Water Governance and Community Based Water Management

Situation Analysis Report
Polder: Latabunia LGED Sub Project, Dumuria Upazila, Khulna

Mustafa Bakuluzzaman
Research Coordinator
Shushilan
August 2012

Table of Contents

1. INTRODUCTION

1.1. Aim of the report

Based on Focus Group Discussions and Key Informant Interviews, this report aims to create a detailed situation analysis of polder Latabunia Sub Project in Dumuria Upazila, Khulna. It will do so by providing:

i) A historical narrative of the polder from the time it was constructed to present;

ii) Farming systems and livelihoods options;

iii) Current state of the polder infrastructure;

iv) Examining the results and process of the water management intervention by the LGED

v) Reviewing how maintenance of water 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 called Latabunia Sub Project of the LGED.

1.2. Methodology

4 Focus Group Discussions and 7 Key Informant Interviews (KIIs) in 3 sub villages (para) of village Latabunia were conducted by Shushilan team during the last week of March 2012.

The map describes where the FGD have been conducted. The villages were selected according to their location, sluice gates condition, canal condition and concentration of shrimp and paddy farming.

- One FGD (with was conducted at Latabunia registered Primary School located in the northeast part of the village and the participants came from the adjoining central part of the village, called Modhya Para. It comprised nine participants, six male farmers, two women (housewife) and one businessman.
- Another general FGD was conducted with 9 participants of which one was woman (housewife) and all eight male participants were farmer. The FGD was located in the southern part of the village, called South Para and all participants live in this part of the village.
- The third FGD was conducted with a group of six WMCA members, 3 men and 3 women all owning 2.5 to 6 acres land. One of the three participants was a college teacher who own 5.5 acres land. Other male participants are farmers and the women participants are housewife.
- The fourth FGD was conducted with a group of seven LCS members, all women. Surprisingly, all six women reportedly belong to households owning 2 to 6 acres land.

In parallel, 7 key informant interviews were conducted with 7 individual respondents. Of them one is a shrimp (cum paddy) farmer owning 45 bigha land (15 acres) and a former UP member, one paddy cum shrimp farmer owning 2 acres land and renting in another 6 bigha is also a shrimp cum paddy fish farmer owning 8 bigha land, third one is also a farmer producing paddy and shrimp and said to be affected by water logging, one is a WMCA president (a teacher cum farmer), one is a woman household head owning 3 bigha land, and one UP member.

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

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

SL #	FGD Type	Numbers of Participants (Female)	Village	Union Parishad	Relevant Sluice Gate Numbers	Adjoining Canals
1	General	9 (Fem 2)	Latabunia East Para	Sahos	Only one sluice gate	Neithela khal, Katakhali, Latabunia East Khal
2	General	9 (Fem 1)	Latabunia Daxmin Para (South)	Sahos	Only one sluice gate	Neithela khal, Katakhali, Latabunia Canal South
3	LCS	7 (M 7)	Latabunia Modhya para (middle)	Sahos	Only one sluice gate	Neithela khal, Katakhali, Latabunia Canal South, Latabunia East Khal
4	WMCA	6 (Fem 3)	Latabunia Modhya para (middle)	Sahos	Only one sluice gate	Neithela khal, Katakhali, Latabunia Canal South, Latabunia East Khal

Table 2: List of KII conducted in Latabunia Sub Project polder

Sl #	Respondent Type	Village/ Venue	Date
1	Shrimp farmer (Affected)	Latabunia	27.03.2012
2	UP member, ward no 6	UP office	27.03.2012
3	Women household headed	Latabunia	27.03.2012
4	Fish farmer (Bagda)	House of respondent	27.03.2012
5	Paddy farmer	House of respondent	27.03.2012
6	President, WMCA	House of respondent	27.03.2012
7	Pipe setter/embankment cutter	Latabunia village	27.03.2012

1.3. Overview of Latabunia Sub Project Area

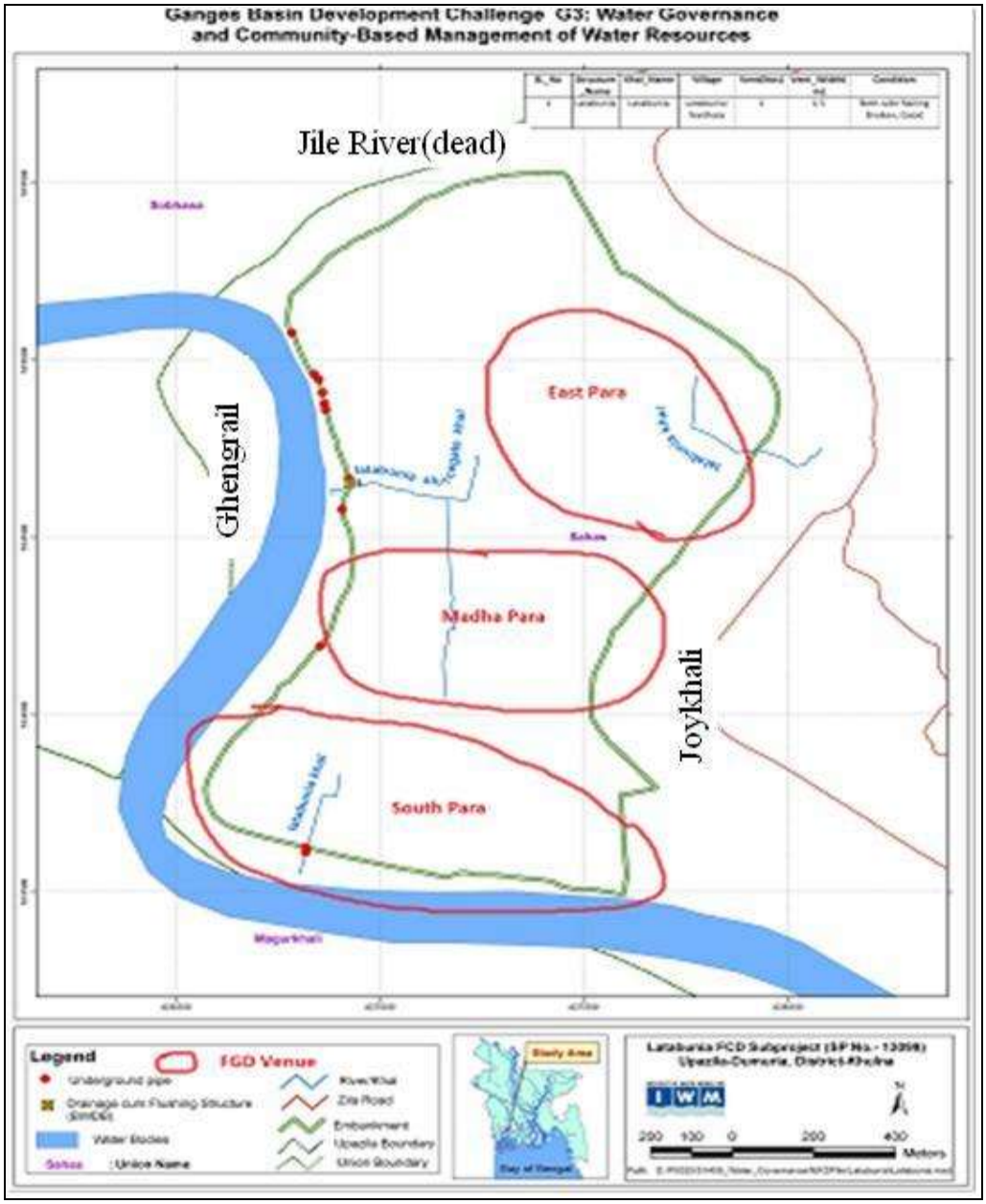
1.3.1. Location and accessibility

Geographical characteristics

Latabunia is a small village of Sahos Union Parishad, Dumuria Upazila, Khulna. It is located about 32 kms south west of Khulna City and only about 12 kms south of Dumuria Upazila town by exiting road link. The polder area is just one beel and comprises one village. It looks like a small island surrounded by the river Joykhali in the north and east and river Ghengrail in the west and south. The interconnector of the two rivers, Jila in the northwest has already been closed and the river Joykhali is almost dead. River Ghengrail is however still flowing.

The whole polder area is a low lying beel (wetland) affected by tidal surge, flood, salinity and water logging. Total area of the polder is about 494 acres or 200 ha (WMCA) of which agricultural cum shrimp gher area is about 162 ha. Land along the riverbank is elevated higher than the interior beel area. The LGED Sub Project Information however shows total area to be 240 ha and agricultural area 220 ha which may have included the southeastern tail area which is not encircled by the LGED embankment but have private gher dykes. WMCA figure seems more realistic.

Map of Polder Latabunia Sub Project



Accessibility by road and waterways

Latabunia is connected to nearby Upazila town Dumuria by rural road (2 kms earthen, 2 kms brick-paved and 8 kms bituminous) accessible by rickshaw, rickshaw van and motorbike. From the Upazila, the area is connected to Khulna City by a regional highway (about 20 kms). Water way

transportation system has disappeared by now due to siltation of the rivers and improved road infrastructure. Still country boats are used locally such as to fetch water and movement of goods.

1.3.2. Demographic features

From the last 2011 census, the latest available so far, 446 inhabitants were living in the polder, Latabunia village corresponding to 104 households. Table 3 provides a brief description of the polder's demography and compared with corresponding data for Sahos Union Parishad and Dumuria Upazila of which Latabunia is a village. Interestingly, compared to 2001, number of households and population decreased from 116 and 495 to 104 and 446 in 2011. Internal migration, rural to urban, seems the main reason.

Table 3: Basic Demographic Information of Latabunia Sub Project Area

SL	Particulars	Latabunia Village	Sahos UP	Dumuria Upazila
1	Area (Sq km)	2.0	24.99	454.43
2	Household	104	4,498	71,909
3	Population Total	446	18,647	305,675
4	Density/ sq km	223	746	673
5	Average Household Size	4.3	4.1	4.3
6	Male Population	230	9,280	153,111
7	Female Population	216	9,367	152,564
8	Sex Ratio (M/F)*100	106	99	100
9	Religion: Muslim %	1.1	80.4	61.7
10	Hindu %	98.9	19.6	38.1
11	Christian and others %	0	0	0.2
12	Literacy All %	44.6	46.1	52.6
13	Literacy M %	51.4	50.0	57.4
14	Literacy F %	37.2	42.1	47.7

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

The areas covered by the village Latabunia used as a proxy to the Latabunia Sub Project Polder (since Census data are broken down to village and UP, and not polder) is nearly similar to the UP and the Upazila in terms of Sex Ratio, average household size and literacy. It however differs in terms of population density, and religious composition. Density is lower in the village Latabunia compared to the UP and the Upazila as a whole. The reason is that, Latabunia village is a remote area and comprises mainly wetland beel area. It has no high land area where people usually build house. Hence population density of the village is about one third of the UP and the Upazila as a whole. In terms of religious community, Latabunia is nearly 100% populated by Hindus in contrast to the UP and Upazila where 80% and 62% are Muslim. Out migration (To urban areas and to India) is another reason of low population density in Latabunia.

Table 4 below shows distribution of working people of village Latabunia compared to UP Sahos and Dumuria Upazila. Population Census 2011 enumerated population of age 7 and above not attending school and showed their working status. The figures are taken from the Community Series for Khulna district to prepare the table presented below. Interestingly, for all three areas women outnumbered men as population 7+ years probably because more girls are out of school than boys.

In the village Latabunia 62% men and 3% women were reported to be working compared to 83% men and 5% women in the UP and 84% men and 6% women in the Upazila. Women's participation in the workforce is seen so low for the exclusion of household work. In the three areas, 63.2, 74.8 and 75.3 percent women were reported to be engaged in household work. High proportion of men and women are reported non working for including 7 yrs to 14 yrs people in this database.

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

SL	Particulars	Latabunia Vill	Sahos UP	Dumuria Upazila
1	Population age 7+ not in school	116	5,437	76,918
2	Male	40	2,418	31,608
3	Female	76	3,019	45,310
4	Employed Male	25	2,017	26,592
5	Employed Female	2	150	2,601
6	% employed Male	62.5	83.4	84.1
7	% employed Female	2.6	5.0	5.7
8	% Looking for Job Male	0	0.2	0.3
9	% Looking for Job Female	0	0.2	0.2
10	% in household work Male	0	1.2	1.0
11	% in household work Female	63.2	74.8	75.3
12	% not working Male	37.5	15.2	14.5
13	% not working Female	34.2	20.0	18.8

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

Table 5 below shows percentage of working men and women engaged in agriculture, industry and service sectors in the three areas. All working men of Latabunia village were shown to be engaged in the agriculture sector. Actually all men are engaged in agriculture including aquaculture and other sub sectors and the wage labor. Some are engaged in business and service sector but that is not seen in the census data.

Table 5: Employment by Sector

SL	Particulars	Latabunia Vill	Sahos UP	Dumuria Upazila
1	**Agriculture % of male worker**	100.0	94.8	80.2
2	**Agriculture % of female worker**		83.3	58.6
3	**Industry % of male worker**		1.1	5.9
4	**Industry % of female worker**		2.0	16.1
5	**Services % of male worker**		4.1	13.9
6	**Services % of female worker**	100.0	14.7	25.3

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

1.3.3. Basic Facilities Access

Table 6 shows availability of or access to several basic facilities like sanitation, drinking water and electricity. Village Latabunia has better quality sanitation (69% water sealed latrine) as per census

data compared to the UP and the Upazila as a whole. Still, 22% households have no latrine and another 2% have non sanitary latrine. Despite difficulty to fetch drinking water (only 2 tube wells in the village) almost all households use Tube Well water for drinking. Census data shows that about 36% households have electricity but actually the village has no electricity connection yet. However, some households are using solar electricity.

Table 6: Basic Facilities Availability/ Access

SL	Facilities	Latabunia Village	Sahos UP	Dumuria Upazila
1	Sanitary Toilet water sealed %	69.2	55.4	50.4
2	Sanitary not water sealed %	6.7	37.3	31.4
3	Non sanitary%	1.9	3.2	13.6
4	No latrine %	22.1	4.1	4.70
5	Water source: Tube well/Tape %	99.8	99.9	99.2
6	Electricity (REB) % or solar**	Solar 35.7	48.6	58.6

Source: Bangladesh Population Census 2011: Community Series for Khulna District
Note: ** The village Latabunia has no electricity connection. Some are using solar electricity.

1.3.3. History of polder Latabunia Sub Project

In Latabunia Sub Project Area, the embankment was built and a sluice gate constructed during 1990s. Although information from participants varied about the time of construction, it appears that actual implementation took place between 1996 and 1999 and LGED activity started in 1994. Interestingly, the reason for constructing the polder differs according to the point of view. One view is that, after constructing embankment polder area was better protected from tidal surge, flooding and salinity intrusion. This resulted to higher crop yield, fruits and vegetables production, aquaculture and increased livestock rearing (WMCA FGD). Another view was that salt water entry did not stop after constructing embankment as polder cuts continued, embankment construction was rather below the requirement and maintenance was poor (farmers of Gen FGD in the South). General FGD in the middle part which received a sluice gate, has a flowing canal and embankment not so weak, was of the opinion that crop productivity improved and local farmers took over shrimp farming from outsider domination which was the case in the pre-embankment period.

The FGD participants provided a nice description of the evolution of polder development in Latabunia as shown below:

> **Before 1965:** Austomasi bandh. Low dykes constructed for eight months by the communities by from the time of great grandparents contributing voluntary labor, materials and some cash. This continued until mid sixties (India Pakistan war). Local community leader called *sana* mobilized people and resources. Landowners in particular locality were assigned responsibility of specific sections. The whole wetland area was encircled by low dykes constructed every year in Ashar Shravan (June July) before planting Aman paddy. The dykes were repaired as per need up to the harvest of Aman paddy in December January. After Aman harvest it was left to nature and the dykes got damaged. During the four months water from the river entered the beel area during high tide and drained out in low tide. Grass, weeds and mat-making leaves grew abundantly. Cattle and buffaloes grazed and fish grew naturally.
>
> **1965 to mid 1972:** All people in the polder are Hindu. Many families migrated to India in late sixties to 1971, those left in 1971 mostly came back but those migrated between 1965 and 1970 mostly settled in India. Those stayed were poorer ones and had little capacity to construct austomasi bandh. The system of making austomasi bandh by voluntary work weakened during the period. Some landowners (richer ones) joined hands with the

absentee landlords and lease holders to construct private dykes. The dyke makers took all fish and were bearing full cost of fish farming. The landowner or the sharecropper was responsible to bear the cost of paddy production. The leaseholder got 12-15% of the paddy harvest and harvesting labor got 10%. The remaining 76-78% was shared equally by the landowner and the sharecropper (Follow-up discussion over cell phone with a General FGD participant). Thus community managed austomasi dyke was replaced by private leaseholder managed farming practice, a move from peasant farming to a sort of semi feudal semi capitalistic mode of production.

1972-1996: As austomasi bandh construction weakened and local landowners' economic condition further deteriorated (most of the farming benefits accruing to a few outsider leaseholders and their local allies) the local landowners had no means to continue farming. Then a capitalist entrepreneur came from Khulna City who took lease of entire wetland area of village Latabunia. The whole area turned into a single gher where aman paddy was produced in Jul-Dec and fish during Jan/Feb to Jun/Jul. A long term lease agreement was signed by the villagers with the leaseholder. The leaseholder made a small dyke encircling the whole area. As per contract, the leaseholder took 8 to 12% of the paddy as dyke construction/ repair cost and 100% of the fish and shrimp. The paddy harvesting labor got 10%. The remaining 80% so were divided equally between landowner and sharecropper, if owner and was cultivator was same household, it got 80%. The local owner operator of sharecropper had to bear full cost of paddy cultivation and the leaseholder paid full cost of shrimp/fish farming (Follow-up discussion over cell phone with a General FGD participant).

This can be seen as a move from few leaseholders to a single leaseholder production system having a mix of feudal and capitalist mode of production. During this period shrimp became an important export commodity hence was a good source of profit to the leaseholder.

Mid 1996 to 1999 Pre –Embankment: Local farmers saw that outsider leaseholder is making money but despite owning land they are deprived. They united and decided not to renew lease agreement. NGO activists and politicians took side of local landowners as 1996 was an election year, so politicians had to promise some positive change. Lease agreement was not renewed and the Khulna based leaseholder had to quit. Then local people made small shrimp gher of themselves. Shrimp and fish were produced during Feb-July and aman paddy during Aug-Dec/Jan.

1999 to 2009 before cyclone AILA: LGED took initiative to construct embankment in1994-95 and implementation period was 1996-99. The embankment contributed to better protecting crops. Aman yield increased. Also, cultivation of chili, vegetables, brinjal and fruits increased.

After AILA 2009: Embankment broke at several places and sluice gate partially damaged-its shutter broke. Community and the LGED repaired embankment but not adequately, instead of steel shutter community made a wooden shutter.

2. FARMING SYSTEMS AND LIVELIHOODS

2.1. Cropping pattern

This polder is located in low land and is affected by tidal surge, salinity, flooding and is vulnerable to crop failure. There is, therefore, low cropping intensity and basically one crop, aman is cultivated here. Substantial area is under brackish water Bagda shrimp cum fish farming. Golda farming introduced after polder construction in 1999 but decreased after cyclone AILA had affected the polder in 2009 but salinity effect has not yet removed.

Linked to the evolution of polder development discussed above, the General FGD and WMCA FGD participants described the change of cropping pattern in nearly five decades. The pattern that appeared from the FGD notes and supplemented by follow-up phone calls is described below:

Before 1965: The traditional austomasi dyke construction enabled protecting crops, mainly aman paddy. During this period rivers and canals were flowing, salinity washed away, there was no water-logging, aman yield was good enough to meet farmers needs (1200-1600 kg paddy/acre). There was just one major crop, local Aman paddy. Winter vegetables, chili and fruits were grown in the elevated land and in the homestead area. Farmers reared buffaloes rather than cattle as they sustain better in wetland condition and ploughed land better than bullocks. Fish, shrimp and prawn fries entered the canals and wetland area with tide water and grew naturally. People made favorable environment for fish in the canals making shelters with tree branches and not fishing in such protected areas from April until end monsoon (October). Fishing was a dominant occupation but aquaculture was not practiced and not even needed as fish was abundant in nature.

1965 to 1972: Only one crop grown, local aman paddy. Crop production decreased. Still land was used mainly for crop production and fish grew naturally in the beel area. Buffalo and cattle rearing were important but decreasing. Paddy Yield was 1000-1200 kg/acre.

1972 to 1995: Still only one crop, local aman paddy and one season fish almost round the year. Aquaculture began during this period as shrimp became an important export commodity. Control of land shifted from local landowner to outside leaseholder. Paddy yield was 800-1000 kg/acre.

1996 to 1999 Pre –Embankment: Local landowner regained control of land. Both local aman and fish and shrimp produced. Crop yield was low (600-800 kg/acre).

Post embankment period 1999 to 2009 before cyclone AILA: Aman yield increased, cultivation of chili, vegetables, brinjal, fruits increased. Besides local Aman, HYV aman cultivation like BR 23 expanded. Yield was 1600 - 1800 kg paddy per acre BR 23 and Local Aman 1000-1200 kg/acre.

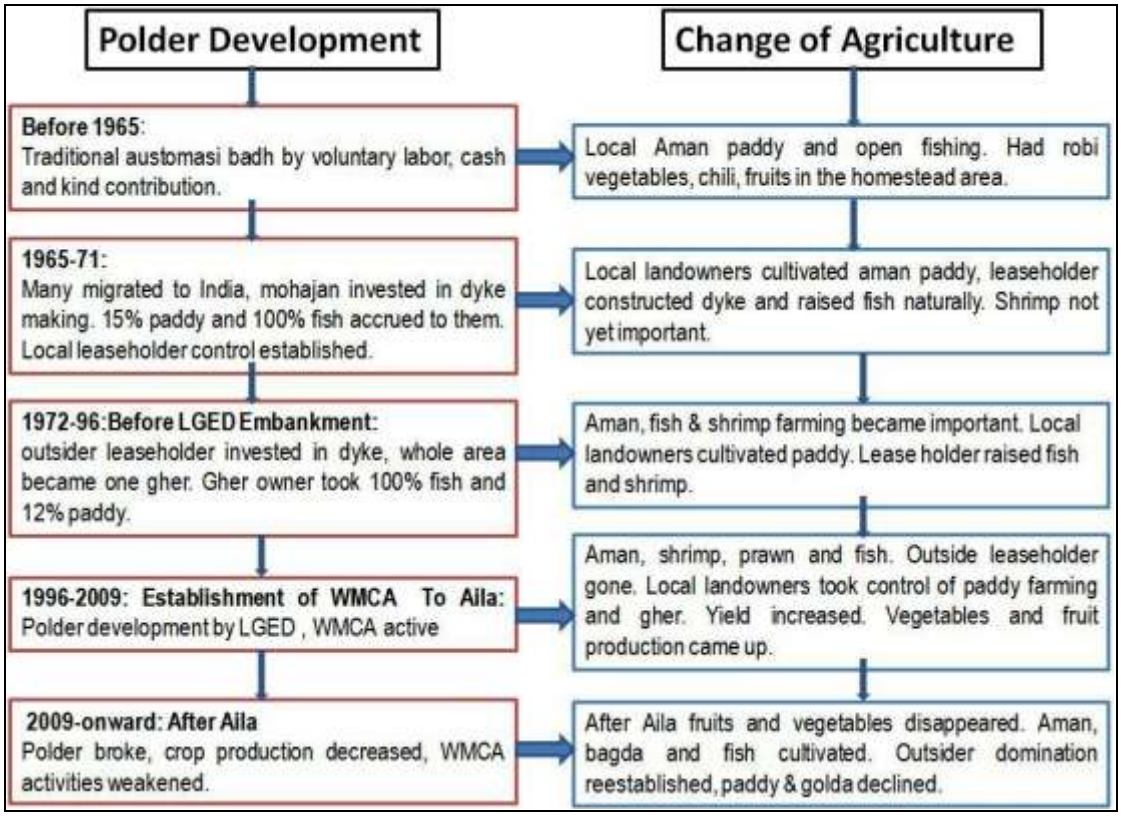
After AILA 2009: Crop production decreased, particularly non rice crops- chili, brinjal, leafy vegetables, mango etc declined substantially. HYV boro started once but discontinued due to

increased salinity. Cattle and goat rearing decreased, only sheep (and duck) rearing increased. Bagda farming increased, golda decreased, mixed bagda, fish and paddy farming increased again. Aman yield BR 23 per acre 1200-1600 kg/acre and local aman 800-1000 kg/acre.

It is interesting that yield of local variety aman was 1200-1600 kg/acre in early 1960s when there was no embankment, no high yielding variety and no chemical fertilizer. Regular tide flow and flood carried fertile silt and maintained soil fertility. Now, after 50 years, yield of modern variety paddy is about the same of previous local variety yield but input cost much higher for using chemical fertilizer.

Figure 1 below shows the link between polder development, or its absence to the change of cropping pattern. This emerged from the General FGD and WMCA FGD notes supplemented by follow-up phone calls to the participants.

Figure – 1: Change of Agriculture and Aquaculture with Polder Development



Source: General FGD and follow-up discussion

2.1.1. Irrigation sources, cost of input and profitability

Aman paddy is planted about the monsoon, hence is mainly rain fed. During the period salinity of river water becomes very low and therefore water from the rivers and canals can be used for irrigation by gravity flow inserting river water to the polder by sluice gates and pipe inlets.

For aquaculture also, the source of water is river, brackish water during Feb-June/July for producing bagda shrimp and Tilapia/ Nilotika. These can be grown in brackish water.

Cost of cultivation and estimated return of Aman paddy (BR 23) are following:

Tillage cost by power tiller of buffaloes:	Tk, 3,000 per acre
Paddy saplings (must be purchased as it requires high land)	Tk. 3,000 per acre
Fertilizer and pesticide	Tk. 2,000 per acre
Irrigation	Tk. 500 per acre
Hired Labor	Tk. 4,000 per acre
Yield 1600 kg paddy, market value of produces	Tk. 24,000
Gross return (family lab cost and land rent not included)	Tk. 11,500
Imputed rent	Tk. 8,000
Gross return to tenant farmer	Tk. 3,500
Net return to tenant farmer (deduct Tk. 4000 as family labor)	Tk. -500

It is estimated based in information obtained by telephone interview to respondents input cost of one acre BR 23 paddy cultivation is Tk. 8,500 despite low irrigation cost as aman cultivation is largely rain-fed and from gravity flow by pipe inlets from the river. If imputed rent based on prevailing market rate (*hari*) and opportunity cost of family labour (assuming, could work as day labor in other farm) are deducted from gross return, paddy cultivation gives negative return even if there is no natural disaster damaging the crop.

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

Shrimp fry 16,000 nos.	Tk. 6,400
Dyke repair	Tk. 2,000
Guard	Tk. 6,000
Other Lab cost (hired)	Tk. 2,000
Tilpia fries	Tk. 1,600
Irrigation	Tk. 1,000
Others Bamboo, fishing trap	Tk. 2,000
Rent	Tk. 8,000
Total:	Tk. 29,000

Value of output

Shrimp 120 kg @ 400	Tk.	48,000
Tilapia and other fish 320 kg 60		19,200
Total		67,200
Gross return		38,200
Family lab		10,000
Net return Tk.		28,000

Source: (1) KII with a farmer, involved in fish, shrimp and paddy farming as well as fish business
(2) Telephone interview with WMCA President who is school teacher, paddy, fish & shrimp farmer
(3) Another informant is a WMCA Member who is college teacher, paddy, fish & shrimp farmer

2.1.2. Productivity

Overall productivity of both paddy and shrimp is low, paddy because of increased salinity after cyclone AILA that affected the area in 2009. Shrimp yield is low because of high mortality of shrimp fries affected by virus. To compensate for the high mortality of shrimp fries, farmers simply stock more fries that increase cost, rather than productivity.

Aman yield was around 40 mounds (1600 kg) per acre in the past (1960s) as evident from a general FGD as well as from informant interviewed over telephone while writing this report. Aman yield decreased in the late sixties to 1972 but still around 30 mounds per acre (1200 kg). It decreased further during 1972-95 when outside leaseholder converted the whole wetland area in to a large

shrimp gher. Yield declined to only about 20-25 mounds per acre (800-1000 kg). After constructing polder paddy yield increased to about 40-45 mounds (1600-1800 kg/acre) again with the introduction of HYV BR 23 instead of local varieties *hogla, koijuri, chapail and jotabalam.* But this increase was short-lived as AILA affected the polder in 2009. After AILA, paddy yield decreased to 1200 to 1600 kg BR 23 per acre (30-40 mounds). Local variety yield is now about 1000 kg per acre (25 mounds).

Shrimp yield now is only about 120 kg/ acre in one season (Feb-June). In the same land extra 320 kg Tilapia and other fish are produced per acre.

Table - 7: Cropping Pattern and Farming System

Crop/ Fish	Variety	Season	Duration	Irrigation	Yield	Remarks
Paddy	Local Aman: Hogla, Koijuri, Chapail, Jota Balam	Kharif – 2	Aug-Dec	Rain River / canal by sluice gate or pipes	25 mounds or 1000 kg paddy per acre	40% of the wetland are covered by this crop in Kharif 2 season
Paddy	BR 23	Kharif - 2	Aug-Dec	Rain River / canal by sluice gate or pipes	1200-1600 kg per acre paddy (30-40 mounds)	60% of the wetland area covered by this crop in Kharif – 2 season
Shrimp Bagda	*P. Monodon*	Robi and Kharif 1 overlapped	February-July	Brackish water from river by sluice gate or private pipes	120 kg per acre	100% wetland area
Fish	Tilapia/ Nilotika	Robi and Kharif 1 overlapped	February-July	Brackish water from river by sluice gate or private pipes	320 kg per acre	100% wetland area, mixed with shrimp

Table – 8: Cropping Seasons

Crop/ Fish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aman Paddy												
Fish/ Shrimp												
Vegetables(on homestead land)												

2.2. Livestock

In the past Latabunia area had plenty of buffaloes and many cattle. People reared buffaloes because these were used to plough the land. Tillage capacity of buffalo is much higher than that of cattle. Particularly, the polder area wetlands were filled with thick grass, weeds and hogla leaves. Bullock plough could not clean the land and plough deeply to make land ready to plant saplings of aman paddy. Still now, buffaloes are used for tillage although power tiller has been introduced decades ago. Another reason for rearing buffalo was that it sustains better in wetland condition, eat water weeds, swims

rivers and is less vulnerable to tidal surge adversities. Presently, both cattle and buffaloes declined because of the loss of grazing area and low availability of grass and fodder. General FGD participants indicated that livestock farmers now have to buy fodder and sometimes send cattle to neighboring village for grazing. The caretaker is paid Tk. 120 per cow and 150 per bull per month. The caretaker gets the milk most of the days and cow owner gets occasionally (General FGD and follow-up discussion). It is however reported that only sheep has increased (FGD with WMCA) and goose also increased rather than poultry. In other areas commercial poultry farm increased which is not the case in this remote polder not having good road and electricity.

2.3. Livelihoods

So, overall, the villagers are now mainly dependent on agriculture and aquaculture. In the past, apart from crop farming two main livelihoods were open water fishing and livestock rearing. At one stage, between 1970s to mid 1990s, outsider lease holders took control of the wetland area and captured full benefit of shrimp and fish farming. Local land owners received only part of the paddy but no fish and shrimp. They became poor. At this stage, many poor people got involved in stealing fish from the gher (Gen FGD, Modhyapara).

Supplementary discussion with several informants (three respondents consulted on 16th Aug 2012) revealed that all households of Latabunia village have some land, nobody is landless and all are involved in both paddy farming and fish cum shrimp farming. However, about 5% households have services like teaching and 2% have small business like grocery shop. About 70% households work as agricultural and gher labor besides operating own shimp cum paddy farms.

Of the women labor force, one half work as agriculture and gher labor in addition to usual household chores. Only about 1% have salaried job, 1% has tailoring business and 2% work as garments labor.

2.4. Drinking water

Access to drinking water

The access to deep tub wells is free, but according to the distance from the house, women have to spend time on carrying water or have to pay for bringing water at home. The village with 104 households has just two Deep Tube Wells for drinking water. So, women have to walk up to one or two kms to fetch drinking water of have a boat ride to carry water from about 1.5 km distance. Usually women carry water by walk. In the rainy season, boat is used extensively as road become muddy and the inners roads are often submerged. For the installation of the tube wells the WMCA president lobbied at the UP office and DPHE and the community contributed Tk. 6,000 to get each tube well. Adjoining households had to apply as a group and subscribe to bear this cost. This is a one off investment cost sharing and repair maintenance cost is shared by the beneficiary households.

Despite having limited number of tube wells, the Population Census Report 2011 showed that nearly 100% households use tube well water for drinking. This implies that people carry water from long distance rather than drinking pond water or river/canal water. This has happened due to increased awareness of the risk of water borne diseases like diarrhoea.

The General FGD and WMCA FGD participants indicated drinking water access, meaning the distance of tube well from individual households as a problem. One general FGD participants also mentioned that installation of tube well is difficult and expensive as fresh water is not found even at depth 800-1200 feet.

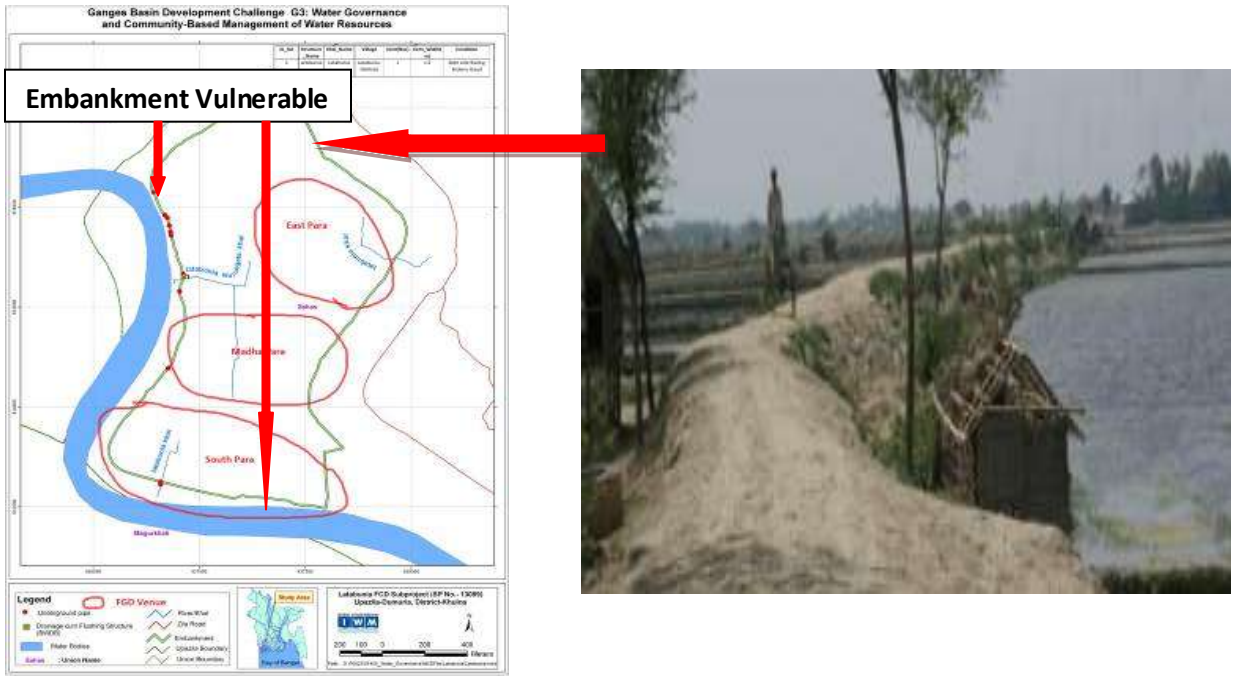
3. PHYSICAL CHARACTERISTICS OF POLDER LATABUNIA SUB PROJECT

3.1. Condition of the embankment

The length of the embankment was reported 4.5 kms (General FGD South Para) and height of about 6-8 feet and crest width of also about 6-8 feet. The LGED Sub Project Information however mentioned length of the embankment of 5.75 kms.

General condition of the embankment appeared poor as stated by most participants. A number of quotes will make it clear.

- "Nowhere the embankment condition is good". In the northeast along the river Jhila it was stated to be very bad. – General FGD, East para.
- "Height of embankment reduced for washing away of top soil in the monsoon". It was over-flown and damaged during AILA 2009 and Flood 2010. – WMCA FGD
- "The embankment is vulnerable, it can break any time" – Gen FGD, Southpara
- "Lots of spores created by pipe inlets" – LCS
- Southern part along Ghengrail river is very weak – General FGD, Southpara



A number of causes of poor condition of the embankment emerged from the FGDs. One reason was that lack of maintenance and not responding the repair needs promptly. Another reason was that the embankment construction is of lower engineering design than BWDB embankments. This argument is substantiated by the participants' demand of having a BWDB type embankment.

It was also evident that natural condition has changed. In the past, 2-4 feet high dyke was enough to prevent salt water entry, now 6-8 feet dyke is inadequate as river flow weakened and their drainage capacity drastically reduced, causing extra water pressure on the embankment, overtopping it and causing breaches and erosion (General FGD, South para).

Yet another cause of poor condition of the embankment is too many cuts and pipe inlets (WMCA, and Eastpara Gen FGD). Previously, wooden box were used, later cement concrete pipe and now PVC pipes. The PVC pipes are removed by water pressure more frequently (Follow-up discussion over telephone) than the CC pipes and wooden boxes

It appeared from the general FGDs that 40 to 50 cuts and pipe inlets now exist in the polder. Such cuts are made by the gher owner to bring salt water to the gher. One participant disagreed and said that there were 20-25 pipes before AILA but it has now reduced to only 4 or 5 which is however not correct. The person saying so is effective controller of the sluice gate as it is located on his land, his gher is next to the gate and he lives very near the gate. He is given responsibility to operate (open and close the gate as per need and as directed by the WMCA).

3.2. Condition of Sluice gates

There is just one sluice gate in Latabunia Sub Project polder constructed by the LGED. FGD with general participants, WMCA and LCS, all revealed that the structure condition is not good. Plaster removed due to salinity (may be cement percentage used was lower than required and workmanship inferior such as curing by keeping wet several days after plastering). The shutter was found broken, rusted and iron rotator also broken. The WMCA provided a wooden shutter in place of steel shutter to keep the gate functional, at least temporarily. With the request of the WMCA, the LGED however made a budget provision of Tk. 100,000 to repair the gate.

In addition to just one LGED gate, there was a mention of one private gate located in the southern part of the polder in the mouth of the canal Katakhali. This is however a Cement Concrete pipe. Many such pipes exist in the polder but those have not been stated as private gate. Follow up discussion revealed that there are a few private more private gates including one in the north east, adjoining the Joykhali river. Private gates are made of brick with wooden shutter and some are made of timber.

As noted earlier, there are possibly 40 to 50 pipes set by the gher owners beneath the embankment, the IWM map however shows only about 10 pipes (red dots in the map). In the past, wooden boxes were used for this purpose. Still today, wooden boxes are found but not many. The advantage of wooded box is that, the roughness of the timber and the joint bars are tied and glued strongly in the mud. Normal tides do not easily remove them. Later, cement concrete pipes took place of wooden box, but still there are many cement concrete pipes. Recently, gher owners are using PVC as it is cheaper and can easily be transported from the market to the gher site. The disadvantage of the PVC pipe is smoothness of its outer surface and low weight. Therefore it is removed by current when water pressure rises. More importantly, the PVC pipes are set by horizontal boring of the embankment. If a PVC pipe is of 4 inch diameter, the boring must be 5 or 6 inches diameter so that the pipe gets in. The extra hole remains as spore. Only on the end points it is somehow filled by clay which is easily removed by current. Therefore, when water pressure rises, the pipe is removed and water enters the polder though the hole, the hole gets larger, soil softened, breaches created and thus embankment breaks (Analysis based on information obtained by follow up discussion).

About the structure condition, it was learnt from the General FGD in the East Para that the sluice gate was good initially but worsened a year ago. The Southpara General FGD participants mentioned that the structure condition is not good, may be because they do not get water from it and have to set pipes.

3.3. Condition of Canals: siltation and private control

In this polder when people are talking about the canals this is to evoke two main concerns: siltation and private control as there is no public or khas khal.

Location of the main canals in Lotabunia

3.3.1. Siltation

Siltation is a main concern, commonly spread over the entire polder. The total number of canals and the names are not known. In the IWM map, only four canals are found. They are the main ones, the Neithela Khal falling into the Ghengrail river in the west, the Katakhal Khal connected to the Neithela khal from south to north in the middle of the polder, the Latabunia East Canal falling into Joykhal river in the northeast part of the polder and Latabunia South Khal falling into the Ghengrail river in the southwest part of the polder.

However, the participants stated very strongly in all FGDs that "once there were lots of khal" (WMCA), among them, the important ones are Chitamari khal, Taltola khal, Gojalia khal, Boshir khal, Katar khal, Madartola khal, Sapmari khal, Neithela, Majapukur khal (Gen FGD Southpara).

Not only the canals, Joykhali river once very wide and deep now it has become a narrow canal with siltation on both sides (see picture above).

It was clearly mentioned that all canals were practically dead except Neithela of which mouth the LGED sluice gate is located. To be specific, the General FGD held at East Para indicated that:

- Shapmari canal closed 10 years ago. LGED was supposed to excavate it but not materialized.
- Joykhali river silted. So, sluice could not be constructed there by the LGED.
- Overall, Neithela canal is in good condition but its branch in the north should be excavated.
- Southern part of this canal is in good condition as excavated by adjoining landowners.
- Land owners excavated private canal Katakhali. About 100/150 bigha (33/50 acres) of land is irrigated through this canal. It was excavated 6 years back.
- Main channel of Neithela khal was created naturally by land erosion. But some land owners near the canal has extended towards both its northern and southern part for their own benefits.

3.3.2. Private Canals

It is important to note that there is no khas khal (public canals recorded as belonging to the government). All canals of the polder are privately owned, hence most them "merged with the private land" once silted up (WMCA).

There has been a long tradition of excavating canals by the community using private land or excavating private khal by community participation to serve common interest of the adjoining landowners. This tradition has weakened but still continues as evident from excavating Katakhali canal. Its narrow, need deepening, widening and the community desire to extend it further south. Such efforts must be appreciated and encouraged by the relevant authority and institutions.

3.3.3. Canal Lease

The polder has no khas canal hence this is not an issue in Latabunia. But not having khas canal is a problem. Any effort to canal excavation must be agreed by all the owners of concerned land.

3.4. Main water-related problems

From the previous descriptions of the embankment, canal and structure conditions, several main concerns are evident. Firstly, the poor condition of the embankment, its low design, infrequent repair and absence of proper maintenance, changed hydrological condition requiring stronger embankment and too many cuts and pipe inlets, particularly the PVC pipes.

Secondly, the damage to structure including the broken steel shutter had to be replaced temporarily replaced by the community with a wooden gate. It involves probably a design issue, what type of structure and shutter are needed considering capacity of the community to operate and maintain one side and longevity and cost effectiveness on the other. There must be a tradeoff.

All canals silted is common everywhere. But the third issue specifically important to this polder is the absence of khas canals. So, there is no canal to excavate with public money. In other polders, the issue is khas lease and private control of public canals. Both are constraints to proper water management.

In the FGDs, when the participants were asked identify a few main problems that affect them most; salinity, water logging, siltation, drinking water scarcity appeared prominently in one group (General FGD, East Para). Participants at South Para ranked a bit differently. Drainage problem was identifies as number one problem, followed by poor condition of polder and riverbank erosion, and then drinking water scarcity. The reason for drainage problem was specified that all but one canal was blocked. All groups identified difficulty to fetch drinking water as the village had just two tube wells and that installation of tube well was unsuccessful for not getting fresh water layer even at depth 800 to 1000 feet.

The WMCA participants remarked that crop production declined in the past three years after AILA 2009 due to increased salinity and poor drainage that made the polder waterlogged in the monsoon. The polder was affected by flood and heavy rainfall in 2010. It was hinted that the gher owners occupied canal near the sluice gate and this must have aggravated water-logging.

Based on the above it can be said that water-logging, salinity, riverbank erosion, poor condition of the embankment and difficulty of accessing drinking water are the problems of the polder.

4. LGED: ADDRESSING WATER INFRASTRUCTURE PROBLEMS

4.1. LGED Pre-Project

Mobilization and Formation of WMCA

As mentioned earlier, LGED initiated their polder development activities in 1994 and the construction was implemented during 1996-99. The Community Organizer form the LGED Upazila level office facilitated the formation of the WMCA in 1995-96. Mr. Bonomali Mollik, a highly educated person and Head Teacher of a local School, too early initiative to mobilize and organize people. He maintained cooperation with the LGED, Cooperatives department to form the WMCA and get it registered.

The LGED Sub Project (SP 13099) report shows that the Latabunia WMCA was 162 months old in 2009 indicating its establishment in 1995 or 1996. This is consistent with information received from the KII with the WMCA President and FGD with general participants. Before works awarded, the WMCA made commitment to contribute 3% of the investment cost and during implementation the commitment was fulfilled.

During the mobilization stage, the UP Chairman of that time had a strong role to persuade landowners and gher owners to become WMCA member, contribute fee and subscribe to deposit the mandatory 3% contribution and occasional repair cost. At that time the WMCA was functioning well as reported by the WMCA president. May be people made contribution that time with the expectation of getting the project implemented. Still positive role of the UP was an important factor. Now there is lack of such initiative from the UP.

Membership Composition

The WMCA president said that the criteria followed to recruit general member was owning land inside Latabunia polder but it was not a criteria that one must be living permanently in the village. For this reason, despite the village having only about 104 households, number of member is 395 and beneficiary households are reported 179. About 40% of the general members are women and all members own land as there is no landless household in Latabunia. The WMCA was registered as a cooperative society in 1996 with the initiative of the founder members including the President Mr. Bonomali Mollik and with the assistance of the LGED. All member households are involved in paddy cultivation and shrimp and fish farming. About one half of the male members are farmer cum day labor and some 10% have second occupation like teaching, other services and business, including fish and shrimp business. About 58% of the beneficiary households are inhabitants of village Latabunia and the remaining 42% live outside of the village but own land in the village.

Sub Committees

The WMCA has two sub committees, one is called maintenance subcommittee which is responsible to see if the embankment or the structure break somewhere, identify repair needs, report the needs to the WMCA and the LGED so that O&M plan can be prepared. It is also responsible to oversee operation of the gate through the adjoining landowners (although not a sub-committee) is popularly known as gate committee. The other sub-committee is called agriculture committee that liaise with the Department of Agriculture, Department of Fisheries and LGED to avail training opportunities in the sub sectors.

Membership Contributions

During the formation of the WMCA, each general member contributed Tk. 50 “as membership fee” which is equivalent to five shares of the organization. Thereafter, every member is required to deposit a monthly saving (sometimes mistakenly said as fee). The accumulated savings is kept in the

organizations account form where loan is given to members for various income generating activities (mainly agriculture and aquaculture).

4.2. LGED during project

WMCA and ability to influence design

To execute the works aiming maximum benefits to the local stakeholders, LGED had strong consultation with the WMCA. It seems from the FGD with the WMCA that the WMCA was formed in 1995 which was confirmed by the WMCA president. On the other hand the works were implemented during 1996-99. This means that the formation of the WMCA preceded rather than followed construction of the embankment. The embankment and the structure were designed after consultation with the WMCA. During this stage the LGED engineers from the district and Upazila extensively visited the polder, surveyed, took measurement and held meeting not only with the WMCA EC but with a grand general meeting. They took people's opinion on what to do and where. The community demanded embankment, suggested alignment and height. Two sluice gates were demanded one at the mouth of Neithela khal in the west and another at the mouth of Latabunia East khal. The community was able to influence design to the extent that the suggested alignment was followed and one of the two sluice gates was approved. The other could not be implemented as the river has been silted and the proposed site does not have water flow. Only the technical details of the structure and the embankment were worked out by the LGED.

Election and representativeness

All landowners are represented by having a male and a female general member in the WMCA. The EC is elected if the is more than one candidate for a position. The first EC was formed unanimously and there was no contestant. It was so because Mr. Bonimali Mollik was accepted by all as the President and other EC members were also selected without contest. This committee carried on responsibility for two terms of total six years from 1996 to 2002. In 2002 election was held and Mr. Bimol was elected as President. In 2008, Mr. Bonomali Mollik became President again and there was no need of election as there was no other contestant. The committee headed by Mr. Bonomali Mollik is still running the organization.

Training

WMCA members received training in agriculture and aquaculture offered by the LGED, the Department of Agriculture Extension and the Department of Fisheries. It was not mentioned by the participants whether they received any training or organization management, water management and infrastructure maintenance. When several participants consulted over cell phone, it came up that, maintenance and water management issues are discussed by the LGED in usual meetings and no training course was organized.

Physical Interventions

LGED investment was Tk. 4.78 million. The amount was spent for construction of 5.75 km embankment (Tk. 2.73 million) and a one vent sluice gate (Tk. 2.05 million). Construction works were implemented during 1996-99. In the SP Information 130099 the intervention it is shown as a Flood Control (FC) Project. The field condition however demands a Flood Control and Drainage Project because drainage is the main problem.

Although present condition of the embankment is not good, the condition deteriorated because of inadequate maintenance rather than design fault or poor construction. Overall design of embankment was bottom width of 44 feet and top width 15 feet which was followed during construction (WMCA President, follow up discussion). But he himself says that this standard could not be maintained as subsequent repair work could not be done beyond 10 feet top width for low budget and further that, in the north, south and southeast repair work is still incomplete. In one part (southeast) embankment could not be constructed from the very beginning. There a narrow private dyke could not be widened as the concerned landowner did not agree to sphere any land

and managed court injunction. LGED is unable to acquire land, pay for resettlement and the landowner did not give land, hence construction incomplete. For this missing section, the polder is at risk (Gen FGD Southpara). About the structure, it is reported that its condition was good but later the shutter broke and canal partially silted and not excavated (Gen FGD Southpara and East para). The LGED did not excavate any canal although it is often demanded since there is no khas khal.

4.3. LGED post-intervention

O&M and engagement of LCS

The main purpose of establishing WMCA was to ensure effective operation and maintenance of the polder. This LGED provides maintenance support through financing O&M plan. The LGED Sub Project Information (SP 13099) shows that the WMCA implemented O&M plan for the fist time in 2000 although it was of low amount (Planned Tk. 2500, fund at hand Tk. 1500 and actual expenditure Tk. 500 only). It seems that since the construction was completed in 1999, O&M need was minimal in 2000. Over the next eight years, O&M plan was prepared for highest amount of Tk. 394,231 in 2006 against which fund at hand was Tk. 46,265 and actual expenditure was Tk. 27,236. In 2008 O&M plan, fund at hand and actual expenditure was Tk. 27 thousand, Tk. 47.5 thousand and Tk. 27 thousand respectively.

O&M need increased after AILA. This year (2012) a total of Tk. 700,000 has been allocated, Tk. 600,000 for embankment repair and Tk. 100,000 for structure repair.

The FGD with seven LSC participants, 4 belonging to village Latabunia and 3 belonging to village Sahos (these three own village at Latabunia, hence included as both WMCA and LCS members) indicated that the LCS was formed in 1999 when embankment construction was on-going. After completion of construction the WMCA engaged the LCS to execute the repair of embankment. This implies that construction and repair work has involved local LCS rather than awarding the works to the contractors.

The above is however one half of the story. The LCSs get work intermittently when some repair is needed, the O&M plan for that is approved and LGED provides allocation. In the LCS FGD it was earlier known that work is implemented by contractor rather than by LCS which is partially true. During the follow up discussion it was uncovered that actually two persons are important in the LCS, the group chair and secretary as they draw the money from the bank and actual work is done by engaging labor sarder. This practice has evolved since there is no landless household in Latabunia. Those owning and cultivation a few acres land do not show interest to work as earth cutting labour. More importantly, LGED pays at their predetermined rate (Tk. 1500 per 1000 cft earthwork) which is lower than market wage rate (Tk. 1700-2000) as appeared from LCS FGD. So, the LCS Chair, Secretary and the WMCA have to manage somehow, meaning reporting higher amount of work but actually doing less. This answers why the embankment width and height cannot be raised up to expected level.

One LCS group member indicated (in the follow up discussion) that while 10% of the repair cost is supposed to be borne by the WMCA fund, the WMCA actually can't make it as most members stopped depositing savings and this is actually deducted from the wage and then deposited to WMCA account. This match with the informants view that wage is deducted by 10%. Unfortunately this is not savings to be paid back later to the members. Even if it goes into WMCA account, the labour is paying for the benefit of the gher owner and the land owner.

Discontinuing micro credit

The WMCA has a savings credit programme. As mentioned earlier, each member deposits a saving of Tk. 10 per month. With so low savings and only 50 taka worth share per member it is unlikely to

have large fund. One fund was received in 2002 from JICA a grant of Tk. 105,000. Even then, fund mobilization is not much high. In 2011, the WMCA had savings of Tk 111,700 (KII WMCA President).

The microfinance program was intended to cover cost of occasional repair and build up capital of the WMCA. This objective has not been achieved. It is learnt from WMCA FGD that loan disbursed to members before AILA are not recovered. Therefore no loan giving has been stopped after AILA.

The SP Information of LGED shows that in 2008, the WMCA disbursed loan of Tk. 158,000 and recovered Tk. 103,282.

The organization charges an interest of 3% per month which is a bit higher than the effective interest rate charged by the Grameen Bank (flat rate 10% and effective 20% yearly) and NGOs (usually 12.5% flat and effective 25% yearly) . But this is still cheaper than interest rate in the rural informal sector (5% to 10% monthly).

Presently, collection of monthly savings is effectively discontinued and membership fee is also not coming as new members are not taken (actually saturated) and existing members are not buying new shares. One important source of the WMCA income was occasional subscription for repair work as and when required. This too has been discontinued a couple of year ago as the WMCA is not working well. This is said not only by general members, but also by the WMCA president himself.

Financial insolvency

Financial solvency of the WMCA declined sharply after AILA. In 2008 the organization had share deposit of Tk. 27,000 and saving deposit of Tk. 120,650. At that time the organization had members' contribution of Tk. 103,072 against the target of Tk. 112,712. But now the WMCA fund has almost exhausted because the loan given to members could not be recovered and members stopped depositing savings. Also, it has now become impossible to collect contributions from the beneficiary landowners and gher owners.

Gender

In order to address gender issue, it was intended to take one women member from each household to the WMCA and similarly one male member was taken from each household. At the end however it was possible to recruit 40% women members. In quantitative terms this has been a good achievement, but this could not raise women's voice. It is evident from the reply of a woman household head, a widow, interviewed as a key informant revealed that although she feels that salt water entry should be stopped she never complained to anybody. She feels that it is useless for woman to complain. Interestingly she is not a WMCA member because when members were recruited in the WMCA, she was part of father-in-law's household. She works as LCS labor but this "did not help" her much because the income was amalgamated in the extended household's fund and she with her children just got subsistence support. Her children are now grownup and she is thinking to become a general member of the WMCA but new members are not taken now.

It is also interesting that women's wage was Tk. 150 and men's wage Tk. 250 for work from 7 am to 4 pm. To her, this is acceptable as "men can work more than women". One male LCS member when interviewed by cell phone however said that women now do all work. In the past, women carried mud and men did the cutting. Now women do both. Hence they take separate section and get wage at piece rate. In the recently competed embankment repair work (June 2012) by the LCS (actually by sarder) women got Tk. 150 for five hours work and men got Tk. 350 for eight hours work. Outside of LCS, women now get wage of Tk. 150/day for five hours in gher work (no food provided). Men get Tk. 350 for eight hours work plus three meals.

4.4. Appraisal and actual achievements

Expected change of crop productivity

The abovementioned information indicates that gross and net benefited areas of the Sub Project are 240 and 220 ha respectively. Community level information revealed that the figures are 200 and 162 ha respectively.

The project appraisal estimated that that rice production will increase from 290 MT to 594 MT and non cereal crops will increase from zero to 200 MT. Considering highest yields achieved the year before AILA, rice production should have been around 236 MT equivalent to 354 MT paddy. So, the desired increase of rice production has not been achieved. And, non rice crop increased a bit before AILA but that was not definitely 200 MT, only about one fourth of it. It was estimated that fish (and shrimp) production will decrease from 24 MT to only about 1.0 MT for stopping bagda gher. Actually Bagda gher did not stop and it is unlikely to stop and actually need not stop as aquaculture is alternated with paddy cultivation. Open water fishing has decreased but despite virus effects, shrimp production remained around 24 MT and additional 64 MT Tilapia and other fish are produced, even after AILA. These estimates are based on follow-up interview with the informed people like teaches, farmers and WMCA president, all having both fish, shrimp and paddy farms.

The increased non cereal crop production is not achieved and is unlikely to be achieved. Pulses and oilseeds have no potential here as the area is basically wetland. Fruits and vegetables do have potential as dyke cropping and homestead agriculture, provided the gher dykes are built stronger and homestead land elevated above flood level. It is learnt from both general FGD and by follow up discussions that fruit tree plantation began after polder construction but most trees died in AILA. Plantation began again now three years after AILA.

5. LABOUR CONTRACTING SOCIETIES

5.1. Formation and work with the WMCA

One Labour Contracting Society (LCS) consisting of landless men was interviewed at Modhyapara of Latabunia village of Sahos Union Parishad. The LCS is linked to the WMCA working in the Latabunia Sub Project area of LGED. It comprises 30 members. Seven of them were present in the FGD. There are three more LCS groups in the Sub Project area including, three have recently been involved in embankment repair work and the fourth one working to repair the sluice gate. Of the four, three LCSs have 30 members each and the fourth one has 15 members as reported during follow up discussion by an LCS member.

As noted earlier Latabunia village has no landless households, the LCSs are formed with members belonging to small and marginal farm households. Informants however said that the LCSs are formed with ultra-poor men and women. The LCS members interviewed owned however owned 2 to 6 acres land. The LCS group has a Chairperson and a Secretary.

Payment

LCS comprises both male and female members. In this polder, men and women work together. Usually men cut earth and women carry the silt to the embankment. For this reason men ware paid Tk. 250/day and women were paid Tk. 150/day. This tradition is however changing. Now women do both cutting and carrying. Therefore women sub groups are assigned task of separate section and get paid at piece rate. This year women got Tk. 150 for five hours work and men got Tk. 350 for eight hours work.

The LCS met had no work assigned last year. However they got a work this year to repair 500 meter embankment. Contract for the work is Tk. 135,000. This is part of Tk. 600,000 allocated for repair work this year. Three LCSs are doing the work, each will be getting more or less similar amount. So, actually the workers will get about Tk. 405,000 against the allocation of Tk. 600,000. The rest is deducted for contributing 10% to WMCA fund and other expenses (could be for labor sarder, office expense!, incidental expenses like conveyance etc.). The money is paid by cheque drawn by LCS Chair and Secretary. After encashment, the workers get paid individually.

In practice, local labour sardar is contracted and he makes a list of 28 or so labour who will be actually working. Bill is received from LGED at piece rate, per thousand cubic feet earth work. Work is distributed among LCS groups by section, 500 feet or 1000 feet length etc. Estimate is made per section and work allocated to particular group. Then the labour sardar in contracted certain work for specified allocation. Labour sarder gets paid from the WMCA as per work done on piece rate contract basis. The labour sarder pays workers by daily rate (Tk 150 per female worker and 200 for male worker for five hours work). For whole day work, male labor is paid Tk. 350). Another alternative arrangement is that 50 meter section is given to each group for specific days, the group could be either male or female, but payment is made at piece rate. It appeared from As reported by the LCS participants, four LCS groups worked recently, three in embankment repair and one in structure repair. Group size was 30 in each of the embankment repair LCS and 15 in structure repair LCS. In each group about one third of the LCS members are women. Men and work together in this area not in separate groups.

Training

The LCS FGD states that no training was received concerning earthwork, maintenance etc. However they received training in agriculture and fisheries.

Specific problems

LCS group did not specify any problems in terms of their work. The participants simply said that, if some ones fall sick, or become unavailable for some reason, others makeup by doing extra work or engaging substitute labor. It was also mentioned that men and women work together and this does not create any problem as they all belong to the same community. It appeared that with the expectation of some benefits, local people enroll them as LCS member but actually do not work as LCS labour. Then actual work is done by engaging labour sarder. This problem came up in follow up discussion although in the LCS it was mentioned "hell with prestige". If someone is hungry must work. But reality is different. It was also said that people go out to work but do not work here unless one is extremely poor. It was also mentioned that society has accepted that women can work out of the house, no problem there.

5.2. LCS livelihood

Livelihoods improvements after joining LCS

The LCS group was positive about the changes since they started their work in the LCS. They can now produce paddy fish and shrimp in own land which was earlier leased out to outside gher owner. Sine LCS work is available only about once a year for a couple of weeks, such workers find work in agriculture and shrimp gher depending on work season. About one third also work outside of the village including going to Khulna City.

Cultivation and water sources

All LCS members however own some land. They cultivate aman paddy in the monsoon which is harvested in December. After aman harvest, they bring salt water to the land, stock shrimp fry and Tilapia fry. Fish and shrimp farming continue up to July, then aman seedling is planted in August-September.

Aman paddy cultivation is mainly rain-fed. This is supplemented by bringing water from the river through sluice gate and pipe inlets. Farmers also keep water rain water or river water when it gets fresh after June and use it for supplementary irrigation of paddy. For shrimp and fish farming, water is taken from the river by sluice gate and pipe inlets.

Most important use of water

Drinking water was seen as the most important use. This happens so because the village has just two DTWs, one in the northeast and another in the middle part. Although most houses have STW, the water is salty and not worth drinking. This is used for washing, bathing etc. People in the southern part suffer as they have to walk 1.5 kms or so to fetch drinking water or to cross the river by boat. Since the river Joykhali is nearly dead, they have to wait several hours for high tide when boat can move. Waking so long distance in monsoon is particularly difficult in the wet and muddy road.

5.3. Governance and water management

Accessible institution for complaints and problems

WMCA and Union Parishad are the two points of contact and LCS members had contacted the UP to sort the drinking water situation and WMCA to get embankment or sluice repaired and work opportunity for the LCS group members. The LCS group interviewed however remarked that Latabunia is a remote village, sparsely populated, the UP Chairman and members belong to other villages of larger size and they rarely come here except in election time.

Role of Union Parishad in water management

Both LCS members agreed that the UP had a minor role in water management, and that polder related work is done by the LGED. One reason for UP not allocating resources to water management is that they get such help from the LGED and therefore can better concentrate on activities like repair of rural roads. The UP assisted to get two drinking water tube wells and sanitation support from NGO BRAC under WASH porgramme.

It was a general feeling that the UP can't play any role to excavate private canals (the polder has no public canal). Still they approach the UP Chairman when embankment breaks or some problem arises so that he can lobby with the government. The LCS members remember that they got shelter at UP complex during the cyclone AILA. The WMCA president said that the UP Chair played a strong role when the WMCA was formed but presently such cooperation has weakened. One LCS group leader said that presently the UP demands share of resources allocated for embankment repair and do not cooperate as LGED allocates implementation responsibility to the WMCA.

A member of Union Parishad said in the KII that the UP constructed small dykes and repaired them. It not continued as LGED does this. UP is new getting support from BRAC under WASH project for improving sanitation. He has further said that development work is implemented mainly through project. Since the UP has no ongoing project, their role in water management is limited.

Participation

All LCS members in this polder are WMCA member. The LCS members interviewed are aware of the WMCA formation and feels that they can give "opinion: and WMCA value such opinion. Within LCS, two are leaders, the group chairperson and secretary. They receive cheque on behalf of all LCS members and have upper hand in the group. Other members can just work like day labour at rate even lower than market wage rate, hence most local labour find little interest to participate. Further, all local people own land, hence not much interested to work as labour. Therefore, effectively the work is done by hired labour supplied by the labour sarder and official formalities are met showing that the LCS is involved. This is managed by the two LCS leaders and labour sarder (LCS and WMCA). The general member has one role, informing the group leaders and the WMCA if there some damage of polder and request for repair.

Emergency

During an emergency and the embankment breaks, local people spontaneously work together with their spades to stop it from breaking further. The embankment broke during AILA and currently it has many spores. The LCS members and other people of the village worked repair the embankment without waiting for somebody to pay embankment is not repaired their crops and fish. The LCS group said:

- Our embankment height is low at several locations (south and northwest) and when water pressure increases it can overflow. So, we repair on our own interest. We do it "collectively".
- The embankment has many spores. If such spores are not repaired they can go bigger and cause damage to polder. So we repair.

Concerns and Suggestions

The rivers and canals are filled up and the LCS group is worried that all rivers and canals will be silted, the embankment will break and the area will be fully waterlogged with salt water. Then "we will be zero", which mean that no crop will be produced and people will not be able to live here.

The LCS group suggested that there should be an additional sluice gate in the southern part as one sluice gate in the northwest is not enough. They also suggested that the embankment should be higher, stronger and wider. They said that local people's participation must be enhanced.

6. MAINTENANCE OF EMBANKMENTS, CANALS AND SLUICE GATES

6.1. Maintenance by LGED

LGED has the key role to maintain the embankment and the gate of Latabunia Sub project. The LGED plays this role through the community represented by the WMCA. The general FGD held at Latabunia Eastpara specified that the LGED works for embankment, meaning that they built it and maintains it, widens it a little and repairs it. This group is aware that LGED made a budget allocation of Tk. 600,000 to repair the embankment this year. When the FGD was conducted, the work was not yet awarded but when consulted during the report writing stage, the earth work was already complete and three LCS groups received payment of Tk. 405,000. It was mentioned by the LCS group members that remaining amount is "deducted" partly to pay for the 10% mandatory contribution by the WMCA that the organization is currently unable to bear for financial insolvency and the rest amount for "various expenses" or guarantee for low work if something is needed to be done at a later stage, sounds like security deposit. This money will however not be paid to the LCS but WMCA will get 10% back to maintenance fund. This group further said that budget is made for 10 feet wide embankment against the need of 12 feet. It was also indicated that work implemented are lower than need and design and partly for low rates approved by the LGED below the earthwork rate in the local market. Hence the LCS and WMCA have to manage somehow, compromising for compaction and this is why the embankment "height become lower" after rains. This group knows that the LGED will provide support for 20 years and expects that this will be extended further.

The WMCA FGD informed that the demanded more, initially Tk. 4,000,000 then reduced demand to Tk. 2,000,000 but actually got allocation of Tk. 600,000 for embankment repair and Tk. 100,000 for the repair of structure.

Repair work was done in 1.5 kms embankment in the north and west part but damaged section not repaired this year in another 1.5 kms in the southwest and southeast. The WMCA FGD mentioned that LGED releases fund very late and work has to be done in monsoon.

6.2. Maintenance by Union Parishad

The WMCA representatives in the FGD said that, currently, the UP has no role in the maintenance of the polder. WMCA president and other members of the WMCA and LCS however said that, the UP had a positive role in the formation stage of the WMCA. In their view it was possible because of special attention given by the then UP Chairman, Mr. Quddus. After him, other Chairmen remained passive.

The General FGD held at East Para however mentioned that the UP repairs "small roads", not embankment. UP executes such work utilizing food for works allocations (once they utilized an allocation of 20 MTs wheat), Cash for Work and 40-days employment support. Despite not having strong role currently, the WMCA FGD and its President desired that the UP role should be enhanced. The General FGD participants in East Para however said that, "we do not go to them" and the LCS participants said that they come in election time only.

6.3. Maintenance by WMCA

Although the LGED provides fund, designs, supervises and monitors implementations and makes payment, the actual work is done by the WMCA. They inform LGED of the repair needs, raise demand, lobby, if needed asks the MP to recommend and thus get an allocation approved, usually once a year.

To get and investment approved by the LGED, the WMCA contributes 3% as beneficiaries and for repair work they have to contribute 10% of the cost. Rest of the money is given by the LGED as grant to the WMCA.

In the formation stage and before AILA, the contribution money came from members' share deposits, savings deposits, interest earned from micro credit, and occasional one time subscription mobilized from the gher owners and the land owners. Presently, all of these income sources are effectively closed as nobody is paying or shows interest to pay. Now, the savings, contributions exist on pa per but actually "deducted" from the LCS wage bill.

Before AILA, the committee planted trees beside the embankment. But most trees died because of severe salinity in soil and water.

Presently WMCA is not functioning well. There are three main reasons for this. The first and most important is that if there is any investment project from the LGED or other agencies, then WMCA becomes active because there is flow of money and they can exercise their authority. Now, there is no investment project, hence the WMCA is not very active. Secondly, most of the trained executive members were not re-elected or re-selected and new members have lack of management capacity which leads the WMCA to be in active. Third, many members could not re-pay their loan due to being affected by Aila which enhances financial problem of the WMCA which is also an important cause of nonfunctioning of the WMCA.

6.4. Maintenance by gher owners and landowners

When embankment breaks or overflows or is threatened, the large gher owners provide money to repair. The LCS labour and other local people participate in the repair work for their own interest. The WMCA takes initiative and collect money from the gher owners and land owners but such collection has now weakened. The WMCA president feels that it will be geared up again since substantial repair work has been done this year and confidence of the community will be regained. No NGO and others have assisted to maintain polder at Latabunia in the recent years.

6.5. Institutional responsibilities in maintenance

Table 9 below provides a glace look of the institutional responsibilities of various actors in Latabunia sub project. Since the sub project comprises only one village of one UP, the matrix is rather simple.

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

Tasks	Who does	Whose mandate	Comment
Minor maintenance	WMCA and LCS without LGED funding	WMCA	WMCA not very active, insolvent
Major maintenance	WMCA with fund from LGED	WMCA and LGED	LGED fond often not available, released very late
Emergency maintenance	Local people, WMCA, LCS	WMCA	Local people organized spontaneously WMCA, LCS take initiative
	Private land owner, gher	Private canal. WMCA, UP	All agencies helpless.

Excavation of canals	owner do on a limited scale for own interest, not common interest of all.	can if land owners free the land voluntarily	Depends on the wish of the landowners

6.6. How does maintenance take place?

i. The main responsibility for gates, embankment and canals is seen as belonging to the LGED. Most maintenance work took place under the LGED through the WMCA. BWDB appears to be implementing maintenance activities quite regularly, almost every year, although not adequately and particularly, not in time. However, LGED has good interaction with the WMCA and the LCS, particularly their leaders.

ii. The Union Parishad has no effective role currently. They are however active in installation of drinking water tube well, repairing minor roads and sanitation.

iii. WMCA currently lacks financial solvency.

iv. Neither UP nor WMCA can initiate canal excavation as all canals are privately owned.

v. Local landowners usually contribute some fees for minor repairs and maintenance. After AILA, they repaired embankment, made temporary wooden shutter to keep the structure at Neithela khal functional and excavated Katakhali canal.

7. OPERATION OF SLUICE GATES

7.1. Operation through WMCA and LGED

The LGED has strong role in maintenance but is not much involved in day to day operation. The WMCA is doing the job. Officially, the WMCA takes decision regarding flushing in and draining out of water during different farming seasons and within farming season, during the strong-current (*goon*) and slow-current fortnights (*be-goon*). But effectively, the adjoining landowner is given key. He takes the gate rotator to his house and effectively controls the gate. If some farmers need bringing draining out, they approach this person. Then the gate may or may not be opened. Officially, the decision is taken by consensus which is unlikely to be the case as need vary by location (near the gate, far away, higher or lower land, beside canal or away from canal etc.). Information obtained by follow up discussion reveals that the adjoining gher owner has the upper hand. He sees interest of his gher first, then of the others. For this reason, farmers having land in the north of the gate, a bit interior, do not get water in time and cannot drain out in time. At the time of writing this report (21 Aug), aman planting started but such landowners cannot drain out water. The gate-adjoining gher owner is not draining water. He wants some extra weeks to have some more harvests of shrimp and fish. He does not drain water early as he has some areas of year-round aquaculture. To him this is more profitable than paddy cultivation but other farmers are suffering.

Usually, the gate is opened in the month of Magh (February) for shrimp farming and after drawing sufficient water in 5-6 days during high tides of goon. The gate is then closed to prevent entry of too much salt water (End Feb). The gate remains closed until the beginning of Ashar (middle of June) when salinity starts decreasing. In mid June, old water is drained out during low tide of *goon* and fresh water entered during high tide. Such opening and closing drain out salt water and bring in fresh water. This is needed to prepare land for paddy cultivation. In each *goon* gated is opened for a couple of dyes during high tides and closed during low tides. Such opening and closing continues up to Bhadra (Aug/mid Sept) when aman paddy is planted. After completing aman plantation, gate is closed totally until mid December. Then it is opened for one and half months to drain out water in low tides and closed in high tides to dry the land prior to anan harvest.

With these cycles of opening and closing, the gate is closed if there is cyclone signal (usually in Oct-Nov and April-May). Also, in the monsoon season, if there is excess rain, water is drained out in low tide by opening the gate.

Actual time and duration of opening and closing is decided by the WMCA. This description is based on the FGD held at East Para and supplemented by discussion with a participant of this group, Mr. Bimal of Latabunia Moddha para (middle part).

The above opening closing system applies to the main LGED gate. Private pipe users open and close as per their need and they have own enclosures.

7.2. Operation through Union Parishad

In Latabunia, the UP is not involved in deciding opening and closing of the gate. The WMCA is responsible for this but has given upper hand to the "adjoining gher owner".

7.3. Operating private gates.

In Latabunia village out of about 450 acres agricultural and gher area, about 75 acres is one gher. This one gets and drains water through the LGED gher. Another 25 bigha area having a few small gher are served by this gate. The remaining 250 acre or about 56% area is served by private gates and pipes. One or two small private gates are managed by four or five farm households, each 10 to 20 acres. Others are all served by pipe inlets. These are absolutely privately managed by individual gher owners.

7.4. How gate operation takes place

There is just one LGED gate and this is operated by the WMCA (officially) but actually the adjoining gher owner holds effective control.

UP has no role in gate operation.

Private gate and pipe inlets are managed privately.

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

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

Type of Gate	Formal authority as stated by respondent	Effective control	Gateman	Gateman's pay/ Cost & how paid	Operator's interest stated vs real
LGED gate: Neithela gate	WMCA	Adjoining gher owner (one gher occupying 17% of the polder area)	None from LGED and WMCA Adjoining owners operate voluntarily!	Stated: No pay. Can fish in the khal. Actual: control over the resources	Own plus neighboring land benefited. Own gher benefited and control over larger area, gets large area leased expands own gher
Private gate: Kartik's gate (example), NE Latabunia	Group of local landowners (gono gher)	Large owners	None but has one main investor	Not needed	Own and neighbors land benefited
Individual pipes (40 or so pipes) mainly in the west part	Individual owner	Individual owner	Individual owner	Needed	Private benefit

8. CONFLICTS

This section outlines three major issues concerning conflicts. The issues are however interlinked.

8.1. Conflicts regarding paddy and shrimp farming

Outsiders' gher owners dominate that area for farming shrimp. They forcefully lease our land to culture shrimp. Crop farming is difficult here for extensive shrimp farming.

About 50% of the land of Latabunia belongs to outsiders. A few are purchasers but most have inherited land the live in other village of the same UP or in other UP of the same Upazila. Most absentee owners do not have time to culture shrimp and paddy by themselves, so they lease to other people on yearly lease basis. Some of the absentee owners are influential people like Mr. Gazi. Such influential ones lease-in land from other absentee owners and make large shrimp gher. The lease holders see shrimp and fish farming more profitable, hence always try to prolong aquaculture season, even beyond August. They do not drain out water from the gher and neighboring paddy farmers cannot plant aman paddy in proper time. In the last two years farmers having land north of Mr. Gazi's 150 bigha gher could not plant paddy. This year also, planting could not be started even in the fourth week of August and it is unlikely that paddy will actually be planted before mid September which is the last time of planting to get good harvest.

For the above reason, paddy cannot actually be grown in about one third of the cultivated area, one half of it under lease to large gher owners and the other half under the management of local farmers who try to produce both shrimp and paddy. The problem area is the northern part of the polder.

This information was obtained from the WMCA and general FGD and follow up discussion with the WMCA president, several LCS members and fish cum paddy farmers. All gave similar and consisted information except one who supported gher owners saying like "farmers can take in and drain water as per need", the owners do not create any problem and no conflict arises. The guy himself is a gher owner and is allied to outsider leaseholders.

A woman household head interviewed said that conflict arises because of outsider leaseholders. Had there been no outsider leaseholder, local people would be able to do both fish and shrimp farming and salinity could be stopped.

8.2. Conflicts regarding high-low elevations

The land adjoin the embankment is higher elevated that the interior part particularly in the north of Neithela khal. For the highlands near the embankment taking in or draining out water is not a problem. Such landowners simply set pipe or make small private gate. The owners of low land adjoining the canals can also manage well. But the owners of the low land away from the gates, embankment and canals suffer most. They cannot produce paddy after shrimp and fish or even if they can, plantation is delayed by two weeks and yield declines. They have another option to continue shrimp and fish farming also during monsoon but this has a risk of gradual increase of soil salinity. The leaseholders do it as they want to maximize profit but the owner-operator local farmers want to maintain long term productivity, not just current year profit.

8.3. Conflicts regarding control of gate

Presently, the largest gher owner is effectively controlling the gate simply because is gher is nearest to the gate. Hence the gate rotator is kept at his farmhouse (gherer basa). It has one advantage, easy and quicker movement and preventing theft. The largest gher owner, despite not living in Latabunia village, he has allies here, owns land in the village and close to the gate, has close link with local power holder. More importantly, the LGED gate is located on private land and the owner of the land is allied to him. This is why, without him nothing can be implemented. Even if all landowners behind

his gher ask to drain out water, he can say "No". Even 99% villagers cannot force him drain out water by Mid August. After all, they cannot move the gate from one location to the other. There is just one way out, build another gate. But again that landowner can behave similarly for self interest.

8.4. Conflict mitigation

In Latabunia, conflict mitigation concerning water management is the responsibility of the WMCA. The WMCA do try to resolve conflict such as when paddy farmers complain that they drain out water, the WMCA requests the gher owners to drain out soon. The gher owners say, OK we shall drain out the gher next week or a week later after having one more catch. But the continue delaying. Local farmers and even the WMCA cannot influence the gher owner as "they are influential people". This can however be resolved in the case of gher managed by local farmers. They reach consensus with adjoining owners on the timing to drain out, second half of August. It becomes possible because the local gher owners culture both shrimp and paddy and therefore, for mutual interest they reach consensus. If needed the WMCA mediates between involved farmers.

In this sub project area, the UP is not involved in conflict resolution as they are not involved in water management.

The conflict issue came up in the FGD with the WMCA, general FGD and LCS FGD. The responses are briefly noted below as example:

- Outsiders' gher owners dominate. They forcefully lease our land to culture shrimp. Crop farming is difficult here for shrimp farming (delaying draining out of water prior to the start of paddy season). – WMCA FGD.
- Gher owners set pipe to bring salt water which increases salinity. Nobody stops them (or can stop them) doing this. – Gen FGD.
- WMCA tries but can't stop them. They are "influential people". – WMCA president in follow-up discussion.
- One conflict seen last year. Despite rainy weather in the monsoon, gateman (meaning gher owner's people) opened gate, excess water came and there was heavy shower, paddy farmers land was flooded. This lead to a conflict between gher owner and paddy farmers. The paddy farmers had to suffer. – A UP member in the KII.
- No shrimp paddy conflict among local farmers. They produce both. But outside gher owners still dominate. – A woman household head in the KII.

8.5. Participation, Exclusion and Gender

Discourse on participation

All households of Latabunia are WMCA general members as they all "own land". Had there been any landless household they would have been excluded. To the people met in the FGDs, participation meant:

- Involving local people like us, meaning the commoners. Local people work through cooperative, meaning the WMCA in "any activity in our area", definitely including water management. – WMCA FGD.
- "If embankment is damaged" somewhere, we call emergency meeting and repair it. – WMCA FGD.
- Participation means "working together". Local worked together during AILA and this was a real participation. "We ensure good water management for paddy and fish (also shrimp) cultivation". We collect money and contribute for the repair work". "We planted trees along the embankment". – General FGD East Para.

- Participation means working together. We (meaning WMCA) hold meeting every two or three months, discuss problems. – General FGD South Para.

Reality of participation in the polder

The absentee landowners are included in the WMCA as they own land in the sub project area. They are large holders, influential, hence dominate. The largest gher owners in Latabunia are absentee owners. They occasionally subscribe to WMCA fund for repair work or to pay "condition money" when some fund is allocated from the LGED against O&M plan. They participate, but the problem is that they do not consider equity and benefit to others. – President, WMCA in the KII.

The absentee land owners, if not gher owner do not show interest and do not attend meetings. Otherwise, people from all class participate. If polder breaks, local people work voluntarily. – President, WMCA in the KII.

People owning small pieces of land do not show interest to participate as they cannot get involved in shrimp and fish farming. They lease out land. So, they have little benefit from shrimp and fish farming. – President, WMCA in the KII.

Shrimp and farming requires larger plot to manage profitably. Shrimp farming plot should be 5-10 acres plot, fresh water fish pond could be of economic size about 2.5 acres. Those owning below this size are do not benefit much from aquaculture. – A mixed farmer producing shrimp, fish and paddy (he owns 2.5 acres).

We do not inform all. Those interested attend the WMCA meeting. – President, WMCA in the KII.

A few more realities emerged from the discussion in the FGD. These include:

- The WMCA and government (LGED) do not discuss with all of us, meaning the common people regarding repair of embankment and gate. They discuss with the elite.
- LGED discusses with the WMCA EC members.
- LGED facilitated formation of WMCA and three LCS.

Gender related

In the WMCA, both men and women members are included. About 40% of the WMCA members are women. This was possible for recruiting one man and one woman from each household. This does not however imply that women have been empowered. Women rarely attend meetings as they are not farm owners or farm manager. In the past they were quite active in the LCS (during the construction of embankment as work was available. Now, repair work requires few labours. Further the wage offered is rather lower than market wage rate. Hence they are not interested to work as LCS labour any more.

In the past, women had interest to join WMCA to qualify for micro credit. This also has been discontinued, hence interest to participate declined. Also, the LGED and the WMCA do not have any programme to train women, such as in income generating activities, skill development, social awareness building, disaster preparedness etc. Homestead agriculture could be a special area of IGA training for women. In the absence of these it is quite realistic that women are WMCA members but not effectively involved in it.

It is itself an indication of the lack of gender issues not properly addressed by their silence in the FGDs. Two women were present in the General FGD with seven men and none said even a single word. Surprisingly, this is a Hindu village and should not be so conservative. In another group, three of the six WMCA FGD participants were women, all of them talked and responded quite effectively and gave good piece of information. These three were a bit older (age 35 to 41) while the former

two were 25 and 27 years old housewife. This is culturally inappropriate for this age group of women in presence in-laws, if senior by age and related like "uncle in-law". This might have happened for the first group for wrong selection, not congenial environment and weak facilitation. This limitation could be kept in mind, but nothing can be done at this stage.

It was said by all that all households are included in the WMCA. The female headed household interviewed during the KII however said that she is not a WMCA member. The lady is a widow. Her father in law is still alive. When the WMCA was formed, this widow with children was part of father in law's household. So she was not included as WMCA member. She however worked as LCS group labour but this did not help her as the income went into the joint family basket. Now she is willing to join WMCA as she is now head of household separate from the in-laws. She is interested as she owns shrimp and paddy land. But now new members are not taken. But just joining WMCA may not change her condition she will not be able to actively participate.

9. CONCLUSION

Latabunia sub project embankment and the sluice gate were constructed in 1996-99. This helped improving productivity of shrimp, fish and paddy. Crop diversification was coming up, fruits and vegetables production increased to some extent, plantation of fruit trees like mango increased and cattle rearing also increased. One specific change was in land tenure. During 1972-96, all land was leased to just one outsider leaseholder. From 1996, local landowners took control of both shrimp & fish and paddy farming. This positive change was however short-lived as AILA affected the polder severely. Outsider gher owners are dominating again and are in control of the sluice gate constructed by the LGED. Paddy cultivation is suffering again. Cattle rearing decreased, open water fish availability further decreased.

Presently, about one third of the agricultural are is out of paddy production as the outsider leaseholder do not allow drainage in time. The remaining two thirds have a combination of paddy, shrimp and fish farming; fish and shrimp during Feb-July/Aug and paddy from Aug/Sep-Dec.

The lone sluice gate of LGED serves about one fourth of the agricultural area. The remaining 75% area is served by a few (2-3) private gates and about 40 pipes. The pipes are needed as there are not enough gates and that all but one canals silted.

The physical infrastructure of the polder is weakened by the lack of maintenance, siltation and river erosion. Similar problems have been emphasized for the sluice gate which had broken shutter when the study was conducted but was under repair by the middle of 2012.

The Latabunia sub project has no khas canal hence there is no khas lease issue. But absence of khas canal has made canal excavation impossible by the LGED and the UP as public money cannot be spent to excavate private canals. Farmers are however excavating canals on a limited scale by giving a few feet of land beside the gher to take in or drain water. By such initiative Katakhali khal in the middle part of the polder to a bit south has been excavated. But this is too narrow like a drain and requires widening and extending further south and north.

The WMCA was formed prior to constructing physical interventions. The LGED facilitated formation of the WMCA and three LCS. The WMCA was consulted to identify problems, suggest interventions, alignment of the embankment and the location of the structure. Thus the community had an opportunity to participate in planning of the interventions. Designing was however done exclusively by the LGED.

Once completed construction in 1999, O&M plan are prepared almost every year making O&M plan started in 2000 and this is continued. The WMCA contributed 3% to the investment cost and is now contributing 5 to 10 percent of the repair cost (10% for first Tk. 100,000 and 5% for subsequent amount).

Thus LGED is helping maintenance of the developed infrastructure, although not adequately and not in time. Not adequately as the O&M allocations are inadequate to repair fully the damaged sections and not in time because funds are released very late about the middle of monsoon. It was reported by the participants that in the absence of full repair at a time, the patch work repair do not serve the purpose. This year, embankment has been repaired in the

north but it is still vulnerable in the south and west. So, danger remains of overflowing or breaking.

Currently, the UP is not involved in water management partly because the LGED is doing it anyway and they can allocate resources for some other purpose like repair of village road. In the beginning, the UP assisted in the formation of WMCA and helped its mobilization of resources mainly the subscription from the landowners and gher owners. This type of cooperation is now discontinued as UP does not find interest in it, because LGED work is implemented through the WMCA and not through the UP lead Project Committee.

The Latabunia Sub Project of LGED should not be seen just as an engineering intervention. Its main aim was to establish WMCA and make them capable enough to operate, maintain and manage the resources for maximum and sustainable benefit to all inhabitants. The WMCA has been established and institutionalized but its capacity enhancement has not been achieved. Rather the organization has become weaker and is now financially insolvent. Many participants including the WMCA president said that they don't have fund for routine repair and fulfilling the conditionality of contributing 5 to 10% local resource for maintenance. The loan given to members before AILA could not be recovered yet and even monthly Tk. 10 mandatory savings not collected now as nobody is interested to pay. Occasional contribution from gher owners and landowners also are not collected and the outsider leaseholders have grabbed the sluice gate for their benefit, rather than sharing benefits equitably.

Although informants talked little about conflicts, the reality is that, there is conflict between outsider leaseholders and local paddy cum fish farmers particularly regarding drainage of water from the gher before planting aman paddy. Outsiders taking lease of absentee owners' land and then depriving the local farmers are the main cause of conflict.

Location of land near the gate and canal is an advantage rather than having land in of the interior part of the beel. Therefore most participants demand canal excavation and access to the sluice gate for drainage. But lack of having khas canal to excavate and outsider control of gate deprive the interior landowners of such opportunity. Their lands are low-lying, hence remain waterlogged and therefore salinity is not washed away.

One problem special to this polder is litigation over a piece of land on the embankment alignment in the southeast corner of the polder. The LGED has no budget to acquire land for constructing embankment. They desire that the landowners contribute land voluntarily for the sake of their development. It happens most of the time. In Latabunia, problem arose for just one plot. The concerned owner did not agree to give land and managed court injunction. A narrow gher dyke serves as a substitute to embankment but this is vulnerable. Here remains a question, whether such project in future should acquire land or rely on generosity of the landowner. One risk is that, if compensation is paid once, everybody will demand it and the LGED will not be able to execute any polder development in future without land acquisition and resettlement. This is far beyond LGED norms and present implementation modality.

The respondents were asked how they envisaged their village ten years from now (2022) if water management continues as usual, the scenario was miserable. Due to silted rivers and canals, weakened embankment, absence of canal excavation, incomplete construction of the embankment, inadequacy of sluice gates, weakening of the WMCA activities particularly its financial insolvency, and outsider leaseholder control of the sluice gate; many feared that the polder will become unlivable within a few years and that agricultural produce, both fish and paddy would not be possible.

The LCS group interviewed remarked that the whole area will turn "lifeless". General FGD participants at South para remarked that "we will be leaving the area within five years" as no crops will grow and the fish farms will be washed away. The participants in the general FGD held at East Para remarked that "water level is rising each year for reduced drainage capacity of the rivers", but the embankment height remains low. Informant said that, 20 or so years ago, 3-5 feet dyke could stop overflowing, now eight feet dyke is not enough. The WMCA participants said, "Rivers will die, drainage system will collapse, hence both fish and shrimp production will decrease further".

Drinking water scarcity is a great concern as there are only two tube wells serving over 100 households. Fresh water layer is not found even at 1000-1200 feet depth. HYSAWA project was approached to provide piped water supply from an area a few miles away but they denied to provide pumping facility for not having electricity in the area.

Capture fishery declined, crop yield fallen, cost of crop farming increased, use of chemical fertilizer increased and cattle rearing declined. Only aquaculture remains but it causes increased salinity. This condition should be changed. Salt water entry must be stopped (Khogendra- age 70, South para genera FGD).

The abovementioned strong statement of the senior most participant reflects general sentiment of many inhabitants. In the changed circumstance it may not be practicable to stop aquaculture, including shrimp farming. But this must be done sustainably, taking care that unregulated entry and prolonging saltwater congestion in the wetland area must not hamper production of paddy, other crops as well as other livelihoods (cattle rearing and diversity of open water fish species) and not adversely affecting environment, both physical and social.

Rebuilding the embankment, making it stronger and completely encircling the area (not leaving certain section incomplete or weaker) was a strong demand. Participants also demanded re-excavating the river Joykhali and the canals and constructing more structures including one in the south falling into the river Ghengrail and one in the northeast falling into the river Joykhali.

The suggestions are briefly the following:

- Build the embankment stronger, 10-12 feet high
- Construct a few more sluice gates
- Keeping the good ones, close the pipe inlets that are causing damage to the embankment
- Excavate canals
- Provide some more tube wells even if 1200 feet boring is needed or provide piped supply of drinking water
- Use local labour for embankment repair

Interestingly five of the above six suggestions are engineering solutions. What was not told in the FGD and KIIs but emerged strongly in the follow-up discussion relate to management rather than engineering solution. The important ones are:

- Stop outsider domination as the outsider leaseholders who have effectively grabbed the control of the sluice gate and denied timely drainage access by the local paddy farmers
- Reestablish financial solvency of the WMCA
- Reestablish cordial relation between the UP and the WMCA. This is not nice that these two institutions stay away from each other.
- The LCS exists on paper but effectively the work is done by labour sarder. If LGED rate is impractical this should be revised, if possible annually rather than "managing

somehow". And, if local LCS gropus cannot be formed any way, landless labor of neighboring village may be included in the LCS. If this is announced, probably local labor will participate because they go to work in Khulna very often and work as wage labour in the gher and paddy farming. This however requires that the wage rate is not below the local market rate.

- The gender aspect is not properly addressed. Women are included as members but they do not have any incentive to participate. This incentive should not be seen as conveyance allowance, but be in the form of training, capacity enhancement, raising social awareness, IGAs like homestead agriculture, poultry rearing, homestead raising and making homestead pond etc.
- The micro credit turned into gift. The WMCA must find other ways. The beneficiaries must pay for the service and contribute more regularly for repair and the share of O&M cost. Somebody paying from own pocket (the WMCA President, LCS group leaders, labour sarder etc), deducting 5-10% "condition money" from LCS bill, outside gher owner making some donation and taking undue advantage are not healthy management.

A. ANNEX 1: INSTITUTIONS IN WATER GOVERNANCE

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

i) Government Agencies

Bangladesh Water Development Board (BWDB)

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

Latabunia Sub Project polder however do not belong the BWDB and they are not involved in its maintenance. Some participants however feel that they should have stronger embankment like those built by the BWDB.

Local Government Engineering Department (LGED)

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

Union Parishad: Grassroots Local Government Institution

Rural 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 Upazila Parishad. Zila Parishad is practically non-existent. Latabunia Sub Project Polder is under the jurisdiction of Sahos Union Parishad in Dumuria Upazila, district Khulna. The UP is not involved in water management in this polder as the LGED is doing it. The UP was however actively involved in the formation stage when the WMCA was established and construction was on-going. The UPs priority seems rural road improvement and repair rather than water management.

The UP however has strong role in:

Drinking water and Sanitation: The Union Parishad installed two deep tube wells in village Latabunia. Beneficiaries contributed Tk. 6000 for each which was collected from nearby households to be benefited. The UP has also helped improving sanitation from BRAC's WASH project and HYSAWA.

Emergency response: During disasters the Union Parishad tends to compensate people for their work through grains or food sometime after the repairs. After AILA, the UP mobilized 20 MT of wheat from the MP to repair damaged road. UP uses Food for Work, Cash for Work and 40-days employment support allocation for repair work. It seems that villagers are able to organize themselves for immediate repairs with or without the UP chairman.

Despite the fact that the UP does not play any important role in water management in Latabunia, the WMCA desired that they should have a strong role here and they should be enabled to play such role.

Role of Upazila Nirbahi Officer and District Committee/MP

The role of the upper level local government institutions of Upazilas and Districts is to coordinate between different government agencies and projects active in their areas. They are also to assist the

Union Parishad for issues they cannot handle alone, as for instance funding required for various development activities (drinking water, emergency, roads maintenance) and coordination at the higher levels. Since Latabunia Polder falls in just one UP hence there is no issue of inter Union coordination by the UNO. The role of UNO did not came up in the FGD and KII discussions. But UNO can play an important role to resolve conflict between the outsider leaseholder and local farmers on drainage, should local farmers seek his assistance.

Department of Agricultural Extension (DAE)
The Department of Agricultural Extension (DAE) is responsible for the dissemination of agricultural technology, information and relevant services to farmers and other stakeholders down to village level. It is the largest department under the Ministry of Agriculture having their extension officer down to village level (one extension officer called Sub Assistant Agriculture Officer for a cluster of villages called Block). In Latabunia Sub Project area the participants did not mention of any assistance from the DAE. May be, because of its extreme remote location, DAE officers rarely visit the area and the farmers do not find interest even to consult them. The DAE also could help farmer to resolve shrimp-paddy conflict on drainage. Only one thing was learnt about support to agriculture. It was about training received by the WMCA and LCS members. It was not mentioned, how and to what extent, the DAE helped in it or it was organized by the LGED to which DAE might have sent resource person.

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 WMCA and LCS members interviewed reported that they received training in aquaculture, including shrimp farming. It was however not mentioned, to what extent, the DoF was involved in this training or it was organized by the LGED to which DoF might have sent resource person.

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. The two deep tube wells received from the UP possibly came through the DPHE.

ii) NGOs

Only four NGO names were mentioned by the participants to be working at village Latabunia. This is a very small village with 104 households. Presence of four NGOs is more than enough, without overlapping, each won't find more than 20 clients (assuming the non-poor exclude) just one group to meet weekly or monthly.

All four were reported to be providing micro credit. In addition, BRAC is providing sanitation support with the resources under WASH programme and Nijera Kori is a right based NGO. They should be helping paddy farmers but this seems not to be the case as the paddy farmers could not convince the outsider gher owners to drain water before planting aman paddy.

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

iii) Private actors:

The private sector also did not play any role in water management.

B. ANNEX 2: INSTITUTIONS

Authority/ Organization	Concerned Ministry	Field Presence	Relevant Functions	Constraints	Suggested remedial measures
Upazila Bureaucracy: UNO office headed by the UNO	Ministry of Establishment	Up to Upazila level.	* General administration * Development coordination * Conflict resolution	* Inadequate manpower * Low skills of staff * Bureaucratic orientation * Lacks public accountability * Political interference	* Reorientation * Freedom to act professionally, neutrally, guided by law *Enhanced public accountability
Bangladesh Water Development Board (BWDB) Not involved in this polder	Ministry of Water Resources	Effectively up to district level	*Develop and maintain polder infrastructure * Implement national water policy in the field level	* Upazilla level office non-functional * Gateman recruitment stopped but alternative measure to O&M by communities not yet functioning effectively	* Repair, reconstruct polder * Transform BWDB from just line ministry control to a people oriented institution
Local Government Engineering Department (LGED) Main agency relevant to Latabunia Sub Project	Ministry of Local Government Rural Development and Cooperatives	Up to Upazila level.	* Plan, implement and maintain rural infrastructure (rural roads, bridge, culvert market, ghat etc) * 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 jolmohal management * Leasing out of khas land, khas jolmohal	* 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	* Provide technical advice * Assist distribution of input subsidies, agr loan etc.	* Sub Assistant Agriculture Officer rarely seen in the village/ UP * Low skills of employees * Political interference * Assigned many work by the	* Establish Union based farmers information and service centre (FIAC) * Ensure presence of SAAOs at least in the UP on a regular basis * Ensure public accountability

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