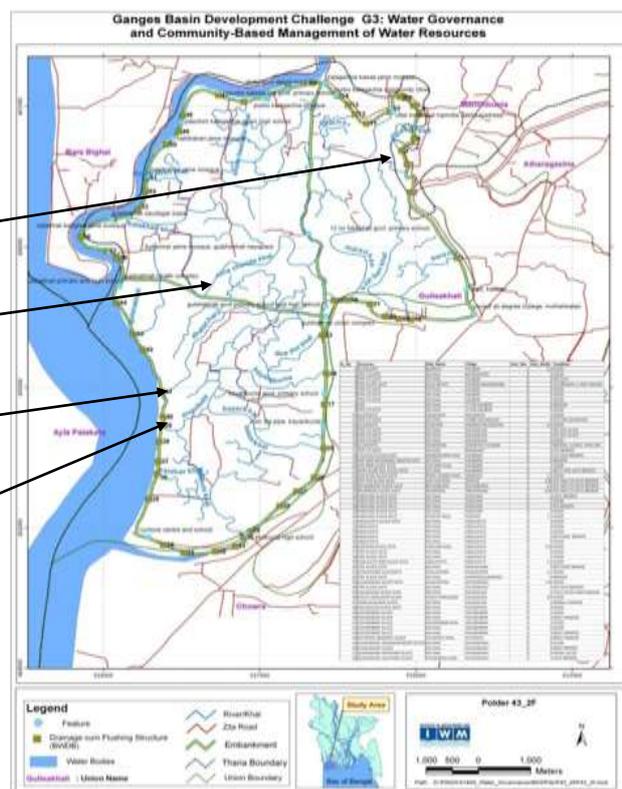
locations converting the canal to several fish ponds. This caused water logging in the area and constrained irrigation.

FGD participants at village Gulishakhali said that this village has several canals. Important ones are Dalacharakhal that is bordering Dalachara and Gulishakhali villages. Another one is Gulishakhalikhal from Ronachonda to river Payra. Both canals fall into river Payra, hence very important for irrigation and drainage but the canals are silted. These two canals have many branch canals but all are silted. It was informed that the canals silted over the last two decades.

The map below shows some examples and location of the silted canals:

Canal Condition

- 40-50 canals in the UP (Dalachara gen FGD)
- 125 kms canals, 52 kms under BWDB (KI SO)
- North part of Kukua river silted
- Ronachanda canal silted
- Dalachara canal silted
- Angulkata canal silted, leased and blocked by leaseholder, 4 cross dams, built house closing the canal.



3.4. Canal Lease

While canals are silted by natural process, the problem of water logging and in the monsoon and lack of water for irrigation in the summer is exacerbated by leasing canals to the influential people while the leasing policy requires that water bodies like canals are leased to fisheries cooperatives and char land leased to the landless. But several canals leased to influential people of course by fabricated documentation like flowing canal shown silted char land and influential people making a fake cooperatives society of fishers.

A few examples of leasing canals are noted below:

- Dalachara and Gulishakhali canals leased out (Gen FGD, Gozekhali)
- The silted canals are given on lease for 99 years! on the plea of helping the landless. The leaseholders make cross dam and convert the canal to private fish ponds. It obstructs the natural flow of water (Gen FGD, Gulishakhali).

- Branch of Kalibarikhalklosed by mud filling 40 yrs ago (gen FGD, Kalibari).
- Nephew of former UP Chairman got lease of Dalachara canal.
- Everybody blames canal lease for water logging, but WMA and WMGs (i. e. Kalagachia) are now demanding such lease as an earning source by aquaculture.

It was stated by the WMA FGD participants that several silted canals have been leased to the “landless” on 99 years term. The leaseholders converted the canals to ponds, completely blocking the flow of water. Instead of leasing them, the canals should have been re-excavated. The respondents said that even if leased, the flow of water cannot be obstructed and this is a condition of lease. But nobody obeys law.

FGD respondents at village Dalachara said that the Dalacharakhal to the east of Cyclone Shelter has been leased out by the Government. The leaseholders made dams closing the canal for aquaculture. Therefore, the farmers cannot use the canal for irrigation and drainage purposes. For not having water flow, the canals are now full of water hyacinth. A nephew of former UP Chairman is the leaseholder who not landless and not fisher to represent “fishers’ cooperatives”. He has been occupying the canal for the last 20 years.

3.5. Main water-related problems

The respondents identified some common problem related to water management in the polders. These relate to irrigation and drainage as well as domestic uses including scarcity of drinking water. The statements relating to water management include the following:

- Canals silted, water storage capacity reduced. So, it is difficult to cultivate robi crops and make Aus seed bed (gen FGD, Gulishakhali).
- Riverbank erosion causing damage to the embankment and making the embankment vulnerable to be damaged if some disasters take place.
- In substantial part, the embankment built on private land. Now people are not willing to allow earth cutting from the adjoining private land. To WMA President, this is “selfishness” and local people must donate and allow earth cutting for own benefit.
- Khas canal lease and high-low land conflict appeared prominently as problems
- Although some respondents demanded DTW for drinking water (like the FGD respondents at Kalagachia) this is not a great problem as distance of one DTW from another is only about 200 m. and every 40 HH has a DTW, now targeting one for every 20 HH (Gozekhali, Gulishakhali).
- Private DTWs are limited as 900 feet boring is too expensive for individual household.
- Salinity goes up during March-April (Gulishakhali) when water from the river cannot be used for irrigation.
- Many sluice gates broken, particularly the shutter broken. Therefore water cannot be stored in the canals for irrigation. – FGD, Kalagachia
- Many of the broken sluice gates are closed by mud filling. Once closed, it is difficult to make them operation again as the shutter is stuck by silt and cannot be lifted even by 40-50 people.
- Installation of DTW is expensive hence ground water cannot be lifted for irrigation. – FGD, Kalagachia.

Besides having general statement of the problems, from each FGD group three top problems ranked one, two and three were noted and compiled. On the whole it revealed

that irrigation and drainage appeared the most severe problems. Both of these were caused by either the natural process of siltation and the problem further exacerbated by injudicious human actions (canal lease and blocking the canals).

The second problem was scarcity of drinking water. This happened so because safe arsenic free and salinity free fresh water layer is about 900 feet below the land surface. Therefore, installation of private DTW is rare and the poor are unable to contribute Tk. 10,000 to 12,000 as share of investment cost per household. The upper income group households do contribute and get DTW one for every 20 to 40 households provided there is no public DTW within 200 meters. The poor fail to get DTW and therefore poor women and girls have to fetch water from longer distance. However, all drink water of the DTW.

The third important problem mentioned was riverbank erosion threatening the embankment. Poor construction, infrequent maintenance work, narrowness of the dyke and inadequate slopes made the embankment vulnerable to riverbank erosion. Embankment of good standard would sustain longer period. Another cause of the vulnerability of the embankment mentioned by the respondent was low natural vegetation along the embankment. In the past, trees and plants grown on the riverbank contributed to lowering erosion but now trees destroyed and riverbank erosion increased.

4. IPSWAM PROJECT

The inhabitants of polder 43/2F are fortunate that they got a project like IPSWAM in 2005 within a decade of constructing it by the BWDB during 1989-95. This section elaborates on the IPSWAM activities implemented prior to the start of the physical work, during the project implementation and its follow up support to the community after completing the physical works.

4.1. IPSWAM Pre-Project

Mobilization and Formation of WMA & WMG

The IPSWAM project facilitated the process of forming water management committee at the beginning of the project. The WMA participants said that the committees were formed in 2005 while the FGD participants at Kalibari said that the committees were formed in 2006. The field team did not check the papers as it was not their job. In the formation stage, the IPSWAM project provided various training to the members and at that time allowance was paid to trainees as well as to trainers. Initially, a mobilization team comprising a male and a female staff came to the village, met all households and informed all about the project. Frequently they held meetings at the madrasa premise and formed committee. They stayed in the area about a year and then went back to Dhaka once the committees were formed (FGD Kalibari).

The WMA participants said that the WMGs were formed before the construction of embankment began. IPSWAM made a survey, then formed a committee comprising all categories of “farmers” (did not mention landless and women) by “election”. The polder has 27 WMGs. From the WMGs, a total of 12 members were taken to the WMA by “selection” (did not mention who selected, BWDB or IPSWAM or elites). But follow-up discussion with two WMA members revealed that, initially, each WMG had 12 or so members, later when registered each WMG comprise minimum 21 members of which 12 are EC members. The 21 general members were elected by the community represented by one member from each household. The 12 EC members were elected by the 21 general members. In the EC, 4 are women members including a destitute woman, one is a fisherman and another one is a landless man. The remaining six positions are open to all, men, women, farmers, teachers, traders etc. In the beginning, 12 EC members were directly elected by the community comprising one voter from each of the 8,086 households. Now the system has changed to send two representatives from each of the 27 WMGs who will elect 12 WMA EC members.

The first elections of the WMGs and WMA were held in 2006 and the same people were elected for another three years in 2009. The third election is now due and is likely to be held in 2013.

WMA participant Mr. Farid Ahmed said that he and other members joined the Somiti (WMA) to have an opportunity to work for the “development of the area”. Initially, there was no problem. All members deposited monthly savings and they were happy to work “for the poor people”. At that stage IPSWAM and BWDB provided training.

FGD respondent Anwar Hossain of Gulishakhali said that they have been working with the IPSWAM since 1996-97. IPSWAM staff formed committees consulting people door to door and the constructed the embankment and sluice gates.

4.2. IPSWAM during project

During the project, the IPSWAM provided several assistances. The most important one was institutionalizing the 27 WMGs and the WMA. The IPSWAM assisted to get the WMGs registered under the Cooperatives Law. WMA is not registered but is recognized by the IPSWAM and BWDB. The WMA comprise 54 members, two from each WMG and for day to day work there is an Executive Committee comprising 12 members. Other assistance comprised physical works like re-excavation of canals, construction and repair of gates and providing pipe inlets for irrigation.

Initially, the WMGs and the WMA had opportunity to give opinion on the type of intervention and particularly on the location of the sluice gates and excavation of canals. Initially, meetings were held quite frequently, opinion taken and honoured (WMA FGD). The LCSs were engaged to re-excavate canals and the WMA monitored the work based on which LCS workers were paid. But the site selection opportunity was soon elite captured. The pipe inlets located at such point where canals cannot be linked and therefore only a few benefited.

IPSWAM re-excavated canals and for doing that engaged LCS. IPSWAM project work is closed since 2010 and it is learnt that new phase of IPSWAM will start soon, said WMA participants.

The WMA participants however also said that at a later stage of implementation the IPSWAM did not honor community demand to re-excavate canals deeper and stopped allocating irrigation pipes. The respondents specifically mentioned that meetings were held quite regularly until September 2010 when the project was closed. Now meetings are not held and peoples' opportunity to give opinion diminished.

During the project, members received training and such trainings were held in Amtali, Patuakhali and Barguna. During that time, people were informed when meeting will be held and where (did not mention what to discuss). Members attended meeting and were encouraged to work. After the departure of IPSWAM, there is no more progress.

Participants at Kalagachia said that the IPSWAM project closed four years ago, meaning 2008 while the WMA participants said 2010 (correct answer is 2010, it means that there is lack of information sharing). Some informants said that, due to improper excavation and neglecting de-silting, the re-excavated canals have been silted again. General FGD members at village Gulishakhali said that they are partially benefited. Improved irrigation facility by re-excavation of canals would benefit them further but the WMA is not helping them (may be unable to help as the project closed and the WMA has no fund to work independently).

4.3. IPSWAM post-project intervention

It appeared from the discussion that everything is project centered. It is evident that the IPSWAM not just facilitated, but in reality formed the WMGs, then WMA and then ensured registration of the WMGs. Door to door visit, engineering survey, listing of household, forming of groups, holding of election and selection, inclusion of members from various socio economic groups (landless, women, fisher, farmer etc) were not only lead but in fact enforced by the IPSWAM project. Training was provided and motivational work done but still the service was seen as of patron client relation rather than partnering. The community stayed in the recipient end and they love to be in the recipient end. Unlike LGED sub projects; there was no visible effort to frame and incentive structure to make the WMA and the WMGs

more self reliant. Ten taka monthly savings is too inadequate to make the organizations self reliant. Some WMGs have only 25 or so members and some have 200-250 members. The WMGs have accumulated capital of Tk. 25,000 to 250,000. The WMA has no fund. Some of the WMGs have given loan to members and are reportedly recovering loans with interest. Those having very little fund are not lending. The WMGs spend some money on repair of gates like replacement of nuts, bolts and greasing. The WMA has no income and no spending. For petty expenses like register books, record keeping, tea and snacks in the meetings and conveyance the WMA members must be spending own money.

As noted earlier, the IPSWAM helped establishing the WMGs and the WMA. The WMGs are responsible to operate gates in respective area and pay for minor repair noted above. The WMA has more coordination and liaison role to identify problems and report to the BWDB and other higher authorities. If BWDB or the IPSWAM allocates fund for LCS work, makes 25% advance payment to the group account and pays the remaining amount by installment subject to certification by the WMA. The role of WMA is selection of LCS group members, monitoring of the work and certifying on the quality of work.

The SO of BWDB reported that the IPSWAM procured cement concrete pipes and distributed them to the WMA for improving drainage. It is however alleged that most of the pipes were sold and others set at improper location in the interest of a few influential people (FGD Dalachara).

It is reported that 32 LCS groups excavated canals or repaired embankment in the first year, 33 in the second year, six in the third year and 16 in the 4th year. The number of LCS group engaged exceeded the number of WMGs indicating that from some areas more than one LCS was engaged. Total number of schemes taken up for canal re-excavation was 20 but some respondents said that only three or four canals were excavated (Gulishakhali FGD). The WMA President however stated that this is wrong information and someone not liking the present WMA must have said so.

FGD respondents of village Dalachara said that water management is not running smoothly in polder 43/2F. They remarked that many sluice gates damaged but WMA executive do not care. They said that the term of the committee expired long ago but the same people occupying chairs and no election held to change leadership. To them the WMA is not function at all. Some respondents of the same village said that when open meeting held in the school compound, we know about the WMA activities. Such a meeting held more than two or three years ago. The group observed that the WMA was active four to five years ago.

FGD respondents at village Gulishakhali said that the BWDB constructed the embankment with sluice gates and culverts and installed some irrigation and drainage pipes. The BWDB formed the WMGs and the WMA and set people in the key positions like President, Secretary and Treasurer where ordinary people had no participation. In their opinion, the WMA executives work "in their area", not on other areas. Canal excavation work at Gulishakhali is still incomplete. Some respondents even remarked that the WMA is captured by three persons, President, a Vice President and Secretary. The WMA president remarked on this point also saying that somebody not liking the present committee must have said like this.

About sustainability of the organization it was remarked that without government help the WMA will not be able to do any work. Some informants at Gulishakhali said that the committee comprises elite people who never put off shoes, so, they cannot work for the poor people. It is surprising how the women, fisher and landless people participate in the EC.

5. LABOUR CONTRACTING SOCIETIES

5.1. Formation of LCS

In polder 43/2F only one LCS group was met at Village Gozekhali. The FGD group comprised five respondents including a female respondent. Of the five respondents, one is homeless who made a small dwelling at relative's land and others own 16 decimals to one acre land. The female respondent belongs to a household owning 32 decimals land.

The LCS was formed in 2005 and they got work from IPSWAM in 2006. The works comprised re-excavation of canal and repair of embankment. It is learnt from the WMA president and the SO of BWDB that in 2006 a total of 32 LCS groups worked in the polder and the five respondents must belong to two of them (one group of male LCS members and another of female LCS members).

As stated by the respondents, the group comprised 50 workers and none of them was WMA or WMG members. This is an indication that the landless and poor are usually excluded and not enrolled as general members while four women members and a landless members are included in the EC to "fulfill the requirement" rather than really meaning it. All of the five LCS members met expressed interest to join WMG except the female respondent who feltherself an old woman (although she is only 50 years old).

Payment

Male and female LCS groups are different from one another. Payment is made on the basis of job contract. If a particular work is contracted, say repair of one km embankment at estimated cost of Tk. 500,000, the BWDB deducts VAT and TAX payable to the government and 25% of the amount payable to workers is transferred to the LCS account of the group (about Tk. 112,500). The remaining amount is paid in two or three installment depending on the progress. Last amount is paid after satisfactory completion of the work. If work done is less than estimated amount, payment is made proportionate to work. The WMA monitors progress and certify on the quality of work and actual payment is made by the IPSWAM project of the BWDB.

The issue of discrimination on wage by gender does not arise as payment is made on the basis of work done. How many days taken to complete the work and whether the LCS members are men or women are immaterial. The WMA president said that male and female LCS workers earned similar amounts and there was a positive discrimination favoring women workers, male LCS groups deployed in relatively difficult work such as for re-excavation of canal and female workers deployed for repair of embankment. The WMA president said that the whole money received from the project is distributed among the group members. If this were true wage rate of both male and female workers would be around Tk. 300-400/day. But a female household head who worked as LCSlabour got daily wage of Tk. 150 and she said that male LCS workers got Tk. 300/day.

One farmer, who is not LCS labour but knows many LCS workers said that, actually the sarder turns into contractor who pays workers lower wage, often on daily basis. He said that the women LCS labour is correct and male female labour got wage from the LCS at daily rate of Tk. 150 and 300 respectively. This is about the same of market wage rate but LCS work is preferred for getting employment for several weeks to a couple of months at a time. Private works are of much shorter duration.

Training

BWDB provided some training to the LCS members. All four male respondents attended training organized by the IPSAWM project. The trainees were taught how to repair embankment and re-excavate canals following the design and instruction of the supervisor and the engineer. The lone woman respondent however did not have opportunity to attend such training. The woman respondent did some earthwork also for the NGO CODEC and NoboJibon and also there she did not receive any training.

Specific problems

About problem of LCS work the respondents said that to the work is awarded very late and monsoon rain starts. This affects meeting of targets which means that earning per day is reduced as work is done by job contract rather than on daily wage basis.

Also there is no problem related to gender or risk of sexual harassment as men and women work in separate groups. There is no problem of security also as work is done in own village or neighboring village area.

Only problem is lack of having regular work. The BWDB has formed new LCS group hence old IPSWAM groups are not getting work.

5.2. LCS livelihood and standard of living

In the absence of regular work, the LCS members have to find work elsewhere. After 2010 there is no IPSWAM activity hence the LCSs have no work. Woman LCS member Anwara is engaged in mat making, sewing kantha (Indigenous quilt made by old clothes) or works as agricultural labour. These are relatively low-paying work compared to LCS work but less laborious. She sometimes works as earthwork labour with NGO CODEC, NoboJibon and Ahsania Mission. Male LCS workers get involved in earth cutting for the contractor or private employer for digging pond or raising homestead land. Some male LCS workers like Noor Mohammad join wood cutting, mason labour or carpenter helper. This means that they find some work whatever is available.

All respondents said that there has been positive change after constructing the embankment. Cropping intensity and productivity increased, hence more work available. The LCS work is an added advantage although not always available. In the past, they could not afford three meals a day, now there is no such problem. Besides, children are enrolled to school and housing status improved. Some like Rafiq have bought cow and even some land. Those owning some land like Rafiq, Farid and Barek cultivate own land producing aman, aus and robi crops.

6. MAINTENANCE OF EMBANKMENTS, CANALS AND SLUICE GATES

6.1. Maintenance by BWDB

BWDB bears overall responsibility to maintain the including the structures and re-excavation of canals. However, the BWDB lacks resources to properly carry out the activity. Main problem is budget allocation, if there is no project. With these constraints, the BWDB is doing maintenance but not infrequently and inadequately.

A few remarks of the respondents will make the point clear, to what extent the BWDB is active or inactive:

- BWDB is not much active – General FGD, Kalibari
- BWDB executes repair by tender. This refers to work implemented with BWDB maintenance fund and not the IPSWAM fund. For IPSWAM, LCS is mandatory. – WMA
- The works executed do not serve the purpose as there is no continuity of maintenance and re-excavation. Canals excavated have been silted again (and many gates broken). - WMA
- The community demanded deeper excavation of canals (but technically the excavation cannot go below the plinth level of the gate). – WMA
- BWDB does not take initiative to repair structures and re-excavate canals. Sometimes they come after repeated request, inspect and give hopes but do not execute work (possibly for budget constraint). – FGD, Kalagachia
- BWDB implemented some re-excavation work. The quality was poor, fund misappropriated and it did not really help serving the purpose. – FGD, Kalagachia.
- BWDB excavated Horidrabarikhhal but 16 Howladerkhal was not excavated, although needed. – FGD, Kalagachia.

6.2. Maintenance by the WMA and WMG

The WMA does not play any role in maintenance except identifying the problems, needs and reporting them to the BWDB. They liaise and lobby at the BWDB and with higher authorities to allocate fund. Once fund allocated against specific works, the WMA makes list of LCS groups and members with the assistance of the WMGs in the concerned area and forward the list to the BWDB. The BWDB awards work to the LCS; pays advance and subsequent instalments and supervises the works. The WMA monitors progress and report on quality based on which the BWDB decides to make payment or hold it. This applies if the allocation comes through the IPSWAM project. In the case of maintenance under BWDB's own allocation, the WMA is not involved.

The WMA has no fund and they are not involved even in petty repair work except on emergencies. The concerned WMGs however do some repair work like replacing nuts and bolts and greasing in the gates.

6.3. Maintenance by Union Parishad

Although the UP lacks resources in terms of finance, institutional support from the government, the UP Chairman and Members were found active to repair small embankment and re-excavate canals. The UP members are involved in the WMGs in respective ward and the Chairman has an oversight role. General FGD participants at Kalibari said that the UP executes repair work utilizing the allocation of 40 days employment support programme. The SO of the BWDB said that the UP Chairman and Members helped forming the WMGs and the WMA. UP Member of village Kalagachia said that if some damage occurs, the UP mobilizes people to work voluntarily. On

several occasions the UP Chairman contributed personally to make some repair work, said an UP Member in the KII. But as an institution, the UP some times repairs embankment and re-excavates canals.

FGD respondents at Kalagachia said that UP executes some repair and re-excavation works responding to local need and repeated appeal by local people. Because, if some problem arises, people come to UP Chairman and Members and they cannot simply say “no”. When a road broke, the Chairman made a bamboo foot bridge. They repair embankment although not at least to stop water coming in temporarily. Better repair needs higher investment which is beyond the financial capacity of the UP. In such case, the UP reaches local demand to the concerned authority (the BWDB, UpazilaParishad, DC and MP).

FGD respondent Mr. A. Awal of Kalibari said that, in the past UP did all work and any government work was implemented through UP. Now, the UP is less powerful. The UP should be strengthened again. This was the view of most respondents. Respondent Delwar of village Kalagachia said that UP should be involved in the distribution of khal land. Respondent Sultan Fakir of village Gulishakhali said that UP must have coordination role in the implementation of all projects of the GoB agencies as well as of the NGOs.

6.4. Maintenance by gher owners and landowners

In polder 43/2F shrimp gher and other forms aquaculture is rare. Hence there is not much urge and financial capacity of the landowners and other private producers to maintain infrastructure. So, the gher owners and gher owners are not involved in repair and maintenance except of private pipe inlets/outlets. They contribute voluntary labour if there is some emergency (own labour or hired labour) and monthly savings to the WMGs.

6.5. Emergency response

Polder 43/2F was severely affected by cyclone Sidr in 2007 and less severely affected by AILA in 2009. Besides these two disasters, several tide cycles about the end of monsoon season damaged embankment and a number of sluice gates. It was reported by the respondents that in such emergencies local people, UP, WMG and WMA all join hands to repair the gate and the embankment at least on a temporary basis to protect the area. For larger interventions they approach BWDB and the government for the needed support.

FGD respondents at Kalibari said that the polder area was affected by cyclone Sidr in 2007 and many NGOs helped. In 2011 sluice gate near Kalibari was damaged. It was not possible to make dam front of the gate and the beel area was flooded. Local people repaired damaged part of the embankment with mud filling and bamboo fencing. The area remained submerged about five months.

FGD respondent Mr. Aziz of village Kalagachia said that, we come together only when there is emergency situation. Otherwise we do not work united. FGD respondent Mr. Delwar of the same village said that, initially we work voluntarily to protect ourselves and at a later stage executes more repair work. NGOs have little role in immediate repair work (they distributed relief materials and later helped to repair infrastructure).

To better respond to emergencies, most participants desired empowerment of the Union Parishad. FGD respondent at Kalibari said that the UP should lead and people to work voluntarily. FGD respondents at village Dalachara said that repair work must be done through UP. Some gave technical suggestion to reserve thousands of sacks full of sand prior to disaster month so that damage can be prevented in a few hours. Some respondents at Gulishakhali said that the WMA

members do not call people, so people cannot participate. They alleged that the WMA members are not farmers, so they are not active. Some respondents of Gulishakhali said that the MP provided fund for repair work after Sidr but work was not done properly.

The NGOs

The NGOs and MFIs active in the polder include CODEC, BRAC, PROSHIKA, Nobojibon, Ahsania Mission and Grameen Bank. There may be more but these are the few names mentioned by the respondents. The respondents blamed NGOs for charging high interest. All NGOs have micro finance as main programme but some have infrastructure repair activity (CODEC, Nobojibon and Ahsania Mission) and some have agriculture support activity (BRAC). The infrastructure repair works by the NGOs were implemented after cyclone Sidr and the NGOs had considerable involvement in distributing relief materials.

6.6. Institutional responsibilities in maintenance

Discussions above in the four sub sections indicated involvement of several institutions in the maintenance. Their roles are briefly described below at Table 8.

Table – 8: Institutional responsibilities and roles played by various actors in maintenance

Tasks	Who does	Whose mandate	Comment
Minor maintenance	WMG, UP	WMA	WMA has no fund.
Major maintenance	BWDB	BWDB	Infrequently and inadequately
Emergency maintenance	WMG, UP, WMA	BWDB	By voluntary work
Excavation of canals	UP, BWDB	BWDB	UP uses 40 days employment support fund and BWDB uses GoB allocation

6.7. Participation, exclusion and gender

Meaning of participation

To the respondents, participation meant the following”

- People from all “class” to work together – FGD, Kalibari.
- The landless should also participate (interestingly, did not mention women). - Kalagachia
- Inviting “all” to discuss problems – FGD, WMA
- Inviting “selected people” for all villages, the “elderly people” *murubbi*– Kalibari
- Inviting people to “attend meeting” – Kalibari
- Taking decision based on “discussion” reaching “consensus”. – WMA
- Those most affected must be included in the WMGs/WMA - WMA

Reality in participation

While the respondents used many good words to mean participation, which reflects their good understanding and wish, but the reality was very different. In reality, participation was very low and ineffective and particularly the government agencies did not properly value the peoples’ opinion. A number of statements below illustrate the status of participation in the polder:

- The BWDB does not value peoples’ opinion. To them it seems not very important. – FGD, Kalagachia

- There is some transparency in IPSWAM project execution. The BWDB and WMA display information in signboard at work sites such as related to canal excavation works.
- People are busy with own work. Not interested to give time voluntarily to attend meeting or opening or dosing gates that require huge amount of manual work. Also, people lack awareness and motivation. – WMA
- There is little participation, meetings not held regularly. – FGD, Kalagachia
- People valued only during the disasters when people have to work voluntarily. But when people request to repair infrastructure before disasters, the GoB agencies do not listen.
- UP consults people and listen peoples' views. – FGD, Kalagachia
- The WMA also consults people (the WMGs in particular). – FGD, Kalagachia
- Only farmers are interested to participate as they are directly affected.

One respondent gave a funny answer (Gulishakhali). Committees are formed with "lower class people" meaning landless, fisher, destitute women as three representatives and another three women representative. To him such lower class people are included unnecessarily. He opined that only farmers (meaning landowners) should be in the committee. He might be one, but this view reflects an unpleasant truth, how the participation of the marginalized people seen by the society.

Improving participation

To improve participation and better inform people a number of suggestions came from the participants. These include:

- Holding meetings
- Miking, loudspeaker announcement
- Decisions should not be imposed

Gender

As per population Census 2011, women outnumbered men in the polder 43/2F, Gulishakhali UP. The reason could be higher out migration of men rather than women for work in the urban areas and in other districts. Sex ratio (M/F*100) was 92. The polder area had about the same level of literacy compared to national average (overall 53%, Male 57% and Female 50%). About 74% of the females of age 7+ not attending school was reported to be engaged in household work only, 21% was reported non working and only 5% reported to be employed in income earning activities. The information presented in the census report relating to women's participation in economic activities should be read with caution. "Age 7+ not attending school" is not a good definition of labour force. It should have been 15+. If all children of age 7 to 14 were attending school then the percentage distribution would be free of distortion but this is not the case. More importantly, the census must have grossly undercounted working women and many recorded housewife even without asking, and even if asked without understanding. Actually, percentage of working women should be 20-25 and non-working women should be around 10 percent and the remaining 65-70 percent might be engaged in household chores. And, the household chores include considerable amount of farming activities such as livestock rearing, kitchen gardening and post-harvest work which are not seen as income-earning but of course expenditure-saving. The female household head not selling egg or chicken but entertaining son-in-law with the eggs and meat of her backyard poultry definitely has economic value.

Besides undermining women's work as noted above, the society has burdened women with the responsibility of fetching water from outside of the house (FGD, Kalagachia) but saying that women work only inside of the house.

If there is forecast for cyclone, men takes care the embankment does not break and repair breaches and closes the gates while women takes responsibility of shifting children to safer place.

This seems a good arrangement but in the absence of inadequate cyclone shelters and other safer place, women face difficulty of bearing this responsibility (FGD, Kalagachia).

Much of the discrimination and subordination of women is related to the gender role and division of labour defined by the social norms. In agriculture, paddy planting and harvesting are men's job while harvesting of minor crops like chili and post harvest activities of all crops like drying and winnowing are women's job. In the latter activities, wage rate is lower and in such activities women are employed because they accept lower wage and such softer but more time consuming and tedious work can be done cheaper by engaging women labour (like picking tea leaves).

In the LCS, payment is made on the basis of job contract. It was therefore said that there is no discrimination of wage by gender and women LCS groups are deployed for relatively easy work (in embankment repair and not in difficult ones like canal excavation). For this positive discrimination female labour can earn about the same wage like male labour in the LCS. This was stated by WMA president and another man. But the female head of household met at KII said that each male LCS worker gets Tk. 300/day and female labour gets Tk. 150/day. One farmer, not WMA member and not LCS labour said that the BWDB pays on job contract basis but sarder turns into contractor and pays LCS labour which is about 150-200 per female labour and Tk. 350 per male worker. This is not very different from market wage rate. Still, LCS work is preferred for getting employment for several weeks or months at a time while private employment is of shorter duration.

It is required that four of the 12 WMA EC members are women. But it seems that they are ornamental members to show that the requirement is met. In the FGD with WMA members, two women were present but the one talked was the wife of the WMA president. The second one was silent most of the time. This reflects reality, how the women participate in the WMG or the WMA.

7. OPERATION OF SLUICE GATES

7.1. Operation through WMA & WMG and BWDB

The BWDB is not directly involved in the operation of gates. Also, the WMA is not much involved in operating gates. This is the responsibility mainly of the 27 WMGs. How the WMGs carry out the responsibility is illustrated below:

- The sluice committee or WMG decides about opening and closing of gates. If some conflicts arise the WMA inform other agencies. – WMA
- At Dalachara, the WMG recruited two gate operators. To pay their remuneration, farmers contribute some paddy (5 to 10 kg per season). Recently there has been problem, farmers did not get water for irrigation and many stopped contributing paddy. – Dalachara FGD
- In the past, there was no gate operator. The WMG recruited operators after Sidr. – Dalachara
- Once damaged, gates are not repaired. Hence it is difficult to operate gates. Local people have fastened steel shutter of the gate by rope with trees. It was said that 30-40 people are needed to open or close gate. So, if closed people do not find interest to open and close again. The WMA president however said that 8-10 people can open the gate. Still it is a problem. If gate is not damaged, one person should be able to operate.
- WMG president decides. One Mr. Howlader keeps the key and orders opening and closing. – KII with paddy farmer.
- WMG of concerned gate decides opening and closing. But the adjoining house owners dominate. – SO, BWDB and UP Member, Kalagachia
- The WMA engaged 3 volunteer gatemen. They did not work. Then the WMG recruited two gatemen. They are paid irregularly and not working properly. – FGD, Gozekhali.
- WMA recruited gatemen. Remuneration for operating one gate is 400 kg paddy yearly worth Tk. 6000. – FGD, Kalibari
- When opening and closing needed, committee members are not found. – FGD, Gulishakhali.
- Committee members are busy with influential people. – FGD, Gulishakhali

The above statements imply that the WMG is making decision on opening and closing and the gate operators (not called gateman to avoid confusion with the former BWDB recruited gateman) do the job. But in this polder one or two persons can't do the job as broken gates need more people (10, 30-40 or 40-50). It is surprising that only a few years old gates are broken.

Farmers in this polder seem not very actively participating to operate. A few kgs paddy per season to pay gate operators and they too are not paid and operators stop working then more farmers stop paying. This makes operation and petty repair in a miserable condition. But, people do respond to voluntary work when they are about to sink.

7.2. Operation through Union Parishad

The UP is not much involved in operating gates but they are quite heavily involved in minor repair and re-excavation work discussed earlier. However, the Ward Members are involved in the concerned WMGs and there they have a voice in deciding opening and closing and local level conflict mitigation.

7.3. How gate operation takes place

Since the polder has no bagda farms, gates need not be opened and closed every alternate tide or ebb or every alternate week in loner months. Gates are opened or closed on the basis of crop seasons. Respondents at village Gozekhali said that the gates are kept closed during the robi season Oct-Dec to Mar-Apr. This is good for robi crop farmers. But the farmers making seed bed of paddy need water in the canals in March then conflicts arise. The gates are opened in April after harvesting robi crops to make seedbed for aus paddy and the gates remain open until about Oct-Nov when robi season starts and aman paddy does not need any more water. Within this period, some gates are opened, if there is no rain fall to prepare land for planting aus paddy in May-June and if there is excess water, gates closed again in July to prevent entry of flood water.

Table 9 below provides a description of gate operation in Gulishakhalipolder area.

Table 10: Operation of sluice gates in Gulishakhali polder area

Type of Gate	Formal authority as stated by respondent	Effective control	Gateman	Gateman's pay/ Cost & how paid	Remarks
BWDB gate	WMG	WMG, adjoining landowner	Recruited by the WMG	WMG, paddy contributed by farmers	Payment not regular
Private gates	Individual farmers	Individual farmer	None, wage labour of owner		
Pipes	Individual farmers	Individual farmers	None, wage labour of owner		

8. CONFLICTS

8.1. Conflicts regarding paddy and shrimp farming

Polder 43/2F is a low salinity area and there is no bagdagher. Hence paddy shrimp conflict is not prominent here. Aquaculture is mainly seen in the ponds and that too in the homestead pond not much on commercial basis. However, aquaculture in the canals by leaseholders and influential people is an issue who blocks the canals. This is different problem discussed under section 8.3.

8.2. Conflicts regarding high-low elevations

Conflict between farmers owning/operating high and low is a major problem in this polder. When the high lands need water for irrigation because the land is still dry and could not get enough water, the low lands have excess water already and submerged. This problem arises also at a time when preparation of aus seed bed in March requires water from the canals, the adjoining land with mug bean and other robi crops need to be kept dry some more weeks. This time clash creates conflict between robi crop growers and aus seed bed makers. One group wants to bring water from the river to the canal and the other group wants to keep the canal dry as it floods the robi crops.

It happens sometimes that one group opened the gate to take water for aquaculture or for making paddy seedbed (at night) so that others do not see them, robi crops like khesari are flooded.

Farmers of the low land need drainage facility and to make a connecting drain to the canal, they need cutting of high land. This creates problem between high and low land owners.

8.3. Conflicts regarding control of gate and canals

This is a conflict in this polder and this conflict is manmade. Many canals are leased to influential elite and local power holders. The leaseholders and encroachers have blocked the canals by making earthen dams and the canals became aquaculture ponds. Some have even built house blocking the canals. Some canals have been blocked by the "landless" making series of fish ponds completely blocking the canals. These are done no to help the landless or develop aquaculture but these are just meant for grabbing of public land for private benefit by those holding power at the local level and by managing the local land administration, not to mention how things are managed. The result is closing of the canals making the sluice gates useless and depriving farmers from irrigation and drainage facility.

8.4. Conflict mitigation

The respondents tended to recognize that there are conflicts and they have also indicated the types and causes of the conflicts. Regarding the conflict mitigation, names of two institutions came prominently. One is the Water Management Association and the Water Management Groups and the other one is the Union Parishad.

It was stated that, if some conflicts arise, the concerned WMG and if needed the WMA sits with the conflicting parties, talk with them and resolves the problem. Very often, the aggrieved party seeks help of the Union Parishad Member and Chairman and then the UP mediates the resolve the conflicts.

There was no mention of the conflicting parties approaching Upazila Chairman or UNO to mediate. It did not come up and could be rare because there is no shrimp gher and therefore the conflicts could be less in number and of small size not involving millions of taka investment by one case.

Smaller conflicts like robi crop versus aus seed bed and high low land issues are often resolved mutually or by intervention of the WMG/WMA and UP. The time and duration of opening and closing gate is adjusted. But big issues like canal grabbing are not resolved so easily. In one instance, making of more houses on the canal was stopped but the one already build could not be removed. Also, the grabbed canals cannot be freed of lease or of encroachment which requires tough administrative action and legal measures with the involvement of the Upazila and district level land offices. The bureaucracy avoids going so far and it is not so easily accessible by the ordinary farmers. Nobody takes initiative to become personally victimized for public benefit.

9. CONCLUSION

9.1. Summary of findings

Location: Polder 43/2F is located in AmtaliUpazila of Barguna District, about 30 kms south of Patuakhali town and 10 kms north of AmtaliUpazila town. It comprises only one Union Parishad, Gulishakhali comprising about 56.22sqkms. The polder is encircled by about 32.5 kms embankment along the rivers Payra in the West and Gulishakhali in the North-west and Chawrakhal in the east and south. Within this boundary, there are six mouzas (village as per land revenue map) such as Gulishakhali, Kalagachia, Fakirkhali, Kalibari, Gozekhali and Khekuani. The polder has other villages which are considered village by the community but treated part of the relevant mouza by the land revenue department. A few examples of villages but not mouza are Dalachara, Bazarkhali, Bainbunia, Deppur, and Horidrabari. In total the polder has more than two dozen villages and roughly one village has a WMG.

Population: Total population of the polder 43/2F (Gulishakhali UP) is 28,458 with average household size 4.4 but population density much lower (506) compared to the country (1000+). Compare to male population female population is higher as evident from the sex ratio, 92 males for 100 females. Most people (about 95%) are Muslim by religion. Literacy rate of this polder is only 53.4% about the same of literacy rate of the country.

History of polder development: Polder development has been a long process. In early 1960s there was a narrow dyke and it could not resist high tidal surges caused by cyclone and then the Government of East Pakistan built a small ring embankment at 50 feet distance of the river in 1965. The BWDB constructed embankment of polder 43/2F during 1989-1995. The polder was severely affected during cyclone Sidr in 2007 and cyclone Aila in 2009. During this period IPSWAM project was ongoing which was implemented during 2004-2010. Under the project, IPSWAM helped to establish 27 village level Water Management Groups (WMGs) and a polder level organization, the Water Management Association (WMA). Further to institutional support, the IPSWAM project supported improvement of infrastructure including repair of embankment, re-excavation of canals, and construction and repair of sluice gates, culverts and pipe inlets. The project aimed to handover the O&M responsibility to the WMA but due to late start and slow progress the IPSWAM could not hand over the project O&M responsibility to the WMA.

Cropping pattern: After constructing the embankment cropping system steadily moved from mono crop aman paddy to two crops and in some areas three crops. Aus (Apr-Jul) and local variety Aman paddy (Aug-Dec) and robi crops (Dec-Apr) increased. Now, in majority of the areas, high yielding varieties of crops are cultivated. Besides paddy, cultivation of robi crops is increasing and in addition to crops fish and prawn culture in ponds as well as in the closed canals is practiced and increasing but still remained low-scale, non commercial.

Irrigation: Cultivation of paddy as well as of robi crops is dependant on rainwater and fresh water taken in to the polder through the sluice gates. Aus seed beds are prepared in March - April with irrigation from the canals or ponds that store fresh water in December January or with new rains in April. Aman seedbeds are prepared in June when monsoon already starts. Aus and Aman are planted in May and August respectively and during this period fresh rain water is available. Cultivation of Boro is limited and reserve water of the canals and Tube Wells are used for irrigation of HYV Boro paddy. Water need of robi crop is minimal and reserve water in the canals and ponds can support robi crops and vegetables cultivation. Aquaculture in the ponds is dependent mainly on rain water stored in the pond and most ponds dry in the middle of winter before which fishes are harvested. Few ponds and closed canals have round the year aquaculture facility.

Open water fishing: Before constructing the embankment, plenty of fish species like shing, cheng, soil, datina, vetki, magur, pangas, boal, bele, koi, kainmagur, bain, kakila and wide varieties of shrimp and prawn were available in the rivers, beel and canals. Now only cultured fish are seen in the market like ruhi, katla, mrigel, silver carp, mirror carp, grass carp, Tilapia, Thai Pangas, China shorputi and African Magur. Plenty of Hilsha were caught in the river Payra. Now very little is caught. Respondent of village Kalagachia said that availability of fish in the nature has reduced by 75% in one and half decades.

Livestock: In the past, each farm household had several pairs of buffaloes and bullocks and a few cows, goats and sheep. Now, only about 10% households have buffaloes, 15-20% have bullocks, 10-15% have goat/sheep and 90% have poultry and duck. However, about 40-50% of the farm households have cow. Rearing of cow is more common among all farm holdings but the marginal farms do not rear buffaloes and bullocks. They rear cow, goat and sheep. Rearing of poultry and duck is nearly universal across the farm holding groups.

Livelihoods and standard of living: Polder development has particularly contributed to intensification of agriculture and expansion of the nonfarm rural sectors. Number of transport operators and small traders increased tremendously. Access to urban areas increased for various trades, services and even day laboring. The labor market is now very wide, to a great extent, nationwide. With these positive changes, access to education has improved. In the past, people could not enroll children to primary and secondary schools, now many are enrolled in the university level in Patuakhali, Barisal or Dhaka. In the past, students used to go to school wearing gamcha or lungi, now everybody has pant shirt. Particularly girls had little access to school as it was difficult for them to walk miles on muddy road or submerged roads. There was a tradition to close school for the day before the next high tide or if the sky became cloudy.

Condition of the infrastructure: Mainly due to the Sidr, but also for poor maintenance and destructive activities by some of the influential elite, the condition of the embankment is “very bad” as reported by the WMA FGD participants. They remarked that, if some more disaster occurs like Sidr and AILA, the embankment may overflow or get damaged. They have reported that the embankment broke near South Gulishakhali, Dalachara, Nayarpar, Horidrabari and Kalibari, to mention a few instances. General condition of the sluice gates is that the shutters are broken and gates cannot be operated comfortably. The broken shutters are often fastened by rope with timber logs. This prevents falling down of the shutter for some time but opening and closing are hampered and ultimately the gates closed. Most canals are silted and for many of them the canal bed is at about the same level of the adjoining plain land and below the level of the interior beel area. Hence water cannot be drained out properly. Besides the natural process of silt deposit, the problem of water logging and irrigation is exacerbated by leasing canals to the influential people.

Problem ranking: Three main problem concerning water management are (1) irrigation and drainage problem due to silt deposit or otherwise closing the canals and gates, (2) scarcity of safe drinking water, and (3) riverbank erosion threatening the embankment.

IPSWAM project: The project facilitated the process of forming water management committees – one WMA and 27 WMGs during 2005-06. This was followed by infrastructure building, repair of the embankment, re-excavation of canals and constructing and repairing structure increasing number from 11 to 58 (16 sluice gates, 4 drainage outlets and 38 pipe inlets).

The WMGs are responsible to operate gates in respective area and pay for minor repair noted above. The WMA has more coordination and liaison role to identify problems and report to the BWDB and other higher authorities. If BWDB or the IPSWAM allocates fund for LCS work, makes 25% advance payment to the group account and pays the remaining amount by installment subject to certification by the WMA. The role of WMA is selection of LCS group members, monitoring of the work and certifying on the quality of work.

The SO of BWDB reported that the IPSWAM procured cement concrete pipes and distributed them to the WMA for improving drainage. It is however alleged that most of the pipes were sold and others set at improper location in the interest of a few influential people. It was reported that the WMA is not functioning well and its tenure expired long ago, no election held after 2006. Non-member respondents appeared unaware of the functioning of the WMA and some blamed three to executives to locate interventions in own area only and capturing the organization. The WMGs are better recognized but the informants are skeptical of the sustainability of the organization and remarked that without government funding they will not be able to do any work.

Operation of the sluice gates: The BWDB is not directly involved in the operation of gates. Also, the WMA is not much involved in operating gates. This is the responsibility mainly of the 27 WMGs. The WMGs recruited gate operators who are paid in kind, 400 kg paddy (worth Tk. 6,000) per year and this too is not regularly paid as farmers deny contributing 5 or 10 kg paddy per season as they do not get water in time and cannot drain water in time. The opening and closing is decided by the WMG executives but the adjoining house owners or landowners tend to influence. The UP is not much involved in the operation of gate but the concerned ward member is part of the WMG.

Maintenance: BWDB bears overall responsibility to maintain the including the structures and re-excavation of canals. However, the BWDB lacks resources to properly carry out the activity. Main problem is budget allocation, if there is no project. With these constraints, the BWDB is doing maintenance but infrequently and inadequately. To compensate for inadequate response by the BWDB, the UP executes repair work utilizing the allocation of 40 days employment support programme. When some damage occurs the UP mobilizes people to work voluntarily. On several occasions the UP Chairman contributed personally to make some repair work. UP has to do the primary work to face crisis and then seek government help for better repair.

Emergency response: Polder 43/2F was severely affected by cyclone Sidr in 2007 and less severely affected by AILA in 2009. Besides these two disasters, several tide cycles about the end of monsoon season damaged embankment and a number of sluice gates. It was reported by the respondents that in such emergencies local people, UP, WMG and WMA all joined hands to repair the gate and the embankment at least on a temporary basis to protect the area. For larger interventions they approached BWDB and the government for the needed support but often disheartened.

Participation: While the respondents used many good words to mean participation, which reflects their good understanding and wish, but the reality was very different. In reality, participation was very low and ineffective and particularly the government agencies did not properly value the peoples' opinion.

Gender: Much of the discrimination and subordination of women is related to the gender role and division of labour defined by the social norms. In agriculture, paddy planting and harvesting are men's job while harvesting of minor crops like chili and post harvest activities of all crops like drying and winnowing are women's job. In the latter activities, wage rate is lower and in such activities women are employed because they accept lower wage and such softer but more time

consuming and tedious work can be done cheaper by engaging women labour (like picking tea leaves). In the LCS, payment is made on the basis of job contract but workers paid at lower rate by the sarder who actually draws the money. Actual wage received was Tk. 150 per female worker and Tk. 300 per male worker per day. It is further interesting to note that none of the LCS members met were WMG or WMA members and it was said that even none of the 50 members in the LCS group was WMA or WMG member.

It is required that four of the 12 WMA EC members are women. But it seems that they are ornamental members to show that the requirement is met. In the FGD with WMA members, two women were present but the one talked was the wife of the WMA president. The second one was silent but the team had to request repeatedly to involve her in the discussion. This reflects reality, how the women participate in the WMG or the WMA.

Conflicts: The polder is a low saline area and there is no shrimp farming and not much commercial aquaculture. Hence there is no paddy shrimp conflict. The main conflicts are related to control of canal by lease or encroachment and on the irrigation and drainage between the high and low land farmers. The WMG, WMA and the UP intervene in conflict mitigation when either or both parties request. Conflicts related to opening or closing of canals is resolved but the issues like garbing of canal are cannot be resolved locally.

9.2. Main Concerns and Suggestions

Concerns

The respondents were asked what is likely to happen in the next ten years if the polder management does not improve from the present condition. The replies were mostly pessimistic and a few of them are illustrated below:

- Desertification process will start (FGD, Gozekhali).
- We shall be drowned (FGD, Gulishakhali and WMA).
- No crops will grow as land will be waterlogged (FGD, Kalibari)
- Water logging will increase on the one hand and canals will be dry in the winter and summer, hence no crops and no fish will be produced. Trees will be fruitless. (FGD, Dalachara)
- Canals excavated will be silted again (FGD, Kalagachia)
- Irrigation will be difficult, robi crop will decrease (Gozekhali)
- River erosion remains a threat (SO, BWDB).
- Increased water logging will reduce crop and fish production (UP Member and Woman Member).
- Food production will decrease (UP Chairman)
- Things will change positively. Crop production will increase. Polder will be greener (SO, BWDB).

Suggestions

The respondents offered a number of suggestions indicating what to do for improving water management in the polder. The suggestions include the following:

1. Deeper excavation of canals to meet the needs of irrigation and drainage of both low and high land areas (Gulishakhali).
2. Small sub polders or smaller water management units with physical demarcation. (Gulishakhali).
3. Improve irrigation facility, construct more gates and excavate/ re-excavate canals (Gozekhali)
4. Gates to be built with proper design such as a two vent gate at Kalibari point instead of one vent gate.

5. Canals should be free of lease, meaning lease cancellation (Dalachara)
6. Reconstruct embankment, Deeper excavation of canals, fresh water reservoir for irrigation, continued assistance to WMA (Kalagachia)
7. Government to lease canal, unused BWDB land and khas land to the WMA (WMA President)
8. Protect polder from riverbank erosion (SO).
9. Increase number of DTW to reach the target of one DTW for every 20 HH. (FHH)
10. Government to pay salary of gate operators, 54 in 27 WMGs.

Please note that the tenth suggestion is impractical and goes against the present policy of handing over O&M responsibility to the community level organizations. Suggestion number 7 seems to be contradictory to suggestion number 6. This debate came up in the validation workshops and the stronger view was in favor of lease cancellation. So, even the WMA or WMG should not get lease of khal and there remains a risk of elite capture. For income earning, the WMA and WMGs must charge fee for the service, irrigation and drainage. Transparent management of fee collection will contribute to improve their financial capability and definitely they should have access to GoB and NGOs for needed support.

Responsible agencies for water management

The respondents have several options to manage water resources in the polder. These are:

- UP with local farmers (Gozekhali FGD & UP Member)
- BWDB with WMA (Gulishakhali FGD and SO, BWDB)
- UP and WMA (Kalibari)
- Local Civil Society/ CBO (FGD, Dalachara)
- WMA to execute, UP to monitor (FGD, Kalagachia)
- BWDB alone (LCS, Gozekhali)

It is important to note that the respondents have suggested involving all three institutions, the UP, WMA and BWDB. Of course there is need for coordination where UP may be able to play a strong role provided building of its capacity and institutionally empowering it while larger maintenance and long term development must be the responsibility of the BWDB.

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 in this report meant mainly 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).

Polder43/2F is a BWDB polder and therefore BWDB is responsible for its improvement as well as operation and maintenance.

Local Government Engineering Department (LGED)

LGED is not involved in the maintenance of this polder as it belongs to the BWDB. However, they use relevant sections of the BWDB embankment to improve rural roads by brick pavement or bituminous carpeting.

Union Parishad: Grassroots Local Government Institution

Rural 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. The polder area comprises one Union Parishads, Gulishakhali of AmtaliUpazila, Barguna district The UP is quite strongly involved in water management in this polder, particularly in minor repair and re-excavation. In this polder the UP members are involved in the WMGs in respective ward. UP is strongly involved in providing tube wells for drinking water and ring slab latrines for sanitation. UP has good involvement in disaster response.

Role of UpazilaNirbahi Officer and District Committee

The role of the upper level local government institutions, Upazilas and Districts is to coordinate between different government agencies and projects active in their areas. They assist the Union Parishad for issues they cannot handle alone, as for instance funding required for various development activities (drinking water, emergency and maintenance of rural road) and coordination at the higher levels. The role of UNO came-up in the FGD and KII discussions. Their role seemed important to enhance better implementation of projects and enhancing participation of and benefits to the marginalized groups.

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. This 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 the polder area, the participants did not mention much about the DAE and there is little interaction of the farmers with the DAE as the officers tend to stay in the Upazila rather than coming to the village.

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 has no field staff and therefore has little interaction with the farmers.

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 Union Parishad and request for deep tube wells or piped water supply systems to access safe drinking water.

ii) NGOs

The NGOs and MFIs active in the polder include CODEC, BRAC, PROSHIKA, NoboJibon, Ahsania Mission and Grameen Bank. There may be more but these are the few names mentioned by the respondents. The respondents blamed NGOs for charging high interest. All NGOs have micro finance as main programme but some have infrastructure repair activity (CODEC, NoboJibon and Ahsania Mission) and some have agriculture support activity (BRAC). The infrastructure repair works by the NGOs were implemented after cyclone Sidr and the NGOs had considerable involvement in distributing relief materials.

iii) Private actors:

Not active in this polder.

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)	Ministry of Water Resources	Effectively up to district level	* Develop and maintain polder infrastructure * Implement national water policy in the field level	* Upazila 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) (Not involved in water management in this polder)	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 khas water bodies management * Leasing out of khas land, khas water bodies	* 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 block level below UP	* 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	* Establish Union based farmers information and service centre (FIAC) * Ensure presence of SAAOs at least in the UP on a regular basis * Ensure public accountability through

Authority/ Organization	Concerned Ministry	Field Presence	Relevant Functions	Constraints	Suggested remedial measures
				* Assigned many work by the government which are not related to agriculture sector	reporting to UP and Upazila Chairmen & UNO
Department of Fisheries (DoF)	Ministry of Fisheries and Livestock	Up to Upazila level	<ul style="list-style-type: none"> * 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 	<ul style="list-style-type: none"> * Lack of manpower * Political interference * Lack transparency and public accountability 	<ul style="list-style-type: none"> * 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 UFO must report to Upazila chairman
Department of Public Health Engineering (DPHE)	Ministry of Local Government Rural Development and Cooperatives	Up to Upazila level.	Support water supply and sanitation <ul style="list-style-type: none"> - Tube Well - Pond sand filters - Rain water harvest - Ring slab latrine - piped water supply 	<ul style="list-style-type: none"> * Political interference * Lack transparency and public accountability * Low coordination with other departments 	<ul style="list-style-type: none"> * Inter agency coordination * Better interaction with the communities
Union Parishad (UP)	Ministry of Local Government	Nearest to people	38 functions <ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - Local government strengthening by the government - Government to support not control local government. - Involve civil society organizations/NGOs to build-up capacity of the UP and raise public awareness