



Water Governance and Community Based Water Management

Situation Analysis Report Polder 24-G, Keshobpur Upazila, Jessore

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October 2012



ACKNOWLEDGEMENT

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

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

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

Finally I would like to thank all FGD and KII participants who spent time with us and provided valuable information.

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1. INTRODUCTION

1.1. Aim of the report

Based on Focus Group Discussions (FGD) and Key Informant Interviews (KII), this report aims to create a detailed situation analysis of BWDB Polder 24/G, Keshobpur Upazila, district Jessore. 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) Examine the results and process of the water management interventions by the BWDB
- 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 BWDB Polder 24/G located in Keshobpur Upazila, Jessore.

1.2. Methodology

A total of eight FGDs and 13 KIIs were conducted in this polder in two phased. First four FGDs and nine KIIs were conducted in April and four more FGDs and four KIIs were conducted in September 2012. The first batch of FGDs were conducted in the north in Panjia and Sufalakathi UP but later it was identified that two more UP are located in this polder. So additional three FGDs and two KIIs were conducted in the southern part of the polder comprising part of Mongalkot and Gaurighona UPs. Two extra KII and FGD were conducted in the Sufalakathi UP because it is highly impacted by the Tidal River Management Project (TRM).

The map describes where the FGD have been conducted. The villages were selected according to diversity of location, distance from the main sluice gates, the extent of water logging, type of present cropping pattern and topography of the land.

1. One general FGD was conducted in April 2012 with a total of 13 participants at village Kalagachia, Sufalakathi UP (northeast). The participants came from the neighbouring villages- Kalagachia, Arua and Sufalakathi. Of the 13 participants six are UP members and seven others are farmers (producing HYV Boro paddy, golda prawn and fish). The participants own 3 to 9 acres land and belong to age group 45-58.
2. The second FGD (general) was conducted in April with a group of 10 participants including three women. One of the three women is a UP member and two others are housewife. Of the seven men, three are teachers, one is NGO employee and the remaining three are farmers (producing HYV Boro paddy, golda prawn and fish). The FGD was conducted at village Panjia of Panjia UP (northwest). The participants are 25 to 65 years old. One of the ten is landless, three own half acre or less and other six own one to five acres land.
3. The third FGD conducted in April was with a group of eight WMA members including a woman member of WMA at village Monoharpur of the neighbouring Monirampur Upazila (northeast). The participants' age varied from 35 to 60. They own one to 30 acres land. Five of the eight participants are farmers (producing HYV Boro paddy, golda prawn and fish), one is a housewife and two others are engaged in business.

4. The fourth FGD conducted at village Arua, Sufalakathi UP (northeast) in April was with male LCS group attended by 11 persons, all males. All are reportedly day labour, two owned land above one acre and all others were landless or owned half acre or less.
5. The fifth FGD (general) was conducted in September with a group of 11 persons including 2 women at village Sonnyergacha of Gourighona UP (Southeast). All are landless or own below one bigha or 42 decimals land. Two women are reportedly housewife and of the nine men, one is a carpenter, one rickshaw van driver, one rural medicine practitioner and six are farmers mainly producing vegetables in small pieces of land.
6. The sixth FGD was a general one conducted at village Ghaga of Mongalkot UP in the southwest. A total of nine participants attended. One of them is a teacher, one student (age 22), one currently unemployed (age 48), and the remaining six are farmers (producing HYV Boro paddy, golda prawn and fish). The participants are all male and of age 22 to 70.
7. The seventh FGD was a general one held with 10 persons including one woman at village Kalicharanpur, Sufalakathi UP (northeast). The participants are of age 39-61 and own about one acre to 7 acres land. One is a housewife, two are teachers and remaining seven are farmers (producing HYV Boro paddy, golda prawn and fish).
8. The last FGD was conducted with a group of nine LCS members (all women) at village Sonnyergacha of Gourighona UP (northeast). All are landless or own maximum 9 decimals land (homestead including kitchen garden).

The list of FGD and KII is conducted in polder 24/G is provided in Table 1 and 2.

Table 1: List of FGDs conducted in polder 24/G Sub Project

SL #	FGD Type	Nu. of Participants (Female)	Village/ Union Parishad	Relevant Sluice Gates	Adjoining Canals
1	General	13 (0)	Kalagachia Sufalakathi	Katakhali	Katakhali, Diyerkhali, Kanasisa khal
2	General	10 (3)	Panjia Panjia	Buruli, Katakhali, KondarpurBazaar	Katakhali, Buruli, Ghaga
3	WMA	8 (1)	Katakhali, Sufalakathi	Katakhali, Agarhati, Kanasisa	Katakhali, Diyerkhali, Kanasisa
4	LCS	11 (0)	Arua, Sufalakathi	Katakhali	Katakhali, Diayerkhali
5	General	11 (2)	Sonnyergacha, Gourighona	One private and one BWDB gate east of Vayena Beel	Sonnyergacha khal, Gouroghona khal
6	General	9 (0)	Ghaga, Momgalkot	Ghaga, Buruli	Buruli
7	General	10 (1)	Kalicharanpur, Sufalakathi	Katakhali	Katakhali, Bagdanga
8	LCS	9 (9)	Sonnyergacha, Gourighona	Mora Bhodra Pipe gate (private)	Sonnyargacha

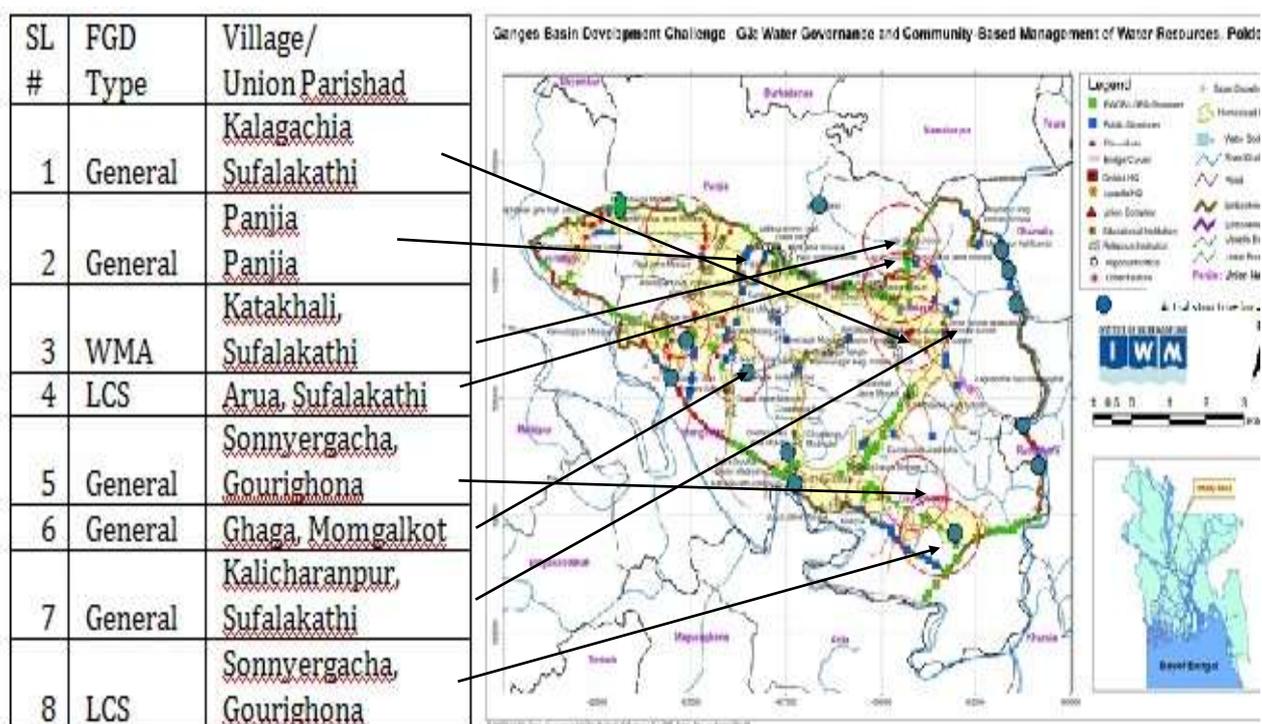


Table 2: List of KII conducted in 24/G polder

Sl #	Respondent Type	Village/ Venue	Date
1	Woman headed household, Fatema Begum	Kalagachia, UP Sufalakathi	6 April 2012
2	Fish, prawn, paddy farmer, Samsur Rahman	Kanaidanga, Sufalakathi UP	6 April 2012
3	Fish, prawn, paddy farmer. Ismail Moral	Kalagachia, Sufalakathi UP	6 April 2012
4	Fish, Prawn, Paddy farmer. Jahangir Alma	Kanaidanga, Sufalakathi UP	6 April 2012
5	Section Officer, KJDRP, BWDB	Jessore	5 April, 2012
6	UP Chairman. SM Manjur Rahman	Kalagachia, Sufalakathi UP	6 April, 2012
7	UP Member. Newsier Ali Biswas	Sufalakathi	6 April, 2012
8	WMA President, KJDRP. Mahir uddin Biswas	Panjia	6 April, 2012
9	WMA woman member. Latika Roy	Panjia	6 April, 2012
10	Farmer. Kalipada Mondal	Kalicharanpur, Sufalakathi UP	25 Sep 2012
11	WMA Landless Representative. Sirajul Islam	Arua, Sufalakathi UP	25 Sep 2012
12	Woman headed household. Asalota Mondal	Magurkhali, Mongalkot UP	27 Sep 2012
13	Sharecropper. Poritosh Bain	Magurkhali. Mongalkot UP	

1.3. Overview of Polder 24/G Keshobpur

1.3.1. Location

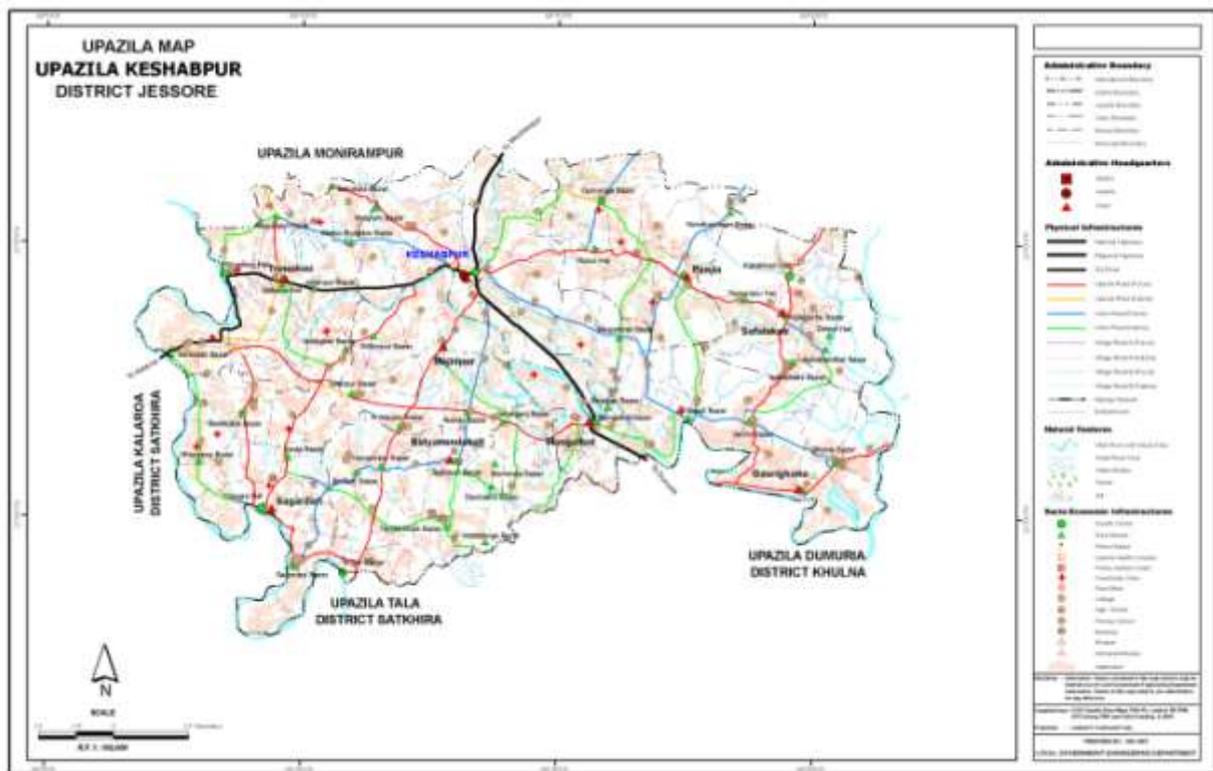
Polder 24/G comprises mainly four Union Parishad areas of Keshobpur Upazila, district Jessore. While other polders have distinct geographical boundaries and surrounded by riverbank embankments, polder 24/G lacks such precise boundaries. In the IWM map, the polder boundary is unclear as it is not defined by any physical barriers between water bodies such as road or embankment. Readers may have a look of the polder 24/G map as produced by the IWM and natural view of the area in the google map which will help understanding of the complexities to define the boundary. The LGED map shown below provides a good look of the present road infrastructure and physical features and type of land.

Google map of the polder area 24/G



Please see in the above google map that the red line is polder boundary drawn by the IWM, the yellow lines are highway from Jessore, the road crossing in the northwest is Keshobpur Upazila headquarters, the blue areas are water bodies (beel) and the green areas are homestead and trees.

Combining the IWM map and LGED Upazila map, we got a clearer boundary that the river Hori from Keshobpur Upazila headquarters to Chuknagar Bazaar forms the western boundary; the southern boundary is river Buri Bhodra from Chuknagar Bazaar to river Shree Nodi and eastern boundary is Shree Nodi which is also the district boundary between Jessore and Khulna. The northern boundary is unclear, particularly in the northeast as the wetland areas there (beel belonging to two Upazilas, Keshobpur and Monirampur) are not bounded by any embankment or road. In the northwest, Keshobpur Panjia Upazila road forms the north boundary but in the northeast there is no such boundary. For the purpose of this study we have considered Sufalakathi UP north boundary as the polder boundary which is roughly correct and somehow close to the imprecise boundary of the IWM map.



Area within this boundary comprises four eastern UPs of Keshobpur Upazila. The UPs are Panjia, Sufalakathi, Mongalkot and Gourighona.

Please see in the above map that basically the eastern half of Keshobpur Upazila is polder 24/G area.

1.3.2 Accessibility

On the whole, the polder area is located about 50 kms southwest of Jessore and 30 kms west of Khulna city and is connected to both cities by regional highways where public bus is the main mode of transport. Local transport modes are rickshaw, rickshaw van, three wheeler auto rickshaw, and engine van. Waterway transport was important in the past but almost eliminated by now as the rivers silted and road infrastructure developed.

Jessore-Chuknagar-Satkhira regional highway passes through Keshobpur Upazila town located in the northwest part of the polder. This highway is only about 500 meters west of the polders boundary in the southwest and almost parallel to the polder boundary formed by the left bank of the river Hori. Another major highway, Khulna-Chuknagar-Satkhira is located only 0.5 to 3 kms south of the polder's southern boundary formed by the river Buri Bhodra. In the southern part of the polder, there is an old road that existed even in the British Period from Daulatpur of Khulna City to the nearby district town Satkhira via the important market centre Chuknagar. This road connects southern and eastern parts of the polder to Khulna Satkhira highway and Daulatpur. Inside of the polder, there are two east-west and three north-south roads connecting four UPs the inner villages to Keshobpur in the northwest, Chuknagar in the southwest and from there to the rest of the world. The inner roads are more elaborately described in the following sub section (1.3.3).

1.3.3 Geographical characteristics

The polder area comprises a series of natural depressions, called beel surrounded by rivers in three sides, west, south and east and overlapping beel area in the north. The land topography is saucer

shaped; the beels in the middle and east and settlement areas in the west and south. Local people categorize land in two broad types, beel meaning low-lying areas and danga meaning relatively highland areas. Roughly one 40% is danga area and 60% is beel area. Beels are more in the eastern half (Sufalakathi, Gorighona, eastern part of Panjia) and danga areas more in the western half (Mongalkot and western part of Panjia). Keshobpur Chuknagar highway is located parallel to the western boundary of the polder and almost parallel to it.

Two major east west roads from Keshobpur via Panjia to Kalagachia, Kakabandhal Bazaar and Keshobpur-Magurkhali-Buruli-Verchi-Bhamia and three north south roads— Mongalkot-Magurkhali-Panjia, Buruli-Ghaga-Panjia and Verchi Bazaar-Sufalakathi-Katakhali roads divided the polder area into seven parts (Please see LGED map).

In the IWM map, the readers may see yellow areas which are homestead area boundaries as per legend and such areas are higher elevated called danga area. In the LGED map, the danga areas are marked by pink color. Seeing both maps, readers may note that the danga areas are approximately 33 to 40 percent of the polder area.

In the LGED map, readers may find that the roads regional highway in the west (dark and wide black), Upazila roads (red), Union roads paved (blue) and Union roads unpaved (green). It is clear in the LGED maps that all such roads predominantly pass through danga areas and the beels are located between the roads. The growth centre markets (green circles), rural markets (green triangles), UP office (red triangles), primary schools (P), secondary schools (H), community health clinics (red cross) etc are all located in the danga areas.

Readers may find in the LGED map, about five beel areas (white areas) north of Magurkhali Bazaar and west of Panjia UP office bounded by three roads. Let's call it zone 1. Three more beel areas are seen south of Keshobpur-Magurkhali-Buruli road. Let's call it zone 2. Three large beels are located north of Panjia-Kalagachia road in the northern part of Sufalakathi UP (North Panjia, Narayanpur and Katakhali beel). Let's call it zone 3. East of Katakhali gate the important beel is Beel Khuksia which is now under TRM project. Let's call it zone 4. South of Panjia – Kalagachia, north of Verchi Buruli, East of Buruli-Panjia there is a vast beel area comprising at least five beels. This is deeper beel Area, have high water logging and large concentration of shrimp cum fish farming. Let's call it zone 5. South of TRM area to Lamia Bazaar there is a vast beel area called Vayena beel in Gourighona UP. Let's call it zone 6. North of Soynnergacha of Gorighona UP to Verchi Bazaar Vamia road there is a small beel area called Agarhati beel. Let's call it zone 7.

Here, we have taken help of LGED map as the physical boundaries and the location of UP, Bazaar and names of important places are clear. Also the IWM map did not show major BWDB sluice gates, not even the most important ones like Katakhali sluice gate Diyarkhali gate and Buruli gate. Instead they showed hundreds of BWDB/LGED structures (actually small pipes and box culvert, mostly not visible and may have gone under mud and buried by gher dykes) and in the structure list all are shown as not linked to any canals.

However, after showing both maps, we shall plot the locations of FGDs and KIIs etc on the IWM map and shall important features coming from the discussion in the IWM map.

The informants often mentioned about 27 beels, a little over one half, say 60% belonging to four UPs of Keshobpur and 40% belonging to neighboring Monirampur Upazila to be interconnected and their water flowing into rivers shree nodi and Buri Bhodra mainly through two gates, Katakhali in the north eastern part of the polder in Sufalakathi UP and Buruli gate in Mongalkot UP.



Beel Khuksia under TRM, one of the 27 Beel in the Jessore Khulna drainage congested area

Water of zones 1 and 2 falls into river Hori in the west of Magurkhali Bazaar and there is a canal flowing into it. Water from zone 3 and that of the southeastern part of Monirampur Upazila pass through Katakhal khal falling in to Diyarkhal khal and then to Shree nodi by crossing the present TRM area. Water from zone 4 drains through Katakhal and Buruli gates to Hori nodi and Srhee nodi. Water from zone 5 falls into Shree nodi directly through the TRM cut points and Diyarkhaligate. Water from zone six falls into Shree nodi through private gate on BWDB embankment north of Gourighona UP. Water from zone 7(Beel Vayena and Agarhati) fall into river Buri Bhodra through Sonnayergacha khal in Gourighona UP.

Ultimately water from all areas falling into either River Hori or Buri Bhodra in the west and south and Shree nodi in the east fall into Shree nodi and through it flows down under the Khornia bridge of Khulna Satkhira highway.

The FGD informants also emphasized that the beel land in Keshobpur area is elevated one meter below the land in the Sundarbans, hence flood and water logging are major problems.

1.3.4. Demographic and other basic information

Table 3 below shows total area of the four Ups which is approximately the area of the polder of about 103.48 ha or about 10,348 ha. Total population of the four UP in 2011 was 85,344 average density 825 persons per sq km and average household size about 4.1. Male and female population is roughly equal overall literacy rate was about 54%, female literacy about 49 percent.

Table 3: Area and Population

SL	Particulars	Sufalkathi UP	Gourighona UP	Mongalkot UP	Panjia UP	Polder Total	Upazila Total
1	Area (Sq km)	25.75	26.15	22.96	28.61	103.48	258.56
2	Household	4,148	5,022	5,538	6,053	20,761	62,309
3	Population Total	17,249	21,138	22,877	24,080	85,344	253,291
4	Population Density	670	808	996	842	825	980
5	Household Size	4.16	4.21	4.13	3.98	4.11	4.07
6	Male Population	8,545	10,660	11,442	12,040	42,687	126,656
7	Female Population	8,704	10,478	11,435	12,040	42,657	126,635
8	Sex Ratio	98	102	100	100	100	100
9	Religion Muslim %	64.7	77.4	80.9	76.9	75.6	82.1
10	Hindu%	35.3	22.5	18.3	23.1	24.1	17.7
11	Christian and others %	0.1	0.1	0.8	0.0	0.3	0.2
12	Literacy All %	55.9	56.2	53.9	49.4	53.9	55.2
13	Literacy M %	61.8	60.1	58.3	54.3	58.6	59.4
14	Literacy F %	50.1	52.3	49.5	44.6	49.1	51.0
Source: BBS, Population Census 2011, Community Series for Jessore District							

Table 4 below shows employment status of people of age 7 and above not attending school. Although 7+ is not appropriate age for defining labor force this data had to be taken from the census report the way it is organized there. It shows that about 85% of the males of age 7+ not attending school are currently working and 14% are not working. Males looking for job and engaged in household work are only about 1 percent. Most of these 14% should be children of age 10 to 15. Of the females age 7+ and not in school 77% are engaged in household work and 18% are not working. The remaining 5% are looking for job.

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

SL	Particulars	Sufalkathi UP	Gourighona UP	Mongalkot UP	Panjia UP	Polder Total	Upazila Total
1	Population age 7+ not in school	3,921	5,336	5,021	6,383	20,661	61,867
2	Male	1,506	2,308	1,998	2,626	8,438	25,666
3	Female	2,415	3,028	3,023	3,757	12,223	36,201
6	% Employed Male	86.39	84.62	84.33	86.41	85.42	85.48
7	% Employed Female	4.76	4.23	6.62	3.86	4.81	4.40
8	%Looking for Job Male	0.13	0.13	0.20	0.23	0.18	0.33
9	%Looking for Job Female	0.25	0.26	0.10	0.21	0.20	0.20
10	%Household work Male	0.93	0.65	0.90	0.84	0.82	0.97
11	%Household work Female	78.14	74.57	75.29	80.14	77.17	78.25
12	%Not working Male	12.55	14.60	14.56	12.53	13.58	13.22
13	%Not working Female	16.85	20.94	18.00	15.78	17.82	17.15

Source: BBS, Population Census 2011, Community Series for Jessore District

Table 5: Employment by Sector

SL	Particulars	Sufalkathi	Gourighona	Mongalkot	Panjia	Polder Total	Upazila Total
1	Agriculture % of male worker	90.93	90.32	90.09	86.56	89.19	85.66
2	Agriculture % of female worker	71.30	78.91	89.50	81.38	81.63	70.14
3	Industry % of male worker	0.38	3.43	3.32	2.91	2.69	4.15
4	Industry % of female worker	2.61	0.78	3.00	2.07	2.21	5.46
5	Services % of male worker	8.69	6.25	6.59	10.53	8.12	10.19
6	Services % of female worker	26.09	20.31	7.50	16.55	16.16	24.40

Source: BBS, Population Census 2011, Community Series for Jessore District

Table 5 above shows that 89% of the employed males are engaged in agriculture, 3% in industries and 8% in services. Of the female workers 82% are engaged in agriculture, 2% in industries and 16% in services.

SL	Facilities	Sufalkathi	Gourighona	Mongalkot	Panjia	Polder Total	Upazila Total
1	Sanitary Toilet water sealed %	37.4	30.4	37.3	30.3	33.85	28.6
2	Sanitary not water sealed %	22.1	39.7	33.3	29.5	31.15	28.6
3	Non sanitary%	33.8	26.8	27.9	35.8	31.08	37.3
4	No latrine %	6.6	3.1	1.50	4.4	3.90	5.6
5	water source:TW/Tape %	98.3	98.5	100	98.4	98.8	98.1
6	Electricity Connected %	46.6	40.3	52.5	46.1	46.38	42.5

Source: BBS, Population Census 2011, Community Series for Jessore District

Table 6 above shows that about 34% households in the polder have water sealed latrines, another 31% have non-water-sealed sanitary latrines, 31% have non-sanitary latrines and 4% have no latrines. These mean that 65% have sanitary latrines. Access to pure drinking water is about 99% while 46% have electricity.

1.3.5. History of polder development in Keshobpur Polder 24/G

In each general FGD and in WMA FGD several elderly people and educated people participated and they were able to give a historical overview of the polder development in the area. Information varied but it was possible to draw conclusion based on the discussion.

The participants in general FGD held at village Kalagachia of Sufalakathi UP said that the then East Pakistan Water and Power Development Authority (renamed BWDB but still locally known as WAPDA) constructed embankment (along the right bank of Shree Nodi in the east and the left bank of Hori Nodi in the west and Buri Bhodra in the south) in 1958. The objective was protecting crops from flood and tidal surge. Crop area and yield increased in the 1960s but in the late 1970s to mid 1980s the rivers silted up and water logging increased. With the increasing public demand for solving the problem of water logging, the implementation of Tidal River Management Project (TRM) began in 2005 and under it village protection embankment was constructed around Beel Khuksia, east of Katakhal gate of Sufalakathi UP in 2005. As a result, land in the beel Khuksia elevated by one meter, water logging decreased but the project is still incomplete and people in Beel Khuksia area can't produce any crop and also can't produce fish and shrimp since the whole area has been unprotected for more than seven years.

One informant, Mr. Kamruzzaman said that construction of embankment by community participation began even before the British rule, inspired by the holy leader Peer Khan Jahan who established mosque and excavated fresh water tank not only in Bagerhat but also in the whole southwest region of the country.

Informants in the general FGD held at village Panjia of Panjia UP said that the WAPDA embankment was constructed during 1959-63 and crop production increased following it for several years but problem arose as rivers silted in the 1980 and 1990s. After silted, all khas khals and even rivers inside of the polder have been occupied by the adjoining land owners further aggravating drainage congestion.

The informants at the WMA FGD held at WMA office said that the embankment was constructed under the Coastal Embankment Project (CEP) of the WAPDA during 1962-66 and after its construction crop production increased but this was not long lasting. In the 1980s water logging

increased as the rivers and canals silted. From mid 1980s people protested against the CEP and demanded to open the embankment.

Participants at Sonnayergacha general FGD held in September 2012 informed that the embankments along Buri Bhodra and Shree Nodi were constructed in 1962. Informant in the FGD held at Kalicharanpur village, Sufalakathi UP had varying opinion on the construction period, one said that it was constructed in 1952 but others corrected that bit was constructed in 1964. Informants at village Ghaga, Mongalkot UP said that the WAPDA embankment was constructed in Pakistan period but could not mention year of construction.

The above information reveals that the "WAPDA" embankment was constructed in the first half of 1960s. It also reveals that after the construction, crop production increased but the rivers and canals silted causing increased water logging and subsequent water logging. As a result, crop production decreased and gradually aquaculture gher, both shrimp/prawn and fish increased from 1980s and ultimate aquaculture became main agricultural activity.

2. FARMING SYSTEMS AND LIVELIHOODS

2.1. Crops and Fisheries

General:

Cropping pattern in the 24/g polder area depends on land elevation, the danga area and beel area. The beel area in has two cropping pattern. In the beels except Beel Khuksia which has been fallow for the last seven years because of the TRM, main crop is fish and shrimp. The produced are mainly golda and also bagda as well as small shrimp harina and chaka. Commercial fresh water fish species grown are ruhi, katla and tilapia. Parse and tengra and several brackish water species grow naturally and some are also stocked. Crabs come in with water. In the deep beel areas fish and shrimp are grown round the year. This covers about 80% of the beel area in the east and 40% of the area in the west. On the whole, about 60% of the beel area has round the year shrimp and fish gher and the remaining 40% area has one season fish and shrimp and one season paddy, HYV Boro. Aman paddy is grown in the peripheral area of the beel in the west and south and aus and jute are also grown in this area (west part of Panjia, west and south part of Mongalkot and the south part of Gourighona Union Parishads).

In the danga area and in the gher dykes in the peripheries of the beel in the west and south, different types of vegetables and fruits like papaya and banana are grown. Another important crop in the danga area west of Panjia and south of Keshobpur is betel leaves (Panjia and Mongalkot UP).

HYV Boro paddy is planted in January February and harvested in April May. Presently, besides HYV Boro, hybrid boro paddy is also cultivated and its yield is better but new seed must be procured from the dealers every year. Aman paddy species are BR 10, 30 and 39 while local variety paddy includes bojramuri. Boro HYV varieties are BR 23, 26 and 28 while the boro hybrid varieties include Lal Teer and Rotna. Local Aus variety is Koitara.

Specific:

It was learnt from the general FGD held at village Kalagachia of Sufalakathi UP that Bagda and golda are both important there and they are producing shrimp, prawn and fish as water logging increased since 1980s and 1990s. In the past, main crop was aman, aus, boro, jute and a wide range of winter or post-winter crops like melon, oil seed (sesame), and round the year vegetables. Also, open water fishes were abundant which are now getting extinct.

FGD participants at village Sonnayergacha of Gourighona Union Parishad informed that Aman and Aus cultivation have been nearly eliminated over the past ten years in the Vayena and Agarhati beel areas, north of the village. In this area crop land has been converted to fish and shrimp gher covering about 18,00 acres land in those two beel. In the past, all gher were operated by the leaseholders, while about two thirds of the gher area is now operated by owner-farmers. In this area only about 20% of the gher area alternate boro HYV paddy with gher, boro planted in Jan-Feb and harvested in April May while fish and shrimp stocked from March April and harvested from June to December. In the remaining 80% round the year aquaculture of fish, bagda and gold avis practiced.

In the danga area around Sonmayergacha covering about 900 acres area 400 acres have houses, bamboo bush and tree plantation. About 300 acres have rotational cropping of one season paddy or jute and another season vegetables. The remaining 200 acres have all season vegetables production.

In Kalicharanpur area, close to Beel Khuksia no crop could be grown over the last seven years because of TRM. In some part, west of Katakhal gate, mainly fish and shrimp are produced and in limited areas, HYV Boro also cultivated, but no Aus, Aman Jute and vegetables. This is learnt from FGD. In the same area one farmer (KII: Kalipoda Mondal) leased out 10 acres of his 12.60 acres land to shrimp cum fish farmers. The leaseholder is producing bagda, golda and fish. In two acres, the farmer is producing both fish with shrimp and paddy in two different seasons and in 0.60 acres area he has all season fish and shrimp farm.

In Magurkhali area of Mongalokot UP, one sharecropper (KII) is cultivating vegetables round the year in 0.21 acre land and in another 0.21 acre he cultivates one season jute and two seasons vegetables. In two bigha land (0.84 acre) he cultivated HYV boro and another two bigha Hybrid Boro. In half bigha land he cultivated Aus followed by aman but aus is left on luck.

One woman headed household (KII at Magurkhali) who is a landless labour has sharecropped 0.14 acre land cultivating jute followed by vegetables and in another 0.17 acre she cultivated HYV boro followed by aman paddy.

A landless representative to the WMA of village Arua near Katakhal gate is a tea shop operator. He owns 0.63 acre land at Beel Khuksia but it has been fallow for the last seven years because of TRM. This is learnt from the KII. Another farmer of village Sufalakathi (KII) owns three bigha land (one bigha=0.42 acre) produces HYV aman (BR 28) as well as fish, shrimp and prawn. This is relatively high land.

2.1.1. Irrigation sources

Farmers at village Kalicharanpur (KII Mr. Kalipoda Mondal) said that, in most part of the beel area water need not be taken in, neither for crop farming, nor for aquaculture. The beel area is always full of water and it has always too much of water. Instead water is needed to be drained out. During monsoon, excess water is drained out through Katakhal gate from June to November. From December to May water of the beel goes down and stays below outside land and water cannot be drained out naturally. During this period water is drained by pumping out with the use of one cusec water pumps operated by diesel engine. Pumping out continues for about four months from Jan to Apr to keep Boro plants surviving up to harvest. It costs Tk. 4000 per 42 decimals land (local one bigha).

Farmers at village Magurkhali, which is relatively highland area, said that for Boro paddy, irrigation is provided by Shallow Tube Well and it cost Tk. 3000 per bigha (42 dec). For aman irrigation is provided only occasionally by STW or LLP and it cost Tk. 200 per bigha. For jute and Aus irrigation is not needed and not usually provided. For winter vegetables irrigation is provided occasionally by STW/LLP and it cost Tk. 400 per bigha. For summer vegetables irrigation is not usually needed and occasional irrigation cost only about Tk. 200 per bigha.

Farmers at village Sonmayergacha of Gourighona UP said that they store tide water in the canal in January February when salinity remains low and this water is used for irrigation of Boro HYV and paddy as well as for aquaculture, bagda, golda, and fish. June onwards, there is enough rain and no irrigation is needed, neither for fish nor for crops. Bagda fries are stocked in Feb-March to April and harvested in May to July. Golda and fish fries are stocked in June-July and harvested in Nov-December.

FGD participants at village Ghaga of Mongolkot UP said that most land remains under water most part of the year hence they can't cultivate aus and aman paddy. They cultivate only fish, prawn and Boro HYV paddy in 40% area and shrimp, prawn and fish in 60% area. Dyke cropping is found in the area adjoining the villages and roads. In the danga area of Mongalkot, bamboo, trees and vegetables are quite prominent.

2.1.2. Productivity, yield and seasons

Table 7 below provides a list of various crops and fish grown in the polder with season, source of water for irrigation and yield per acre. For paddy yield please note that two third of the paddy yield is equivalent yield converted to rice. If the reader is interested in yield per hectare, a conversion factor of 2.47 can be used (1 ha=2.47 acres).

Table - 7: Crops and fish grown, source of irrigation and yield

Crop/ Fish	Variety	Season	Duration	Irrigation	Yield kg paddy/acre	Remarks
Paddy	Aus Local	Kharif 1	Apr-July	Rain	1400	Limited area
Paddy	Aus Local (late)	Kharif 1	May to Aug-September	Rain	1400	Limited area
Jute	Tosa	Kharif 1	Apr-July	Rain	1800	Limited area
Paddy	Aman Local	Kharif 2	July-Nov	Rain	1600	Decreasing
Paddy	Aman HYV	Kharif 2	Aug-Dec	Rain	2000	Decreasing
Paddy	Boro HYV	Robi/Boro	Jan-Apr	Drain out by LLP or irrigation by STW	2500	20-40% of beel area
Early Winter Veg	Bean, cabbage, cauliflower, brinjal	Kharif 2 & Robi overlapped	Sep-Feb	Rain + STW	4000	Danga area and gher dykes
Winter Veg Late	Bean, cabbage, cauliflower	Robi	Nov-Apr	STW	5000	Medium high land
Shrimp	Bagda	Robi	Feb-June	Canal, gate, storage of tide water	150	Beel area
Prawn	Golda	Kharif 1, 2	Apr-Dec	Canal, beel, gate	200	Beel area
Fish	Parse, Tengra, Tilapia, Ruhi, Katla	Year round	Year round	Beel water, storage of tide water, canal, gate	500	Beel area

Source: FGD and KIIs at Sufalakathi, Mongalkot and Magurkhali combined

Table - 8: Crop Seasons

Crop/ Fish	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aus paddy Early												
Jute												
Aus paddy Late												
Aman Paddy												
Boro HYV												
Bagda												
Golda												
Over wintering of last season golda fry												
Fish												
Veg Dyke crops												
Veg Winter early												
Veg late winter												
Summer veg												

The main farming systems in the beel area are: (a) Boro HYV, golda and fish and (b) Bagda, golda and fish with no paddy.

Main combination in the medium high land is (a) Aman HYV and Boro HYV and (b) Jute and vegetables, (c) Aus and vegetables, (d) vegetables and chili etc. Main crop in the danga area is (a) all season vegetables, (b) jute and vegetables (c) turmeric with fruit trees, timber trees in the shady area, (d) bamboo, (e) banana, papaya etc. On the gher dykes, various vegetables are produced almost round the year.

2.1.3. Cost of Cultivation and Profitability

Table 9 below shows cost of production, yield and profit to farmer per acre per season of some major crops- Boro paddy, aman paddy, jute and vegetables. It shows net return to share cropper in the last row.

Table 9: Cost of production and benefit to farmer

S L	Items	HYV Boro	Hybrid Boro	HYV Anan	Jute	Vegetables
1	Tillage by tractor	1,429	1,429	1,429	2,381	2,381
2	Leveling by cattle		-		476	952
3	Transplanting	1,429	1,429	1,429		476
4	Seed/sapling	714	714	714	476	1,190
5	Weeding	476	476	476	476	952
6	Harvesting	1,905	2,381	1,429	7,143	952
7	Irrigation	4,762	5,952	952	952	952
8	Other materials (bamboo)					5,714
9	Sub Total	10,715	12,381	6,429	11,904	13,569
10	Fertilizer Urea	3,143	3,810	1,667	952	1,905
11	TSP	2,143	2,143	714	714	2,143
12	MP	905	905	643	643	952
13	Gypsum	286	286	190	190	286
14	Pesticide	762	1,524	381	381	1,905
15	Sub Total	7,239	8,668	3,595	2880	7,191
16	Direct Cost	17,954	21,049	10,024	14,784	20,760
17	Rent (Crop share to owner)	11,794	17,190	19,643	29,786	31,746
18	Cost to Share Cropper	29,748	38,239	29,667	44,570	52,506
19	Yield kg/acre	1,800	2,000	1,600	1,200	4,762
20	Price/kg	17	17	20	25	20
21	Value of output	32,381	48,571	34,286	53,571	95,238
22	Value of straw/ jute stick	3,000	3,000	5,000	6,000	
23	Total Value of produce	35,381	51,571	39,286	59,571	95,238
24	Gross income to Share Cropper	5,633	13,332	9,619	15,002	42,732
25	Imputed wage for family Lab	4,000	5,000	3,000	6,000	30,000
26	Net return to sharecropper	1,633	8,332	6,619	9,002	12,732

Source: KII with more information from other farmers in the same village

Table 10 below shows cost of production and profitability of cultivating mixed bagda, goloda, fish and paddy per acre of land. Cost of production of paddy per acre of land is over Tk. 18,000 and value of output is Tk. 36,000. Considering family lab cost. Return to owner farmer is estimated at Tk. 11,650 but after paying rent to owner, one third of the produce, net return to sharecropper becomes negative. Actually he gets the wage of family labour, Tk. 6000. If the farmer can take the land on fixed rent basis, he earns Tk. 6000 extra but increases his risk.

Table 10: Cost of Cultivation and Profitability of producing HYV Boro in shrimp gher

SL	Particulars	Value Tk
1	Land preparation for paddy	500
2	Seed/ sapling	2,100
3	Transplanting mainly lab cost	3,600
4	Weeding	900
5	Fertilizer	3,750
6	Irrigation	4,500
7	Harvesting paddy	3,000
8	Cost of prod of paddy	18,350
9	Paddy yield 2400 kg*15	36,000
10	Gross return	17,650
11	Crop share to owner	12,000
12	Gross Return to sharecropper	5,650
13	Imputed value of family labour	6,000
14	Net Return if Owner farmer	11,650
14	Net Return to sharecropper	(350)

Table 11: Cost of production and profitability of mixed bagda, golda, shrimp farming with paddy

SL	Particulars	Value Tk
1	Land preparation	1,500
2	Lime 60 kg	300
3	TSP 150 kg	4,200
4	Urea 150 kg	3,000
5	Cowdung	3,000
6	Oil cake 150 kg	6,000
7	Rice bran	15,000
8	Other feed	4,800
9	Hired Lab	3,000
10	Guard, harvester	6,000
11	Bamboo etc	1,500
12	Bagda fry	5,000
13	Golda fry	5,000
14	Other fry	3,000
15	Rent of land	18,000
16	Water Cost	9,000
17	Total cost	88,300
18	Total value of sale (bagda 90 T, Golda 90 T and fish 45 T)	225,000
19	Gross Profit	136,700
20	Management/ Family Lab	50,000
21	Net profit to gher owner	86,700

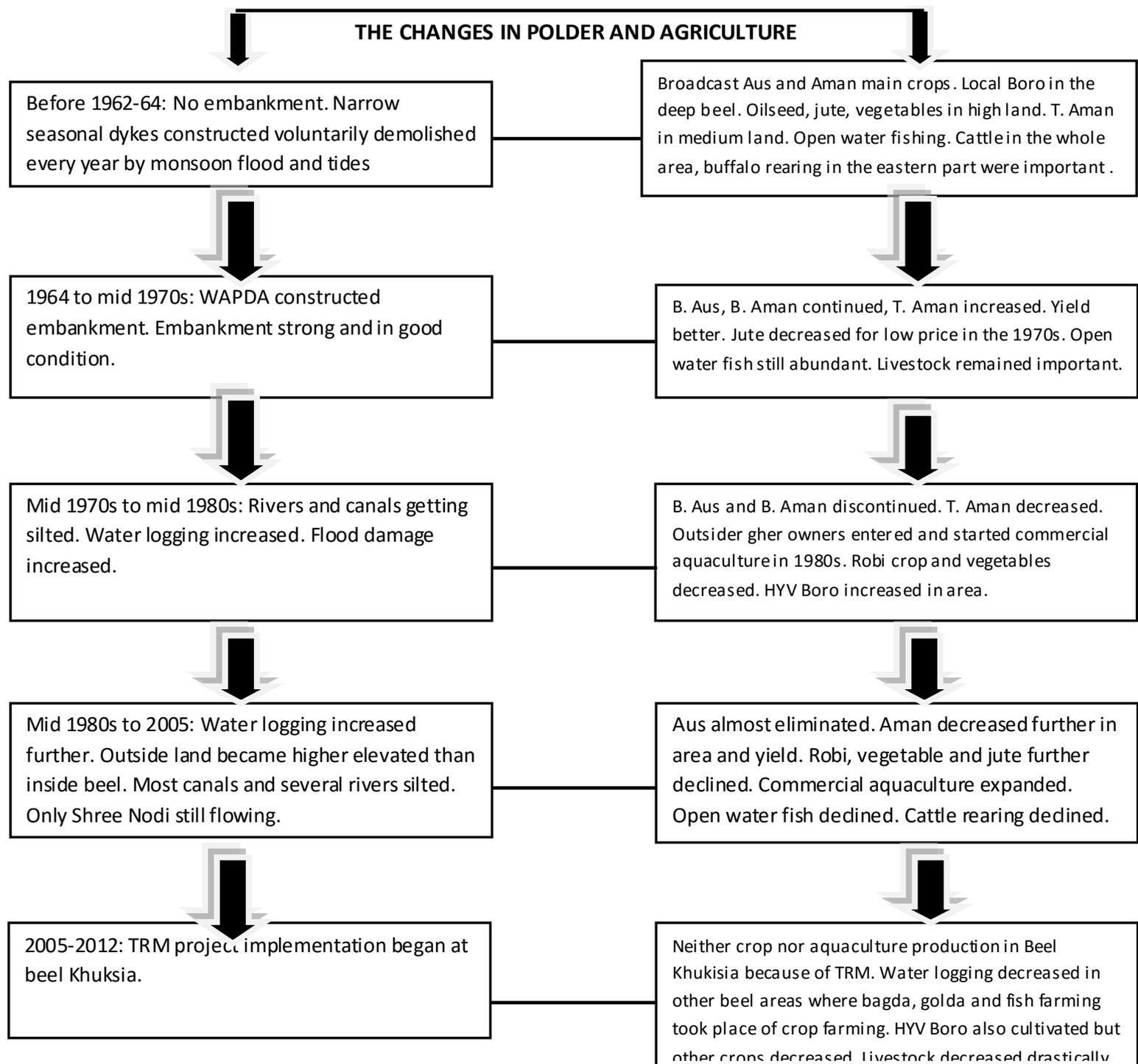
Per acre of land, total value of shrimp, prawn and fish produced is Tk 225,000. Cost of production is a little over 88,000 including rent of Tk. 18,000. Gross profit is Tk. 136,700 and net profit minus cost

of family labour is Tk. 86,700. It seems quite profitable, about 100% compared to operating expenses.

2.1.4. Change of agriculture with polder development

Figure 1 below shows change of agriculture with polder development since mid 1960s when the WAPDA embankment was constructed.

Fig. Polder development and change of agriculture since 1960s



There are two different views about livestock. The dominant view and most frequent responses indicate that livestock rearing decreased as a result of increased water logging and subsequent shift to aquaculture from crop agriculture since mid 1980s. In the past, farmers in the eastern part of the polder had many buffaloes, not only cattle. Other parts had fewer buffaloes but many cattle. Informants of FGD at village Kalagachia said that after constructing embankment, cropped area increased first then increased aquaculture area but grazing area and grazing period between crops decreased. At a later stage when water logging increased, paddy area decreased, availability of straw decreased. All of these contributed to gradual decrease of livestock rearing. Buffalo rearing almost abandoned and cattle rearing drastically reduced. Informants at Panjia at FGD said that their ancestors had farmhouse full of paddy and livestock sheds full of cattle but those days are now gone. This could be emotion but contains some element of facts.

Besides decrease of grazing area and scarcity of fodder, another cause of decreasing cattle and buffaloes is increased use of tractor and power tillers that reduced the need for cattle and buffalo rearing. Now diesel engines replaced animal power in both cultivation and rural road transport. KII informant Mr. Kalipoda Mondal said that farmers like him had 12 to 15 cattle before now has only two cows.

There is one view of increasing cow rearing on a commercial basis but in the small scale and still home based. This view held that people's purchasing power improved and poverty decreased. It has contributed to increased demand for milk, meat and eggs. Therefore some farmers are rearing cow although few are rearing bullocks. It was specifically observed in Mongalkot area (having about 40% high land) that marginal farmers and women headed households rear goats and poultry. Some are also engaged in poultry rearing. General FGD participants at village Ghaga, Mogolkot said that rearing of cow on a more commercial basis increased in the recent years for reduced poverty.

The truth is that livestock rearing decreased for two reasons, reduced availability of fodder and reduced need as tillage power. But rearing of cow, goat, poultry and cattle fattening increased for responding to market demand.

2.2. Livelihoods

Livelihoods are related to the main crops, horticulture and aquaculture produces- paddy (mainly boro but also aman and aus), jute, vegetables, bamboo, betel leaf, vegetables (beans, borboti, okra, chichinga, bitter gourd, brinjal, cabbage, cauliflower, tomato, cucumber, potal, water gourd, sweet gourd, oalkachu, mukhi kachu), fruits (banana, papaya, jambura), spices (chili, turmeric) and chewing variety sugarcane. Chuknagar haat is located in south of the polder just on the other side of river Buri Bhodra and at the intersection of Khulna Satkhira and Satkhira Jessore highways and is very famous for vegetables and fish. This has been a good advantage of growing a wide variety of vegetables in the surrounding areas including polder 24/G. As a result, quite a few trading and transport activities are found in the area as forward and backward linkages to crops, horticulture, aquaculture and livestock sub sectors.

Rural road transport- rickshaw, rickshaw, rickshaw van, engine van, motor cycle service, battery operated auto rickshaw expanded quite rapidly. Also, substantial proportion of households are engaged in small trading related to these produces, mainly fish and vegetables and other agricultural produces. A few important cattle and goat markets are located in the nearby Dumuria Upazila on Khulna Satkhira highway. This has been a trigger to cattle and goat fattening and expanded aquaculture have also encouraged cow rearing which would otherwise have declined even faster as a result of the scarcity of fodder and grass.

Hence the major livelihoods are agriculture mainly in three sub sectors (crops, horticulture and aquaculture). Livestock declined, particularly the rearing of bullocks and buffaloes but rearing cow and cattle and goat fattening remained important.

A few examples will make the point clear. One of our woman household head is currently rearing a cow, seven goats, 14 ducks and four hens. This is a landless household. The household head and her mother are both widows. The elder daughter lives with her with husband and a child, the second daughter is waiting for marriage and the third daughter is a student of grade ten. They all are engaged in livestock rearing and producing fruits and vegetables in the small homestead area. Although a few trees died because of water logging in the last few years (three jackfruit trees, a jambura tree, two ata trees, one dalim tree and three sajina trees) the household still has a small orchard with trees, lemon garden and turmeric plants. This implies how actively the household is engaged in livestock rearing and horticulture. Also the household has diversified occupation by sharecropping of 27 decimals of land (paddy). The son in law works at a tailoring shop in the nearby market and daughters have a sewing machine. The son in law has recently procured a small diesel engine for water pump. Next season he will sell irrigation service in addition to increasing area under sharecropping. The lady household head (45) works as a day labour in agriculture and occasionally as LCS labour in the UP/LGED earthwork. The mother now about 70 years old still works as housemaid in the village for food and Tk. 200 per month.

One male Landless person who owns 63 decimals land which is uncultivable now for the TRM is currently operating a tea shop at Katakhal Bazaar. He and his 23 years old son have a small business, fish trading at Katakhal Bazaar. He represents landless in the Water Management Association.

2.3. Drinking water and water for uses other than irrigation

Accessing drinking water is not difficult now. Exactly 50 years back from now, people had to drink water from the beel, canals and rivers. People were not so aware of the risk of drinking water from the beel. Beel water was clean seen by open eyes but it was not even though that it could be unsafe. Tube wells were rare so people were accustomed to drink water from the beel. About 30-40 years ago there was scarcity of drinking water. At that time, pond water was used as drinking water.

Presently most households have access to tube well in the locality. Some informants said ninety percent but it is close to 100 percent. For drinking water BRAC provides tube well. One tube well is given against 40 applicant households with community contribution of BDT 10,000. The Union Parishad distributes tube well in the locality free of cost with the assistance of the DPHE.

The tube wells are of two types, Deep Tube Well provided by the BRAC or DPHE. The STWs are about 200 feet deep but DTWs are about 1200 feet deep. DTWs are used for drinking water while STWs are used for washing bathing etc. It is learnt that people prefer drinking water of DTW as it is free of arsenic.

Informants in the FGD at Sufalakathi and Mongalkot (village Ghaga FGD) said that they collect water from DTW located maximum 500 meters from the house. It happens so because 20 or 40 households (information varied) must apply for a tube well. Where the houses are isolated some have to walk longer distance. STWs are found much closer, within next two or three houses but for the arsenic problem people bring at least drinking water from the deep tube wells even if distance is 200 or 500 meters or even higher in extreme cases.

One KII informant at village Magurkhali of Mongalkot UP said that 20 households including the informant applied for a DTW to UP, contributed Tk. 400 each as beneficiary contribution and got a

DTW. For bathing, washing and cattle bath this household uses water of the pond but when pond dries (March April) he uses DTW water for all purposes. Then the frequency of cattle bath is reduced, once a week instead of a few times each week.

Another informant (woman household head) said that the nearest DTW is 200 meters away from her house and she brings drinking water from there. She did not contribute to the cost sharing but still access the DTW for drinking water. The nearest 20 households contributed. For bating and washing there is a pond but administration leased it to fish-lord.

As for complain about water access, she said, "Nothing will help us. The pond we wish to access for bathing is leased to fish farmer who is very influential". It could be a public pond but the leaseholder is using too much feed and water is contaminated.

3. PHYSICAL CHARACTERISTICS OF POLDER

3.1. Condition of the embankment

Polder 24/G is not a well defined hydrological unit, neither by natural boundaries nor by well developed embankment and sluice gates. As noted in the introductory chapter, the west boundary is formed by the river Hori falling to river Buri Bhodra near Chuknagar Bazaar. The southern boundary is river Buri Bhodra from Chuknagar to Shree Nodi and the eastern boundary is Shree Nodi which is also district boundary between Khulna and Jessore. The western and southern boundaries could be defined by BWDB embankment constructed during 1960s on the left bank of rivers Hori and Buri Bhodra but the IWM map shows a rather unclear boundary. The eastern boundary has embankment constructed during 1960s but presently embankment is visible in the Gourighona UP part. In the Sufalakathi UP part, the embankment is almost fully eroded because of the TRM. The TRM made cuts in two points near Diayerkhali gate and Kanasisa gate.

Although the TRM made cuts in the embankment 200 feet at each site, now the embankment disappeared in 1000 feet at two sites and at other places have many breaches. As a result the Beel Khuksiahas become fully unregulated wetland area where river water and beel water stay at same level.

In the northeast a narrow strip of land north of Katakali gate has beel area on both sides without any physical boundary. There is no embankment in the north, west and east of Katakali and the beels are spread over two upazila, Keshobpur and Monirampur. The north boundary west of village Panjia is however defined arbitrarily by Upazila road from Keshobpur to Panjia.

The riverbanks are quite stable in the west and south as the rivers Buri Bhodra and Hori do not have strong current. Several times re-excavation have kept them somehow flowing during the monsoon season while in the winter their combined meeting point with the river Shree Nodi, north of Khornia bridge is closed every year to prevent silt deposit and it is opened again beginning of the monsoon when silt is removed by monsoon flow. These two rivers were re-excavated under the KJDRP project during 2000-2002.

Condition of the embankment is good in the west and south but because of narrowing of the river, adjoining owners of the land made fish and shrimp gher in the area between the old embankment and the river particularly in the south along the river Buri Bhodra. In the west, along the river Hori, the embankment in most area is merged with the land but the embankment is not over flown as it is in the highland area.

In the east, embankment condition is good at Gourighona part but it is in bad condition in the Sufalakathi part, particularly in the east of Beel Khuksia where TRM has been started in 2005 but is still incomplete. Embankment with structures needs to be reconstructed here.



Embankment near Katakhal, next to WMA office.

Embankment condition is poor or non-existing in the north of Katakhal gate in the east of Monoharpur Bazaar to the district boundary. The WMA FGD participants mentioned that embankment condition is particularly poor near Katakhal, Kakbadhal and Arua. Even, the embankment almost destroyed near Katakhal and it can collapse any time.

3.2. Condition of Sluice gates

Actually, very few sluice gates are in existence. The IWM prepared 4 lists of structures and plotted individual structures on the map. In the first list out of 121 structures only four are sluice gates and two other box culverts have linked canals. The remaining 115 are box or pipe culverts on rural roads without any canals.

The four sluice gates are following:

IWM FID number 41. Agarhati Sluice Gate, Linked Khal Agarhati, Vill. Agarhati, Mongalkot UP.

IWM FID number 78. Pipe Sluice, Linked Khal Buruli, Vill Bora Patra, UP Mongalkot

IWM FID number 100. Katakhal sluice gate, Linked Khal Katakhal, Vill Katakhal, UP Sufalakathi

IWM FID number 107. Konderpur Sluice gate, Village Konderpur, UP Mongalkot

In addition to above four sluice gates there are three box culverts of LGED with link canals. These are:

IWM FID number 79. LGED Box Culvert at Village Patra, UP Mongalkot. Linked canal Buruli Branch

IWM FID number 94. LGED Box Culvert at Magurdanga, UP Keshobpur. Linked khal Magurdanga

IWM FID number 117. LGED Box Culvert at Konderpur, UP Keshobpur. Linked Khal Gorali

Of the 68 private structures noted by the IWM in the second and third lists only five have link canals.

These are:

IWM FID number 11. Sarutia bridge at Gourighona UP. Linked khal Sarutia.

IWM FID number 12. Diarkata Box Culvert, vill. Kakbodal, UP Sufalakathi. Linked khal Diarkata

IWM FID number 47. Bhamiya sluice, Neokhali Khal, Vill Beel Vayena, UP Gourighona

IWM FID number 49. Kondarpur bridge, linked to Boira nodi, Kondarpur, Keshobpur UP
IWM FID number 60. Barenga Culvert, Mongalkot khal, Barenga, Mongalkot UP

The fourth list has a record of 55 pipes, 3 located at Sufalakathi, 8 at Panjia, 15 at Mongalkot, 13 at Keshobpur, 5 at Gourighon and one at Khanpur UP of Monirampur Upazila.

The IWM map is unspecific of BWDB gates. Combining the above four lists only five sluice gates can be identified, four from the first list of which the gates belong to LGED and one from the second list, a private gate.

In addition to the above five sluice gates, FGD held at Sonnayargacha, Mongalkot UP revealed that there is a BWDB gate East of Beel Vayena. The FGD informants said that within Gourighona UP, in the north of Gourighona Bazaar, two gates are located on the BWDB embankment. One is private gate which is found in the IWM list 2 (private structures) and the other one belongs to the BWDB which is missing in the IWM list. It seems that the IWM list somehow missed the BWDB gates.

Two more BWDB gates are located in the East of Beel Khuksia (Diayerkhali and Kanasisa gates) but these are not found in the IWM list and in the IWM map. In fact no green marked structure is shown in the IWM map east of Beel Vayena and Beel Khuksia. These two gates however are not functional now as the TRM cuts and breaches have made the embankment east of Beel Khuksia inoperative, hence the gates are not used at all.

Of the eight sluice gates noted above, five gates are now used for effective drainage. These are Katakhal gate of Sufalakathi UP (FID 100), Buruli gate (FID 78) and Kondarpur gate (FID 107) of Mongalkot UP, Beel Vayena private gate (FID 47) and Beel Vayena BWDB gate (not shown in the IWM list) of Gourighona UP. These are still functional with link canals but the structure condition very poor and canals are silted. Agarhati gate is in bad condition and canal fully silted hence the gate is not functional. The last two gates east of Beel Khuksia have been blocked by silt deposit from the TRM cut points, the canals silted hence not in use. From Beel Khuksia and surrounding beel, water drained out by Katakhal gate flows in the river Shree Nodi through TRM cut points and not the gates.



The WMA FGD participants stated that there are eight sluice gates. Five of them are within the jurisdiction of polder 24/G. These are Agarhati 2 vent (FID 41), Vayena one vent (not mentioned in the IWM list), Diayerkhali 8 vent (not mentioned in the IWM list), Kanasisa 2 vent (not mentioned in the IWM list) and Katakhal 4 vent (FID 100). Three others are outside of 24/G area. These are Bhobodaha 21 vent (further northeast in Avoy Nagar Upazila), Kasimpur (further south near Khornia) and Kapalia (further north in Monirampur Upazila). Of the five gates, Diayerkhali, Kanasisa are damaged while Agarhati, Katakhal and Vayena gates are still functional although the canals are silted in most part.

Although still functional, condition of Buruli gate is not good. The shutters are partly damaged and partly stuck by silt. It is very difficult to operate the gate, still people are doing it.

3.3. Condition of Canals

3.3.1 The Canals and their condition

No canal in polder 24/G is in good condition. All are silted. The difference is that some canals can be traced and seen existing while others are not visible at all and have been merged with the gher or adjoining land by the adjoining landowners. Combining IWM map, LGED map, IWM structure list with link canals and field level FGD, KIIs and observation have identified twelve canals still existing. These are:

1. Agarhati khal at Gaurighona UP
2. Sarutia khal of Gaurighona UP
3. Sonnayergacha khal of Gaurighona UP
4. Neokhali Khal of Gaurighona UP
5. Magurdanga khal of Keshobpur UP
6. Kondarpur khal of Mongalkot UP
7. Buruli khal of Mongalkot UP
8. Buruli Branch khal of Mongalkot UP
9. Barenga khal of Mongalkot UP
10. Ghaga khal of Mongalkot UP
11. Katakhal khal of Sufalakathi UP
12. Dayerkhali khal of Sufalakathi UP

Condition of all canals could not be known as the informants tended precise information to give information of the canals located in the surrounding area only. This is better as they were able to give very clear and precise information of the specific khal. General FGD participants at village Sonnayergacha said that from Sonnayergacha brickfield to Goughona Bazaar, only one of the five canals now existing. All others are fully silted. The District Board road within this area has five culverts, two of them on recorded khas khal which had wooden bridges in the past. These two canals were used by boats coming from the other side of the Agarhati and Vayena beel and going to Chuknagar Bazaar. One canal now looks like a drain as this too became narrow. It drains water from the beel in the monsoon to the nearby Buri Bhodra river, Other four are fully silted. The canals have been occupied from both sides by the adjoining landowners, initially making them narrow and ultimately merging with the land.

Participants at Kalicharanpur, Sufalakathi UP said that all three canals of their area have been silted. Katakhal gate is still draining water from the beel through 4-vent BWDB gate but this too has been silted. It remains deep in only about 200 meters length. In other parts of about 5 kms, it is silted, both narrowed and depth reduced to a few feet only. The Diayerkhali khal has been silted about 4 kms and only about 1.5 kms remains deep. It cannot adequately drain water from the beel. The same is the condition of Kanasisa khal east of Katakhal.

In the west part of Mongalkot UP, only a couple of canals are still existing- Kondarpur, Barenga and Ghaga. All others are fully lost. These three are somehow draining out in the monsoon season. In the east part of Mongalkot UP only Buruli and Branch Buruli exist and linked to Buruli gate.

It is important to note that the surrounding areas are higher elevated than the beel areas and with canals silted, excess water cannot be drained out after monsoon. Then, from winter to summer excess water is pumped out by the farmers to plant HYV Boro paddy. Again, as the canals are silted, water for irrigation does not reach relatively high land areas and farmers have to use STW for irrigation in such areas.

Khas lease issue

FGD participants at village Kalagachia said that the khas canals have been occupied by the adjoining land owners. They could not say whether the canals were leased to the occupants by the competent government authority or not.

Participants in the WMA FGD said that there are many canals in the area under individual possession. The informants said that influential gher owners and adjoining landowners took possession without legal process. In one case, Mader khal, west of Panjia is said to have been leased by the government, meaning DC office. It was indicated that the interested parties contact AC Land office at the Upazila and the ADC (Land) office in the district for getting lease following official procedure and other means. The concerned lands are declared silted canal suitable for crop farming although such areas are under water and the leased lands are converted fish farms often blocking the water flow.

3.2. Main water-related problems

There is just one water-related problem in this polder. Inside of the polder, the beels are lower in elevation than the surrounding land. The rivers and canals have been silted. Only the Shree Nodi is flowing along the east side of the polder while Hori and Buri Bhodra in the west and south are flowing only during the monsoon. Inside of the polder there are many beel, often said 27 beel spread over three Upazila (east part of Keshobpur, south east of Monirampur and west part of Avoyanagar). The inner canals are all silted and the canal beds are higher in elevation than the even the peripheral land of the beel. Hence the canals do not drain out water. As a result, farmers have to drain water from the beel by pump. This drainage by pumping goes on from December to April to cultivate Boro paddy. But it is difficult and expensive to pump out water of large beel areas. The result is gradual decrease of paddy cultivation and increase of aquaculture. It was also mentioned that deeper parts of the beel are too deep 12-15 feet and oxygen does not reach so deep and aquaculture too is becoming difficult.

When asked about problems most frequent answers were water logging and siltation of the canals and rivers. These two are really the same problem – water logging problem getting worse due to rapid siltation of the rivers and canals (Gen FGD Sufalakathi and Panjia for example). River Hori and Buri Bhodra were excavated under the KJDRP about 10 years ago and these two rivers are kept surviving by making temporary closure at Kasimpur point, north of Khornia bridge. The earthen closure is build by mud filling in December to prevent entry of silt by high tides and then opened in June to remove silt. But this has simply deferred silting up process to some extent. The river Shree nodi in the east is surviving because of TRM over the last one decade but if TRM stops this too will be silted, the informants said in just one year.

Besides water logging, one problem regarding drinking water came up. This is about arsenic. Most houses in the polder have Shallow Tube Well (about 200 feet deep) but for drinking purpose, water from the Deep Tube Well must be collected. The DTWs are free of arsenic and they are about 1200 feet deep, hence expensive to install. UP and BRAC are providing DTW, one for every 20 or 40 applicant households and it happens that home households have to fetch drinking water from a distance of 200-500 meters (Gen FGD Ghaga). This point has been discussed earlier under drinking water.

KII Farmer at Kalicharanpurvillage said that, over the last 10 yrs water logging increased as about 3 kms canal silted from Katakali gate to Diayerkali gate. About 2 kms of the canal is flowing but water flowconnectivity is lost for silting up of the other part of the canal close to the river.

4. BWDB: ADDRESSING WATER INFRASTRUCTURE PROBLEMS

Polder 24/G is a sub polder of the BWDB hence improvement and maintenance of water management infrastructure in this area is the responsibility of the BWDB. The polder was first built in the 1960s to protect crops and homestead land from flood and tidal surge. The purpose was largely served in the first one decade when crop area as well as yields increased considerably. But it was not long lasting. The rivers and canals silted and the land outside of the polder became higher elevated than the inside beel area. This caused increased water logging in the polder area. The result was mass protest and forcible cutting of embankment by local people in the east of Beel Vayena. The result was removal of waterlogging, elevating land in the beel area and resumption of the flow of the river Shree Nodi.

4.1. BWDB Pre-Project Mobilization and Formation of WMA and WMG

Following increased local pressure, the BWDB took up two projects in the area in the recent past. One is called the Khulna Jessore Drainage Rehabilitation Project (KJDRP) followed by the Tidal River Management Project (TRM). Rest of the section briefly discusses the BWDB activities in the area in cooperation with the Water Management Association established during the KJDRP period.

The WMA executive members met at their Katakhalī office in an FGD said that the village level committees of the WMA were formed in 1997. Initially a total of 77 primary somiti was formed. This was followed by formation of a 21 member general members' committee along with a 9 members Executive Committee. There are the central committees to represent all 77 primary committees. In the village level, general members were taken from all households and at least 30% of the general members were supposed to be women. The BWDB arranged registration of the 77 primary societies with the Department of Cooperatives. As per cooperatives law they are village level primary cooperatives while the central association is the apex body. This matches with WMA and WMG structure as provided in the Guidelines for Participatory Water Management. The WMA FGD further said that the 77 committees and the central associations were formed before launching the KJDRP and that the project staff of the BWDB based in Jessore facilitated the formation and registration process. This implies that the WMGs and the WMA were formed at the initial stage of the project before physical works started.

The 77 primary organization include 70 village committees, six landless committees and one fisheries committee. Total number of members of the 77 WMGs was Total 18,980. Members were taken from all households and taking 30 percent women member was mandatory. Information revealed that there were 78 general members. Possibly the 78 members meant those representing the WMGs, at least one designated member from each WMG.

The WMA and the WMGs have their bylaws to govern their activities and make decisions as per bylaws which must not be conflicting with the GPWM, the Cooperatives Law and the Cooperatives Rules. It was intended that the decisions about the project implementation in the field level (design, site selection etc) will taken by the community and for that purpose the WMA and the WMGs were formed. The project officials also convinced the local people saying that the savings deposited by the members and other fund will be kept at the bank and only authorized persons will be able to draw money to ensure that there is no misappropriation even by the central association executives.

In the initial stage representatives from each WMG as well as central association received training but after closing the KJDRP the training activity stopped totally.

The KJDRP was closed in 2002. After three years gap, the TRM project started at Beel Khuksia in 2005. At that time no new WMG and WMA were formed. It was assumed that those formed during

the KJDRP should remain active and it was sensible that formation of new ones would create conflicts. But the old one became inactive and effort to activate them during the TRM project was not successful as the TRM began with a main problem of failing to compensate for the loss of crops to the affected farmers. For this problem local people lost trust on the executing agency and this breach of trust is still continued.

4.2. BWDB during project

Information from the participants about the activities of the KJDRP was limited as the project was closed about ten years ago and its impacts are not visible now. However, the participants recalled from memory and said that the project organized the WMGs and the WMA noted above. The organization building itself could be appreciated as a great achievement if they remained active till now and thereby sustained.

The participants remember that during the implementation of the project they were consulted. However, they remarked that the community consultation was done “because of donor pressure”. The donor ADB Country Director and high officials had strong monitoring role, reviewed and visited the project area. One consulting firm was engaged for supervision and monitoring. The ADB made it mandatory that the WMA must certify against the work done so that the payment can be made. Therefore the executing agency staff worked in close cooperation of the WMA.

Regular monthly meetings were held by the project where the WMA representative had strong voice. Also, before undertaking any sub project, meetings used to be held to take opinion of WMA regarding setting up regulators or re-excavation of canals. Opinion the WMA representatives were highly valued.

During implementation of the KJDRP WMA members received training on various aspects including fishery and crop production. Members also acquired skills on cooperative and management and control water logging or water management.

For all these activities, the WMA and the WMGs were very active during the implementation of the KJDRP.

The TRM project started at Beel Khuksia area in 2005. It was planned to be completed in three years but still remains incomplete. Under the TRM, a village protection embankment has been constructed to confine flooding within Beel Khuksia and leave the villages west of it unaffected.

The TRM aims to elevate Beel Khuksia lands so that they are not affected by flood, silt deposit in the river is reduced and the river flow enhanced by both way movement of tide water. The feature of the TRM is allowing tide water entry in certain beel through cutting of embankment at selected locations. This particular beel flooded for several years during high tides and water drained out during low tides. This affect cultivation of paddy and other crops for several years but on completion, water logging is expected to be reduced and future productivity of land improved and crops as well as aquaculture better protected.

As planned and in consultation with the WMA, two cuts were made at two locations east of Beel Khuksia on the BWDB embankment, one near Daiyerkhali and another near Kanasisa. The cut points widened and the bulk of the embankment got destroyed. The two gates in this section of the embankment became inoperative as there was no more scope to regulate water flow and silt deposits blocked the structures. One more effect has been silt deposit almost closing large sections of Katakali and Diayerkhali canals. Water now drains out overflowing the diyerkhali canal during the monsoon but after monsoon when water recedes and canal bed silted, excess water from the beel cannot be drained out. Then farmers have to remove water by pumping. It is a huge task and very expensive too, to drain excess water from the beel of thousands of hectares and about one or two meters water in height.

Now the water is drained out but time will come when all the rivers and canals where water is pumped out will themselves water logged. Farmers are worried where they will pump water ten years from now.

The technical remedy is once TRM is completed in one area, the damaged structures and embankment rebuilt, canals re-excavated and new TRM implemented in the neighbouring beel. With this idea, TRM has been completed in one beel (Beel Kedaria) then it started in Beel Khuksia and was expected to be started by now in Beel Kapalia, all northeast of polder 24/G.

But TRM is now incomplete in Beel Khuksia even after seven years while it was planned to be implemented in three years. A few hundred acres of land elevated one to two meters near the cut points and adjoining the river but the interior part of the beel did not receive much silt. If this trend continues, farmers apprehend that longer time will be needed to elevate land. Farmers could be convinced to extend implementation period but the bureaucratic process of making payment against compensation has removed confidence of the affected farmers on the relevant authority (BWDB and the district administration). If TRM fails, this will be the main reason for the failure. One informant at village Kalicharanpur said that he met concerned staff of the DC office six times over two months, submitted all relevant documents as desired but could not get the application even processed. He is asked meet again a month later (after Eid holidays). His and others' compensation should have been paid seven years ago. One landless representative in the WMA said that farmers of two mouza including Arua of Sufalakathi UP will not receive any compensation, although affected, as these two mouza are not listed as affected.

Outside of polder 24/G but within the zone of influence in terms of hydrology, TRM implementation could not be started at Beel Kapalia in the next sub district due to mass protest. Participants in a workshop of the IWM held in August 2012, it has been apprehended that, if the TRM cannot be implemented in Beel Kapalia (and successfully completed in Beel Khuksia), it will be very difficult, even impossible to execute TRM in other areas. It will mean that all rivers in the region will have the fortune of the river Kabutak which was flowing only a few years back is now dead. Of one observes from the outskirts of Khulna city to Satkhira, dozens of long bridges

will be found, all except one at Khornia, completely dead. If TRM discontinued, the rivers Shree nodi, one flowing from the north of polder 24/G to Khornia bridge will also die.

To sum up, the expense of project implementation, particularly of the TRM is not encouraging. The participants therefore demanded strong action and commitment from the concerned authorities to properly implement the TRM.

It is important to note that, although most participants are in favour of TRM as an idea, they are worried of its implementation and apprehend that the affected farmers will remain deprived hence TRM will be opposed rather than supported for implementation complexities.

Participants at village Ghaga, Monagalkot UP said that although TRM at Beel Khuksia has been helpful to stop further deterioration of water logging north of Buruli gate, they won't support cutting of embankment at Buruli or in the adjoin area. Their attitude is, let there be TRM, we can benefit out of it but please do not cut embankment around our beel. Everybody is saying that. The remedy is strong consultation in the field level, reasonable compensation package for the loss of crops and fish and efficient payment mechanism so that the affected farmers are duly compensated and in time.

Mr. Nitai at Kalicharanpur FGD said that as water logging increased, cultivation of paddy and fresh water fish decreased and brackish water aquaculture increased. It caused increased salinity and now people need DTW for drinking water. In his view TRM intends to improve navigability of the rivers. It is needed. Farmers of one area are affected and other areas benefited without compensating the affected area farmers.

FGD participants Mr. Sahidul and Kafiluddin said that the KJDRP project spent Tk. 2.54 billion and its outcome is TRM which is now at comma. Under the KJDRP, 112 kms road have been developed and 18 bridges and about a dozen sluice gates have been constructed and several rivers like Hori and Buri Bhodra have been excavated. The road development has been nice but the main purpose of the KJDRP, drainage remained a problem.

The WMA formed by the KJDRP is already captured by the local powerholders. In the past, local people drove away the shrimp lords like feudal lords, now the political lords have driven away the yesterday's lords but the powerless are still suffering.

The LCS FGD participants at Sufalakathi UP said that the village protection embankment constructed only two years ago under the TRM has beendamaged and still remained in damaging condition and the damage is increasing for not maintaining it. This damage is not being repaired as such durability of embankment is on the decline. Participants felt that the cause of damage was poor construction.

4.3. BWDB post-intervention

Of the two projects, one, the KJDRP, has been closed in 2002. It was expected that the WMG and the WMA will be active and takeover the operation and maintenance responsibility. But the reality is that the WMA and the WMGs are not active. It was however said that the election of the WMA is held every three years. But the “elected” WMA executives do not work properly. It was specifically mentioned that the WMA is less active in Keshobpur Upazila as the top executives belong to other Upazila and do not show much interest to the problem of Keshobpur Upazila which the core part of polder 24/G.

FGD participants at village Ghaga, Mongalkot UP said that water management in the polder is not functioning at all. Being frustrated, some farmers intend to cut the BWDB embankment to drain water but being afraid of legal and administrative action by the BWDB, they refrain from such drastic action.

It was a general reply that after closing the KJDRP, nobody is consulting at the community level to solve the problems. One UP member at Sufalakathi UP said that sometimes the UP tries to repair damages of embankment, mainly by earthwork with whatever small allocation they can make from the UP and interest of local people. But the BWDB disagree saying that this is our embankment and we shall repair.

The WMA Chairman said that they cannot get needed information from the BWDB on what activities will be implemented in a year or in the next few months. So they cannot reply queries of general members. He has also informed that the WMA has no formal LCS but when required they make informal groups of earth cutting labour to get the work done as and when required.

A farmer of village Magurkhali said in the KII that after completion of the KJDRP, there has been no re-excavation of canals, hence water logging increased. So, there is need for more regular funding, not waiting for next project to come. The FGD participants at village Kalagachia, Sufalakathi UP gave similar view and suggested for regular funding. A woman household head of village Magurkhali, UP Mongalkot said that there is no budget, hence no work from the BWDB. She felt that there is need for good leadership.

WMA landless representative in the KII said that the WMA was formed to operate gates, drain out water, liaise with BWDB and implements repair work through LCS when BWDB allocates fund. The WMA is not active now. He informed the WMA implemented works through LSC three worked in Beel Kapalia and last LCS activity in Beel Khuksia was implemented seven years ago. These were the works related to the TRM but its implementation in the field level is effectively stopped as the TRM failed to keep promise of compensating affected farmers.

FGD participants at village Kalagachia said that the WMA executives rarely come to office at Katakhalia and the committee is dysfunctional. According to them there has been no work like canal excavation in the recent past possibly because there was no funding from BWDB after closing the KJDRP. It matches with the view of the FGD held at Panjia UP saying that, “once government fund discontinued, it is not

possible for us to carry out the work". The Panjia FGD felt that, if the WMG and WMA could work united and could access donor fund, they could continue work. It should be noted that this group had a number of educated people like teachers and an NGO activist. This could be a reason why they pleaded for direct donor funding to the WMA. The WMA FGD felt that NGOs could be engaged to help the WMA for maintenance after closing the project. The WMA Chairman in the same FGD said that "the BWDB and WMA worked together during implementation. It implies that they are now constrained to working together. He has particularly said that the maintenance suffers after "completion of the project".

Mr. Ahad, an executive of the WMA said in the FGD that during the project training was provided but it stopped after closing the project. He suggested that NGOs be involved to continue training after the project. He has also mentioned that the members are working "voluntarily" and because of shortcomings 17 of the 77 WMGs were dissolved.

The WMA seems to have conflict within organization. It is evident from one group challenging the result of the WMA election held on 22 November 2011. The defeated group sued against election that created problem of running the organization. The department of cooperatives has to intervene. It is not known whether the case has been settled or not. NGOs may come forward for better maintenance once government finance is stopped.

It was reported that the annual general meetings are held we hold annual general meetings are held regularly where audit report and plan for the next year are approved.

5. LABOUR CONTRACTING SOCIETIES

5.1. Formation and working with the LGED or BWDB

Formation

The study team conducted FGD with two LCS groups, one at Village Sonnayergacha and another one at village Arua of Sufalakathi. The LCS group met at village Sonayargacha was formed in June 2008 by LGED. To form the group it was announced in the market area by drum beating by order of the Gaurighona UP Chairman that those interested work as LCS group labour should assemble on a specific date and time from where a list will be prepared and lottery held. A total of 32 women assembled and listed. Ten of them were selected by lottery. UP members, local respected people and CO from the LGED were present and selection was transparent and fair as stated by the FGD participants.

The male LCS group met at village Arua, Sufalakathi UP was formed in 2005 when TRM project started in the area. Actually, this is a very loosely formed group comprising 25-30 people. Exact number could not be obtained. The group members are just neighbors going to work together and the number depends on the specific work contracted to the group either by institutions like WMA/BWDB or private party.

LCS Work

The group is engaged in the minor repair and maintenance of village roads by earthwork. The group leader is Halima and the Secretary is Sufia. None of the ten is WMA or WMG member may be because this group works with the LGED under RREMP while the WMA and WMG were formed by the BWDB under the KJDRP.

WMA membership

None of the two LCS groups met are members of WMA. The women are not interested as they are all landless. Although some of the men, particularly those owning land are interested to join but they feel that they will not be well treated and none have encouraged them to join.

Payment and Savings Fund

In the case of LGED LCS, decision regarding work and payment is made at the Upazila level. The group has bank account operated jointly by the group leader and the secretary. The money is drawn from the bank by the above two signatories and then given to the Supervisor and through him to the CO. Then the CO deducts savings which is deposited to the LCS group fund (for capital buildup) and paid later with interest on completion of three years term. Each worker is entitled to receive Tk. 2,700 per month from which Tk. 1,080 is deducted as savings. Remuneration of male and female labour is equal hence there is no wage discrimination by gender.

Problems faced

It happens that sometimes payment is delayed and sometimes payment of two or three months is combined. This could for irregular fund flow to the Upazila Engineer from higher level or other procedural requirements. In one extreme case payment was delayed for seven months.

When payment is delayed, the LCS group members approach the Supervisor, contacts the bank and the CO of the LGED. The concerned people always say that when fund is available the LCS will be informed, so they can do nothing but waiting.

The women LCS group talked about toilet problem as they have to work on the road. They have to go to other peoples' house which is shameful. An alternative could be going to nearby school toilets but most schools do not have such facility. Men can go to mosque or market toilets or to nearby jungle but building and maintaining school toilet could be a good idea for working people.

5.2. Livelihoods and Standard of Living

In the case of LGED LCS, the group members received training on fish farming, poultry rearing and vegetables cultivation. The Upazila level officers of DAE, DLS and DoF provided training on vegetables cultivation, poultry rearing and aquaculture in the small ponds attached to homesteads. Each trainee was provided lunch, snacks and an allowance of Tk. 100 per day. Some of the BWDB group members received training on aquaculture from the DoF for two days. Each participant received daily allowance of Tk. 250 with training.

The LGED LCS group is employed for a three years term and during this period employment is assured. The male LCS group has uncertainty of employment as the WMA has occasional funding from the BWDB for canal re-excavation or embankment repair etc. For the BWDB group, LCS work is very casual and in fact they work mainly as earth cutting labour or wage labour in agriculture and aquaculture.

The LGED LCS group comprises all women and all landless labour. They do not have any land except homestead area and there they produce vegetables and rear livestock and poultry. The BWDB group met comprises all males and most of them (eight of the eleven) own small pieces of agricultural land. They cultivate crop and have small fish ponds but most often work as agricultural wage labour. Occasionally they work at Noapara town going there in the morning and coming back in the evening. In addition, they make fishing trap (charo) with bamboo and go on fishing in the beel and river. So, their livelihoods are quite diversified and they have diversified it for survival as cost of living is increasing.

The women LCS members do not own crop land or aquaculture land and they are not engaged in crop or gher farming. Therefore water for irrigation is not very important to them except for homestead gardening that requires very little or no irrigation. Some of the male LCS members however have crop farming and aquaculture. They get water from the gate, canal and drain out water to canal.

The women LCS members said that their standard of living improved, they have savings and their status improved. Also they feel empowered for economically contributing to the household. The male LCS group members however feel that previously they had good income agriculture and aquaculture despite owning small holdings. But now there is no crop in the beel aquaculture too affected due to TRM. Therefore, they have to work harder, still not having enough income.

If faces any problem regarding water access or drainage problem the women LCS members approach the UP but for getting Tube well they are unable to contribute money as needed (a few hundred taka each household). They better collect water from tube wells even if located a few hundred meters from the house.

6. MAINTENANCE OF EMBANKMENTS, CANALS AND SLUICE GATES

6.1. Maintenance by BWDB

Since polder 24/G belongs to the BWDB, its maintenance is the responsibility of the BWDB. However it was noted in the FGDs and KIIs that the maintenance was largely neglected. General FGD participants at village Sonnayergacha of Gaurighona UP said that the BWDB usually do not carry out maintenance unless there is any development project like the KJDRP. The participants said that the Sonnayergacha canal of Gaurighona UP was excavated long ago in 1980s. The KJDRP implemented some polder improvement works (did not specify what) but it included re-excavation of rivers Hori, Buri Bhodra and several canals in polder 24/G. After the closing of the KJDRP in 2002, no significant maintenance work has been implemented by the BWDB as reported by the participants.

Some participants in the FGD clarified that there no ongoing project of the BWDB (except TRM which is now at mess) hence no work is coming up. BWDB established some committees (meaning WMA and WMG) but they are not taking any initiative.

General FGD participants at village Ghaga, Mongalkot UP said that in their area embankment did not break hence major maintenance was not needed from the BWDB side. In their assessment the WMA dominated by the elite become very active during project as huge financial transactions involved. Thereafter, in the maintenance stage they tend to sleep and wait for the next project to come. One participant said that there is no gateman now from the BWDB. Engagement of gateman by BWDB was felt important to him but without considering that the BDWB gatemens had little role in polder O&M it took quite long time for the government to get rid of them.

Mr. Ronjit of Kalicharanpur in the general FGD said that the BWDB repairs sluice gate or embankment if damaged. Kalicharanpur is an area where TRM project implemented some works under the TRM in the recent years. So, people of this area saw some work done by the BWDB. Besides, the gher owners of the adjoining area made some pressure on the BWDB to repair the gate and the embankment failing which they could be affected.

Mr. Nirmal of the same area however blamed TRM for increased water logging. In his view, because of the TRM, the beel committee became inactive and larger area gone under water. This is true for the Beel Khuksia but the beels in the west of Khuksia are benefited. He specifically emphasized that the farmers have to drain out water by pumping in some area and at the same time lift underground water by using STW. With good drainage and irrigation canals both cost could be saved had the rivers could be de-silted by dredgers and canals excavated (possibly in addition to TRM which has no alternative as everybody agree).

FGD participants at village Kalagachia said that the BWDB does not work properly for improving drainage and maintaining embankment. They work only when there is project. BWDB people never come for maintenance during the rainy season to repair embankment. Mr. Mannan at Kalagachia FGD said that BWDB worked nicely in the past but from the time of KJDRP and the TRM their performance (measured by quality of works) deteriorated. This group further felt that the BWDB staff members are “outsiders” and hence are not sincere to local development. FGD participants at Panjia said that the recent re-excavation works done by the BWDB were simply eye wash and for doing so people are not consulted.

6.2. Maintenance by Union Parishad

The FGDs and KIIs revealed that the participants have varying opinion about the present and potential role of the UP in water management including maintenance. The dominant view supported larger involvement of the UP in water management although their present and past role is rather limited small repair work of the embankment or minor excavation of canals.

The FGD participants at village Sonnyargacha, Gaurighona UP said that the UP allocates fund from the 40 days employment support programme to for repair work. Latest two years ago Mr. Siddique Chairman repaired embankment and re-excavated canals with utilization of this fund. This group strongly suggests that the role of UP in water management should be enhanced. Besides maintenance, the UP can play a strong role to freeing the khas canals from the land grabbers which is a precondition to re-excavate canals.

This group specifically mentioned that the KJDRP did not excavate canals at Sonnyargacha while the UP makes temporary earthen dam each year at Kasimpur in the winter to prevent silt deposit in the rivers Hori and Buri Bhodra and demolishes it in June when monsoon starts so that silts are removed by flood water.

FGD participants at village Ghaga, Mongalkot UPopposed the above view and remarked that the power of the UP should be further reduced and made them powerless. This harsh statement was made for inactivity of the Mongalkot UP Chairman who did not excavate canal while neighboring Sufalakathi and Gaurighona chairmen did it successfully in the recent past. The participants at Ghaga further said that they re-excavated canals by voluntary work and former minister Mr. Sadeq who hails from Mongalkot UP excavated canals and rivers. This group also blamed BWDB and LGED for not re-excavating canals.

FGD participants at village Mukandapur said that the UP must have strong role in water management. As peoples' representatives at the grassroots level the UP members and chairman have strong linkage with the local people. The UP can coordinate water management activities in the local level implemented by various agencies like LGED, BWDB, WMA and NGOs.

The FGD participants at village Kalagachia said that the UP executes limited work concerning water management. They recognized that despite having the good intention the UP can't do much as its budget is too poor to carry out maintenance work of embankment which is much bigger than the village roads. However, they do some work under food for works or other Social Safety Net programmes. In Sufalakathi UP the chairman repaired Santola embankment after AILA spending Tk. 27,000 when fund from no other source was available so quickly. This type of work could be small but can save a lot.

FGD participants at Panjia said that the UP is not much involved in water management and they usually construct and repair village roads. But they do repair minor damages of embankment and also assist Beel Committees to drain out water.

It revealed from the FGD with the WMA executives that the UP has an advantage to play important role in local level development as the main institution in the Upazila Development Coordination Committee now chaired by the Upazila Chairman although administered by the Upazila Nirbahi Officer. Chairpersons of all UPs are the most important members. The WMA approached the Upazila Chairman to include them in the Upazila Development Coordination Committee but UP Chairmen opposed this proposal. The UPs' concern is that the WMA may try to take away some share of the Upazila Annual Development Programmes which can reduce UPs' share. Making the WMA a member of the Upazila Development Coordination Committee requires decision from very high level, the Ministry of Local Government as well as the Cabinet Division. But the Upazila Chairman can definitely invite the WMA representative in

the UDCC meeting and discuss various problems and even take up projects and coordinate efforts of various agencies. It should not be seen as a zero sum game and it can in fact build a win-win situation.

The WMA Chairman clarified that in the KJDRP, the UPs were bypassed and they were not given any role to play. It is pity that the government, donors, NGOs at one time (in the 1980s and 1990s) had negative view of the local government. Now the donors and the civil society are very vocal of local government strengthening but the government functionaries, the bureaucracy and the parliament in particular tend to take steps to further weakening, rather than strengthening the local government.

The FGD participants at village Kalagachia said that if the relationship between the UP and the BWDB could be improved and funds provided, maintenance could be better. One participant (a UP member) was very critical of the commitment of the BWDB staff members as they are “outsiders” hence lack local knowledge and ownership.

6.3. Maintenance by WMA

It revealed from the discussion that the WMA and WMGs formed during the KJDRP are no longer active since the project closed in 2002. Also during the TRM the organizations remained inactive. Instead the water management at the beel level has been vested with the Beel Committee lead by the UP Chairman/members. Only at PanjiaUP, the WMA seems functional and at Sufalakathi UP it was active before but not now. In Gaurighona and Mongalkot UP people are not even aware of the existence of the WMA and WMG. What they are familiar with is the Beel Committee.

The FGD participants at village Sonnyargacha, Gaurighona UP said that there is a Beel Committee for Beel Vayena and Agarhati. Mr. Liaquat, UP Member of Gaurighona UP and some other local elite are its members. Poor farmers and landless are not included as stated by the participants. It may happen that some landless and women are listed as members but effectively the elite run the committee. The BWDB formed this committee.

FGD participants at village Ghaga said that they are not aware of having any WMA or WMG but they know that there is a beel committee and in the beel there are several gher committees (the shrimp/fish farmers are the members). Please note that the WMA comprises 60 or so village level water management groups formed and registered during the KJDRP while Beel Committees are formed by the BWDB headed by UP Chairman or member in which mainly the gher owners and landowners are members. The jurisdiction of a beel committee is a particular beel or a cluster of beel usually served by one or more sluice gates. Main function of the beel committee is operation of the gates for drainage and irrigation and minor repair work.

FGD participants at Kalicharanpur, Sufalakathi UP informed that, in the past the WMA was active. In addition, there was a beel committee. The UP Chairman was the President of the Beel Committee by designation while other members were selected (by the president and the BWDB). The BWDB formed the committee and gave them responsibility of the O&M of the gates in specific beel area. Number of members in the Beel Committee varied from nine to eleven. The participants demanded that the Beel Committee should be formed again to take care of the water management and the committee should carry out its responsibility in consultation with the local stakeholders.

The FGD participants at village Kalagachia, Sufalakathi UP said that the WMA performed well in the remote past. Later they started to misappropriate project fund during the KJDRP.

The WMA FGD participants at Panjia UP said that they got lease of the unused land of the BWDB and sub leased to members for aquaculture. Revenue generated from the land and income received from other

sources, are now lying idle. Thanks to the WMA that they have not misappropriated it. They are planning to invest the fund for income earning which will be used for maintenance. The money (about Tk. 500,000) is held at bank account operated by three executives (President, Secretary and Treasurer). Name of the account is Panjia Water Management Cooperative Operation and Maintenance Fund. In addition, the association has savings of Tk. 70,000.

The WMA FGD participants said that they cannot maintain the sluice gate and embankment as the BWDB does not allocate money to the WMA. Instead the BWDB engages contractors. The Katakali gate was repaired by the WMA in 2009.

6.4. Maintenance by gher owners and landowners

All those who live or have farming or business in the polder are the direct beneficiaries or victims of water management. Those affected most in financial terms, positively or negatively are the aquaculture as well as crop farmers, both land owners and lease holders. In the polder paddy and fish farming are usually combined and most farmers are both crop and aquaculture farmers. Particularly, aquaculture farmers are often lease holders who take in lease of larger chunks of land to make an aquaculture farm. In the state of small and fragmented landholding, it is difficult to make aquaculture farm on small pieces of own land. So, land of many owners have to be combined to make a fish farm which is an enclosure surrounded by earthen dykes. This type of a farm is called gher, literally meaning enclosure. Combining many peoples' land in one enclosure requires either doing it collectively by all owners or leasing in of the land of other owners by a single or group of entrepreneurs called gher owner. The gher owners are the most dominant stakeholder group in the polder as they hold both wealth and influence. The other directly benefited or affected group is the land owners who may be crop as well as aquaculture farmers or lease giver or a mix of both.

Since the gher owners, land owners, other farmers and local inhabitants including the landless are directly affected, they contribute to repair when the polder breaks, the structure damaged like the shutter damaged. They gher owners, landowners and farmers do it to protect crops and even the landless do it to protect homestead area.

FGD participants at village Kalagachia said that they "work together" to "repair damaged embankment". For such repair work they raise money from gher owners and landowners and the poor contribute voluntary labour. Local people come forward first and it takes time to get money from the government. This voluntary repair work takes place particularly when polder breaks but such volunteerism is not found to re-excavate canals as it costs more. FGD participants at village Kalagachia said that local people did not carry out excavation work in the area.

FGD participants at Panjia UP however said that do not re-excavate canals. Everything is done by the Government when project fund is available. The same view came from the WMA participants local landless people work for re-excavation and the BWDB pays for this but in the same FGD some participants (Mr. Rahim) said that before introduction of TRM project our area was inundated and local people made connection of canal to the river by voluntary labor.

The WMA participants provided one example of local initiative in water management that has to be done to drain water. Very often, water flow is obstructed if algae formed in water particularly in the canal and near the sluice gate. In such case, local people voluntarily remove the algae. Prior to Boro season we undertake different activities. During the period we invite people using amplifier to join the algae removal task. FGD participants at village Ghaga, Mongalkot UP, informed that they re-excavated canal by voluntary labour

6.5. Emergency Response

LCS group met at Sonnyargacha (LGED LCS and all women) said that in their area embankment did not break as river flow weakened and the river is now at safe distance from the village. About 15 years ago the polder broke near Kasimpur, 3 kms south. At that announcement was made from the loudspeaker of the mosque to join voluntary repair work and people did it. The participants remarked that the government agencies cannot respond immediately but local people, UP and informal voluntary organization (was not specified but could be local NGOs and CBOs) respond quickly. This group suggested to government quicker allocation of government fund (to who was not specified but might have meant UP).

FGD participants at village Sonnyargacha said that local people have to face disaster and they join voluntary work for survival. The landowners and gher owners come forward to protect crops and fish and landless to protect the homestead area, the house, trees, vegetables etc.

Mr. Narayan Chandra of village Sonnyargacha in the FGD said that the polder does not break now. Four years ago it broke near Gaurighona Bazaar and local people repaired it. The UP joined people to overcome crisis to repair damaged embankment. A year ago at village Sonnarargacha, the village road (brick paved by the LGED) submerged for water logging. Gher owners of the adjoin land blocked the canal with bamboo fencing for fishing purpose. The whole area was flooded for 15-20 days. Then people from the village and UP Chairman went in action and demolished all fences. Soon the water drained out.

Participants at village Ghaga, Mongalkot UP said that polder did not break over the last 20 years in their area. UP repaired breach of embankment at Saltola, Sufalakathi UP after AILA. In this UP several NGOs including Muslim Aid and Dhaka Ahsania Mission provided relief materials including rice, lentils, edible oil etc. At a later stage, UP implemented repair work with the allocation of Food for Works. FGD participants in Panjia UP said that the BWDB carried out repair works by engaging LCS where WMA had supervising role. In the same UP LGED repaired roads after AILA. The DC provided food assistance (puffed rice and beaten rice- chira muri) after AILA.

Table –12: Roles played by various actors in maintenance

Tasks	Who does	Whose mandate	Comment
Minor maintenance	Beel Committee, Gher owners, UP	WMA	Earth filling to repair breaches, repair of shutter etc. are minor repair
Major maintenance	Neglected for scarcity of fund	BWDB	This is why embankment breaks at vulnerable areas
Emergency maintenance	Community, UP, CBO	WMA, BWDB	GoB agencies respond at a later stage when fund available
Excavation of canals	BWDB, UP, Community	BWDB	BWDB under project, UP under FFW etc and community by voluntary work. Excavated canals get silted again and rather quickly and excavations are often very inadequate and “eyewash”.

6.6. Institutional responsibilities in maintenance and water governance

6.6.1 Accessible institution for complaints and problems

Inhabitants of polder 24/G need access to water management mainly for three purposes- crop farming, aquaculture and domestic uses including drinking. The farmers need irrigation and drainage. In this polder, drainage is more important than irrigation. Farmers at village Kalicharanpur said that there is too much water most part of the year. They need drainage facility. Drainage is a problem as outside land is higher elevated than inside land. Finding no other option to drainage, farmers have pump out water. And, now pumping out also is constrained storage and drainage capacity of the canals.

Farmers have several institutions to complain- the BWDB, MP, local administration (DC/UNO), WMA, Gher Committee and finally the nearest local government, the Union Parishad. When drainage is needed the participants most often approached the UP Chairman or members or the Beel Committee who are actually same people, the beel committee includes UP Chairman/Member as the key persons. The WMA is inactive, MP's agenda is politics, the DC is inaccessible and BWDB can't help if there is no project.

A sharecropper met at village Magurkhali, Mongalkot UP felt that, more transparent and pro-poor management of the gate could make more land suitable to crop production and farmers like him would get more land for sharecropping. A woman household head of the same village felt that this would reduce flood and no more trees would die in her homestead area. She would not have to buy straw or would buy at lower cost. This year she spent Tk. 2000 to buy straw for the cow. God helps, there was not much flood this year and she has been able to cultivate turmeric in the homestead area. So, drainage is important not only for the large farmers but also people like this woman and the sharecropper.

Some people do not complain as it is meaningless to complain such as for drinking water tube well. Government has a policy to provide a tube well for every 20 to 40 households and those living at isolated locations have to fetch water from a distance. Rich people however install tube well at own cost.

An LCS member of Sufalakathi UP said that when the embankment of the beel was damaged a year ago, local people informed the Deputy Commissioner and the Water Development Board. They came to the site with staff members but could not make any allocation for repair work.

Some participants were very critical of unethical practices that constrain quality of works. Regarding present weaknesses of the institutions it came up very clearly that, the level of misappropriation increases with hierarchy. It was said, if you pay money to the UP, they will eat some and do some work, if you give it to Upazila Parishad, they will eat more do less work and if you place it to the MP, there will be no work but bill paid 100 percent. It could be exaggeration, but of course, people's perception.

6.6.2 The Role of Union Parishad in Water Management

An LCS member, Malek of Sufalakathi UP felt that, officially, the UP has no role in water management. This is the job of the WMA and the BWDB. However, people like him seek intervention of the UP Chairman when gate is damaged or water cannot be drained out for some reason. The chairman, by dint of his position in the Beel Committee intervenes and arranges repair of the shutter etc. In his assessment, the WMA wait for the money to be provided by the BWDB under new project. In his view, the BWDB has overall responsibility of water management and this must be done in cooperation of the UP. The LCS

group specifically mentioned that the main leaders of the WMA belong to other sub district and the WMA does not show interest to solve problem of this area. UP is closest to people so easily accessible.

6.6.3 The NGOs Active in Polder 24/G

NGO activist Mr. Sahidul who is an NGO activist informed in the FGD held at Panjia UP that as many as 45 NGOs and MFIs are working in Keshobpur Upazila. These include Grameen Bank, ASA, Manab Unnayan Songstha, CARITAS, Bachte Sekha and HEED Bangladesh, involved mainly in providing microfinance. Among other NGOs, Somadhan and ECO are engaged in road repair by earthwork. Somadhan distributed 100 houses to disaster victims. BRAC provides microfinance service as well as disaster relief, Agriculture training, seed and fertilizer and sanitation facility. Dhaka Ahsania Mission provides non-formal primary education and skill training. Jagoroni Chakro provides credit as well as aquaculture training.

6.7. Participation, Exclusion and Gender

6.7.1 Discourse on participation

It revealed from the FGD and KIIs that the need for participation is understood and all (or most) primary stakeholders do respond to save themselves when some danger arise or some project demands it as precondition. In later case the committees and somitis (associations) are established by the local project people but such organizations become inactive after closing of the project. This is done to satisfy (or bluff) the donors and everywhere tokenism (one of the 77 primary cooperatives are formed for the fishermen) and ornamentalism (women included in the WMA and invited to attend meetings) to show up rather than really meaning it. This is proven again and again by elite capture of the organization as well as the resources like canals.

To the FGD participants at village Kalicharanpur, Sufalakathi UP, participation meant drainage and distribution of water (for irrigation and aquaculture) in the interest of all primary stakeholders (local people). This group emphasized drainage as the top priority in water management. To the FGD participants at Panjia UP, it meant concerted effort of all government officials and people for their own interest and it is better if union parishad joins. To them, participation also meant inclusiveness (all are included) so that common people can join the WMA and WMGs.

It was emphasized that participation of “common people” is more important than consulting “upper level” people. It was also emphasized that local people rather than officials should be taking decision as “it is our life and death question and government must value it”.

6.7.2 Reality of participation in the polder

FGD participants at village Kalicharanpur, UP Sufalakathi said the WMA executives do not carry out their responsibility and the BWDB fails to keep promise. They discuss in the meetings but do not value peoples’ opinion and need. One former UP Member said that he attended 10-15 meetings and experienced that what is agreed in the meetings are not actually implemented. This group however felt that there is no deliberate exclusion of any particular section of the socially disadvantaged people like women and landless. In fact, people of this type are not interested to participate as they own no land in

the beel. Here is a misunderstanding. The water management has been narrowed down to beel management and not management of water of the whole sub polder area.

FGD participants at village Kalagachia said that there is participation at the activities where UP is involved. However the UP invites local elites for discussion and opinion of common people is not taken in to account. Usually, the community leaders find place in the committee. They remarked that the WMA exist on paper but the office room is always locked. When the WMA was functional, six landless committees and a fishermen's committee were active and now all are inactive.

The Beel Committee and the UP have to do some work as they live close to people and their private interest is also the same, drainage and irrigation for crop farming and aquaculture. If other farmers' land is flooded, the chairman's land is also flooded. The BWDB have five gates in the surrounding area but they are not maintaining those. The Beel Committee, UP and people have to somehow operate those, particularly the Katakali gate. The Beel Committee headed by the UP Chairman engaged private gateman and his salary is paid locally.

A woman household head and a sharecropper of village Magurkhsali and FGD participants of village Ghaga, all in Mongalkot UP said that they have not seen any activity of the WMA. What they are aware of is Beel Committee dominated by the elite, hence the poor can't participate. The problem they fingered at is the negligence of the GoB officials to come to the field.

To the FGD participants at village Ghaga, the Beel Committee meant Liaqat Member, Monju Chairman and gher owners. So, "common people" do not feel it important to participate. The FGD participants at Panjia UP said that the BWDB is disinterested to disseminate information which constrains participation. People interested to know what is being planned to give opinion what to do, where, when and how etc.

6.7.3 Improving Participation

One problem of participation is exclusion particularly of the landless and women. To address this issue the FGD participants at Kalagachia suggested special care to include the landless owning below 15 decimals land. This group also suggested that the opinion of "common people" is valued by the concerned GoB agencies (the district and Upazila bureaucracy and the BWDB, to be specific). It further suggested create employment opportunity for the poor in the infrastructure building and maintenance (which is already there to engage LCS but might need reviewing its constraints and inadequacies).

FGD participants at village Ghaga, Gaurighona UP suggested that the concerned GoB agencies should consult "common people" rather than discussing only with the Chairmen, Member and WMA executives. To ensure better consultation with the people, the committees must be reorganized with new members. The election of the committee must be transparent. They however remarked that the landless and marginal farmers are not interested to participate as they do not own land in the beel. They own only homestead land and some small pieces of land around the homestead area. Water needs of the poor (paddy and vegetables production) and the rich (aquaculture gher) are different and the needs of the poor must get priority in the decision making process and that will be an incentive for the poor to participate in water management rather than in LCS only.

The WMA participants said in the FGD that involving "all people" is "practically impossible". This statement is a clear indication of the problem of mindset. Present level of orientation of the elite dominated WMA leadership is unlikely to promote participation of the poor and women.

Hence there is a need for reorientation rather than just changing committee. Some action research in transparent and participatory development should be demonstrated.

6.7.3 Gender

Women are progressing in the polder area like other areas of the country but are still at disadvantaged position, particularly the poor women. In the polder area women population is exactly 50% as per the population census 2011. The polder area has 24% Hindu population compared to 10% in the whole country. With higher concentration of non-Muslim population, the polder area can be expected to be less conservative and in a better position in terms of literacy, particularly, women literacy, but this is not the case. Female literacy of the polder area is exactly same as female literacy of the country (49%). However, male literacy is 59% in the polder area against 54% in the country. This means that gender imbalance in literacy is higher in the polder area than in the country as a whole.

The census data shows that only about 5% of the female population in the polder area of age 7+ and not attending school are reported “employed” compared to 85% of the male population of the same group. Of the limited number of women reported “employed” 81% are working in the agriculture sector (including horticulture, livestock and fisheries), 2% employed in industries and 16% employed in the service sectors.

The census report seems to have grossly misreported and specifically underreported women’s work. Employment does not mean wage employment or salaried employment or working outside of the house. Self employment, even within the house can be income earning employment if it adds to household income (even if expenditure saving is not counted). If a self-employed male farmer or fisher is employed, definitely a self-employed woman farmer who produces vegetables, milk, egg, fruits etc. in the homestead farm is employed. The 85% of the males employed definitely includes self-employed farmers and fishers.

In rural Bangladesh, there is a tendency of reporting women as “housewife” and men as “farmer” although bulk of the household income may come from a petty trading and the woman may operate a small farm and may have income from other sources. Interestingly, all of the nine LCS group members interviewed identified themselves as “housewife” although each earn Tk. 2700 from LCS work and this is ensured for three years. So, the census report saying 5% working women must be interpreted with caution.

Example of a woman household head interviewed at village Magurkhali will make the point clear. The lady (45) is landless and has a homestead land where she has a small piece of land producing vegetables, lemon, coconut, banana and turmeric. In addition she works occasionally as agricultural labour, earthwork labour. She rears a cow, seven goats, 14 ducks and four hens. Her mother (age 80) still works as housemaid and her two daughter help her in homestead agriculture besides sewing clothes with a small machine at home. None of the two daughters, the household head and her mother can be traded to be engaged in household chores and they are not

grainy or housewife. All four are working women but the census enumerators would count them as engaged in “household work”.

Interestingly, the above woman household head sharecrops 31 decimal of land. She grew jute, aman paddy, boro paddy and vegetables this year. Her son-in-law helps her to produce crops. Polder water management is very much relevant to her. The land she is sharecropping must not have too much water when boro and aman paddy is planted. Her vegetable land must dry soon after harvesting jute so that she can plant vegetables. Also her homestead garden must not stay in water-logged condition. If it happens so, her turmeric, vegetables and fruit trees will dry. A number of trees died already. Even her mud wall house is at risk, it can be damaged if water logging continues. She can't tell her problems to anybody as nobody will listen. The shrimp and fish farmers are interested to keep water in the beel for longer period to increase profit. The lady said that “nothing will help” so she does not complain.

She collects water from nearby deep tube well provided by the UP. It is 200 meters away. The pond she wishes to access for bathing is leased to fish farmer who is very influential. It could be a public pond but the leaseholder is using too much feed and water is contaminated.

She says that more transparent and pro-poor management of the gate could make more land suitable to crop production and farmers like her would get more land for sharecropping. This would also reduce flood and no more trees would die in the homestead area. If paddy cultivation could be increased she would not have to buy straw or would buy at lower cost. This year she spent Tk. 2000 to buy straw. God helps. There was not much flood this year and she has been able to cultivate turmeric.

She is not involved at all in the WMA as “we have no say there”. She said that only matabbor can go there and the BWDB makes committee with matabbor (village leader), UP member etc.

The lady works as agricultural labour. Wage rate for woman in paddy harvest is Tk 200/day and for man it is Tk. 300/day. Working hour for both is 8 am to 6 pm with an hour lunch break. She did not work as LCS labour but worked under 40 days employment programme of the UP. Wage rate was Tk. 150 for both male and female labour for earthwork and working hour was 8 am to 3 pm with half an hour lunch break.

The above discussion reveals that water management is not irrelevant to the poor, landless and women. They too need drainage and irrigation. Therefore the women, also landless men should not be denied participation in the WMA, WMG and the Beel Committee.

7. OPERATION OF SLUICE GATES

7.1. Operation through WMA and Beel Committee

BWDB is not directly involved in the operation of sluice gate. Instead they have assigned the task to the WMA established during the KJDRP and the localized Beel Committees formed by the BWDB under the leadership of the UP Chairman/Members. It was observed that WMA and the WMGs became inactive after dosing the KJDRP in 2002 and in the field the Beel Committees are really operating the gates with the support of the gher owners and landowners rather than all local stakeholders.

KII Farmer Kalicharanpur and landless representative to WMA said that the Katakhal gate is kept open from Ashar to Kartik (June-Nov) to drain out water for saving Boro HYV paddy and aquaculture (Bagda/Golda shrimp, natural brackish water fish parse, tengra, and fish stocks ruhi, Katla, tilapia etc). Opening and closing decision is made by UP Chairman lead beel committee in consultation with farmers to serve interest of most of the land area (not most people). From Dec to May canal cannot drain out water hence gates are kept closed. The fish and shrimp farmer/ gher owners' interest better served instead of poor farmers' interest.

KII farmer at village Magurkhali said that every year earthen dam is made on river Buri Bhodra in December and demolished in June to prevent silt entry from the river Shree Nodi with the tide. This has been the practice since 1990 and it helped keeping the river Hori and Buri Brodra from still surviving. With the dam, water is kept in the smaller river for irrigation. It helps plantation of aman in the medium high land areas. The Buruli gate, Mongalkot UP, is closed in Jan to reserve water and opened in July for drainage. Sluice gates are not opened all the time. Flood water remaining stagnant in the winter to summer cannot be drained out as exterior land and canals are silted.

As a result of water logging, Aman area decreased and not much land and is available for share cropping said a landless farmer of village Magurkhali. A woman household head of the same village said that even the homestead area goes under flood water and trees die. Even if water level remains high in July-Sept, gher owner has no problem as fish and shrimp can be grown. But aus and aman crops as well as vegetables cultivation is affected. Both respondents said that the nearest gate is 6 kms away at Buruli and it is controlled by the beel committee dominated by matabbor (village leaders), Chairman, Members and they get authority from the BWDB.

Mr. Narayan Chandra of village Sonnayargacha in the FGD said that the beel committee assigns responsibility of opening and dosing gates to nearby fishermen group and in return sells fishing right to them for specific canal and gate. The fishermen group pays a fee to the beel committee so that no other fishers allowed fishing in the gate area. Opening and dosing decision comes from the beel committee. The gate has wooden shutter and if the shutter breaks, the gher owners subscribe to repair it by the beel committee. Near the gate the embankment is partially damaged but not yet repaired.

FGD participants at village Ghaga said that the Buruli gate is opened during low tide and closed during high tide so that water is drained but not flushed in. The length of opening and dosing time is set in the interest of the large gher owners and not the small farmers. The large gher owners are leaseholders of private land paying the landowners fixed yearly rent. Since the land owners are not farming, they do not care when water is drained out or not.

Beside the large gate at Burili, constructed by the BWDB, local farmers have constructed a small private gate. The large gate is partially blocked for silt deposit for quite long time. The small private gate is functioning better. The beel committee decides opening and closing of both gates the operator engaged privately and paid by collecting subscription from the gher owners. In the past (did not specify how many years ago) BWDB had a gateman. Now, there is no gateman from the Government.

FGD participants at village Kalicharanpur informed that the gate (Katakhal) is opened in Ashar (June) and closed in Agrahayan (November). The beel committee decides opening and closing time. Sometimes if water level rises too high or goes too low inside of the polder threatening damage of crops or otherwise huge loss to the inhabitants, people open or close the shutter without asking anybody in case the beel committee fails to take prompt decision. Otherwise the beel committee decides on opening and closing in consultation with local inhabitants, gher owner and UP member/ chairman. It was however indicated that the decisions tend to favour the gher owners who can influence the committee.

The participants added that Katakhal gate has a gateman hired by the beel committee who is paid Tk. 4000 per month for the service. This is a BWDB gate and is operated nicely in the assessment of the respondents.

FGD participants at village Kalagachia said that the gate is closed at high tide and opened at low tide. During the harvesting time of Boro paddy, the gate is closed for some weeks (April) and it is kept open to bring water in during the growing stage of HYV Boro paddy (Feb March). The opening and closing decisions are taken by the beel committee but in consultation with both crop and fish farmers (effectively same as most farmers produce both). This group specifically mentioned that the WMA is inactive and the Beel Committee is actually operating the gates.

FGD participants at Panjia UP were very critical of the current condition of the BWDB gates saying that "all are inoperative" (actually only about one fourth are functional now). Siltation has closed most of the BWDB gates. The group informed that farmers are now pumping out water to the canals and rivers. They apprehend time will come when there will be place to throw water by pumping as "whole area will be inundated".

The WMA participants in the FGD claimed that they operate gates. This was however not supported by information received from other groups and individuals. Others felt that the WMA became inactive after closing the KJDRP. The WMA participants however gave information that for opening and closing gate the gher owners engage own labour which is consistent with information of other groups. In their view, the village level WMGs decide on operating the gates which is impractical as command area of each gate has dozens of villages it is unlikely that 12 or so WMGs sit to take decision on day to day operation of the gates.

It was mentioned earlier that the farmers have to drain water by pumping to plant boro paddy. In the last Boro season (Jan-Apr 2012) farmers drained out water from the beel to the canal then canals became full of water that flooded other land constraining boro plantation in some areas. The WMA made arrangement to drain out water from the canal to the river.

7.2. Operation through Union Parishad

The UP as an institution is not involved in operating sluice gates but the UP chairman and members of the concerned area are involved as UP representative in the Beel Committee which has key role in the operation of gates in all UPs. However, the UP helps removal of obstruction to drainage and makes minor excavation for this purpose.

7.3. Operating private gates.

Two important private gates are located in the polder, one at Gaurighona UP and another at Buruli UP. Both gates are functional and managed by the beel committee and for the operation the gher owners subscribe money. In one case operators are paid by fishing right (Gaurighona UP) and in the other by cash payment (Buruli, Mongalkot UP).

FGD participants at village Sonnayergacha, Gaurighona UP said that inside of the embankment there is water logging. So, the farmers of the area have constructed a wooden gate to drain water subscribing one hundred taka each farmed. This helped removing water logging. The farmers open and close the gate themselves, no gateman is needed.

7.4. How gate operation takes place

Table 13 below provides a description of gate operation in polder 24/G

Table 13: Operation of sluice gates in Polder 24/G

Type of Gate	Formal authority as stated by respondent	Effective control	Gateman	Gateman's pay/ Cost & how paid	Operator's interest stated vs real
BWDB gate Buruli	Beel Committee	Gher owners	Private	Cash paid by gher owners	Cash payment
Private gate Buruli	Beel Committee	Gher owners	Private	Cash paid by gher owners	Cash payment
BWDB Gate Katakhal	WMA	Beel Committee	Private	Cash paid by Beel Committee	Monthly Salary
Private gate, Beel Vayena, Gaurighona	Beel Committee	Gher owner	Private	Fishing right	Fish catch

8. CONFLICTS

8.1. Conflicts regarding paddy and shrimp farming

The KII Farmer at village Kalicharanpur and the landless representative to the WMA from village Arua, Sufalakathi UP said that some problem arises. Those having land far away from the canal in the danga (elevated) area prefer cultivating aman cultivation but the gher owners want to keep water as they do not cultivate aman. Their land is located in the middle or deeper part of the beel not suitable for aman cultivation. Such issues are solved by discussion but in the interest of the gher owners, not aman farmers.

The KII farmer at village Magurkhali also said there are problems. It is somehow managed in the boro season. The gher owners drain out water in their interest. They too have HYV Boro land and need drainage. But they drain out to the extent of their need, not caring the need of others. They make alliance with landowner. Either make them partner (giving share of gher or paying good amount as yearly rent called *haari*). So they land owners do not make trouble particularly the absentee owners are happy to receive fixed yearly rent.

8.2. Conflicts regarding high-low elevations

The peripheral high land area farmers want to lift water or retain water to cultivate paddy but the low land farmers want to drain out. The beel committee, UP Chairman, members discuss with farmers from both sides. Ultimately decides that drainage must continue until the gher dykes stay about one foot above water level. It is said, we have dykes surrounding the beel. Now you protect your land, make inner dykes, pump in or pump out water. This way issues are solved (or kept unsolved).

Due to this problem water logging cannot be reduced and therefore cultivation of paddy decreased. Cultivation of aman paddy is almost stopped. Eight to ten years ago both aman and boro paddy were cultivated in almost the whole area but now aman is totally lost and Boro HYV cultivated in about 70% area in combination with bagda and in 30% area only fish and shrimp are produced. This is the pattern in the beel area west of Katahali gate.

8.3. Conflict mitigation

Two institutions, the Beel Committee and the UP are involved in conflict mitigation. If some problem arises about opening or closing of the gate, removal of barriers created in the canal or gate that obstructs water flow or creates water logging artificially, the affected people approach the Beel Committee or the UP Chairman. Effectively the group of people mediates either under the umbrella of the UP or the Beel Committee. The UP Chairman and Members are the key persons in both.

In one instance at Sonnayergacha village, canal was blocked by the fishers that prolonged water logging. The affected people requested the UP Chairman to resolve the problem and he went to the canal area with the affected area people. Then he ordered to remove the barriers and free the canal flow.

In the case of gher owners taking in salt water in February April but paddy farmers demanding drainage, decision goes in favor of gher owners in the low land areas and it goes in favor of paddy farmers in the medium land areas. This can somehow be resolved as most local farmers combine paddy and fish farming and they have to come to a decision. Shrimp/fish farmers can win if they can lease in large areas and those interested in paddy farming has control on very small area. The women headed household of village Magurkhali said that the gher owners make alliance with landowner. Either make them partner (giving share of gher or paying good amount as haari). So they do not make trouble. But the poor farmers, landless remain affected and even the homestead area is flooded and trees die, vegetable cultivation affected or at least delayed.

9. CONCLUSION

9.1. The Study Findings

Location: Polder 24/G is located in the southwestern district of Jessore and comprises mainly four eastern Union Parishad areas of Keshobpur Upazila. While other polders have distinct geographical boundaries and surrounded by riverbank embankments, polder 24/G lacks such precise boundaries. The boundary seen in the IWM map seems arbitrary and is different from the natural boundary made by the rivers in three sides and naturally elevated areas between the large beels in other side.

Accessibility: The polder area is about 50 kms southwest of Jessore and 30 kms west of Khulna city and is connected to both cities by regional highways where public bus is the main mode of transport. Local transport modes are rickshaw, rickshaw van, three wheeler auto rickshaw, and engine van. Waterway transport was important in the past but almost eliminated by now as the rivers silted and road infrastructure developed. Two rural towns are located in its proximity, Keshobpur Upazila headquarters in the northwest and an important growth centre Chuknagar in the southwest.

Physical features: The polder area comprises a series of natural depressions, called beel surrounded by rivers in three sides, west, south and east and overlapping beel area in the north. The land topography is saucer shaped; the beels in the middle and east and settlement areas in the west and south. Local people categorized land in two broad types, beel meaning low-lying areas and danga meaning relatively highland areas. Roughly one 40% is danga area and 60% is beel area. Beels are more in the eastern half (Sufalakathi, Gorighona, eastern part of Panjia) and danga areas more in the western half (Mongalkot and western part of Panjia).

Area and population: Geographical area of the polder is about 103 sq kms with total population of 85,344 as per population census 2011.

History of polder development: The history of constructing earthen dykes of low height and of temporary nature goes back to the period of Peer Khanjahan, a philanthropic religious leader of pre-British period. But constructing stronger dykes was initiated in Pakistan period and the polder in this area was constructed during 1962-64 by the EP WAPDA which is now inherited by the BWDB. The aim of constructing polder was to protect crops from flood and tidal surge. The objective was largely achieved and crop production increased in the mid sixties to early seventies. But later the rivers silted and water drainage emerged as the main problem. To address the problem, the BWDB, with the assistance of the ADB implemented the KJDRP during 1997-2002 and started implementing TRM project in this polder in 2005.

BWDB projects: Under the KJDRP, 112 kms road have been developed and 18 bridges and about a dozen sluice gates have been constructed and several rivers like Hori and Buri Bhodra have been excavated. The road development has been nice but the main purpose of the KJDRP, drainage remained a problem. As the KJDRP could not solve the drainage problem, the BWDB took up a new project called TRM. The conventional engineering solution of canal excavation and dredging of rivers failed to improve drainage as the re-excavated rivers and canals get silted again. Local people innovated a new system of managing tidal rivers by allowing entry of tide water to the beel and this helps keeping the river flowing, the beel land elevated and reduced water logging.

The TRM is appreciated by all as an idea but its implementation made chaos. The TRM was planned to be implemented in three years in Beel Khuksia but it could not be done in seven years. Farmers were

promised compensation for the loss of crops during the implementation period but the BWDB and the district administration failed to make payment of compensation. As a result, the affected farmers lost trust and TRM is now unlikely to be implemented successfully.

Besides constructing roads, sluice gates and excavation of canals, the KJDRP established a water management association and 77 primary somitis or WMGs. Initially the WMA was functional. They were consulted by the BWDB during project but at a later stage, when the project closed, the WMA as well as the WMGs became inactive.

With the construction of polder in 1962-64, crop area and yield increased. Farmers moved away from low yielding broadcast aus and aman mixed farming to better yielding transplant aus and aman. In mid seventies to mid eighties, water logging began as canals and rivers were getting silted. Aman cultivation decreased and commercial aquaculture began. In mid 1980s to 2005 Aus paddy eliminated, aquaculture aman decreased further and aquaculture expanded. From 2005, both crop farming and aquaculture stopped in Beel Khuksia. In other beel boro paddy cultivated in 30% area with fish and shrimp and in 70% area only fish and shrimp are produced. In the danga area and homestead land and gher dykes, vegetables cultivation expanded because of having good market access.

Condition of embankment: The polder has embankment in three sides, west, south and east. Embankment condition is good and stable in the west, south and southeast in Mongalkot and Gaurighona UP. In the northeast the embankment has been damaged almost entirely because of the TRM allowing entry of tide water. In the north, there is no embankment.

Condition of structures: The IWM map and list shows a total of 121 LGED structures, 68 private structures and 55 pipes. Of them only five are sluice gates with link canals. IWM map however did not show about 5 BWDB gates and a major and a minor private gate. Apart from about a dozen sluice gates all only 3 box culverts and 4 pipe culverts have link canals. All other structures are buried under mud or are inoperative. Even it is difficult to trace them. Most of such structure are box culverts or pipes on Upazila, UP or village roads of the LGED inside of the polder and not on the outer embankment.

In total the polder has only about 8 sluice gates. Of the eight gates, five are now used for effective drainage. Of the three non functional gates two are in the TRM area hence not in operation and canal blocked by silt deposit and another one silted outside of TRM area.

Condition of canals: Only about a dozen canals could be identified against 244 structures by checking IWM structure lists with or without link canals. These too are silted and not draining adequately. The polder had many more canals but all occupied by the adjoining landowners with or without any valid lease from the GoB. This has been a cause of increased water logging.

Operation of the sluice gates: BWDB is not directly involved in the operation of sluice gates. Instead they have assigned the task to the WMA established during the KJDRP and the localized Beel Committees formed by the BWDB under the leadership of the UP Chairman/Members. It was observed that WMA and the WMGs became inactive after closing the KJDRP in 2002 and in the field the Beel Committees are really operating the gates with the support of the gher owners and landowners rather than all local stakeholders.

The UP as an institution is not involved in operating sluice gates but the UP chairman and members of the concerned area are involved by designation in the Beel Committee which has key role in the operation of gates in all UPs. However, the UP helps removal of obstruction to drainage and makes minor excavation for this purpose.

Maintenance: Since polder 24/G belongs to the BWDB, its maintenance is the responsibility of the BWDB. However it was noted in the FGDs and KIIs that the maintenance was largely neglected particularly after dosing the KIDRP in 2002. The UP has limited role in maintenance of embankment and structures because of their priority is rural roads and limited resources they concentrate there. They occasionally repair embankment or re-excavates canals using allocations under food for works, cash for works or 40 days employment support programmes. Most participants supported larger involvement of the UP in water management although there was strong criticism of their performance. Also, there is question of mandate, the BWDB discourages UP to undertake repair of the embankment. The WMA is non-functional and the Beel Committee is financially and institutionally incapable to undertake any work beyond minor repair.

Emergency response: This appeared better. There is local initiative from the community, beel committee and UP. Government and NGOs support comes a later but they do contribute to repair damages after the disasters like AILA.

LCS: Two LCS groups were met. One (woman group) organized by the LGED is a real LCS and better supported under the RREMP. Employment is ensured for three years, selection process transparent, savings scheme incorporated and group members improved socially and economically. However, payment of wage was sometimes delayed. The other group (all men) is working occasionally with the BWDB. This is actually a group of earthwork labour who work most of the time as agricultural and non agricultural wage labour as well as fisher.

Meaning of participation: To some, it meant drainage and distribution of water. To others it meant concerted effort of all government officials and people to work for their own interest and it is better if union parishad joins. To them, participation also meant inclusiveness (all are included) so that common people can join the WMA and WMGs. It was emphasized that participation of “common people” is more important than consulting “upper level “people. It was also emphasized that local people rather than officials should be taking decision as “it is our life and death question and government must value it”.

Condition of participation: It appeared from the discussion that participation is lacking as the WMA executives do not carry out their responsibility and the BWDB fails to keep promise. The elites feel that common people do and need not participate while the poor and women feel that they are not allowed to participate. There is a common understanding that the landless (and marginal farmers) need not as they do not own land in the beel area. Thus the meaning of water management has been narrowed down to beel management and not management of water of the whole sub polder area. To the FGD participants at village Ghaga, the Beel Committee meant Liaqat Member, Monju Chairman and gher owners. So, “common people” do not feel it important to participate. The FGD participants at Panjia UP said that the BWDB is disinterested to disseminate information which constrains participation.

Improving Participation

Suggestions provided by the FGD and KII respondents include the following:

- Need special care to include the landless owning below 15 decimals land.
- Opinion of “common people” is valued by the concerned GoB agencies

- Concerned GoB agencies should consult “common people” rather than discussing only with the Chairmen, Member and WMA executives.
- The committees must be reorganized with new members. The election of the committee must be transparent.
- Water needs of the poor and the rich are different. Hence the needs of the poor must get priority in the decision making process and that will be an incentive for the poor to participate in water management rather than in LCS only.

The WMA participants said in the FGD that involving “all people” is “practically impossible”. This statement is a clear indication of the problem of mindset. Present level of orientation of the elite dominated WMA leadership is unlikely to promote participation of the poor and women. Hence there is a need for reorientation rather than just changing committee. Some action research in transparent and participatory development should be demonstrated.

Gender

Women are progressing in the polder area like other areas of the country but are still at disadvantaged position, particularly the poor women. How the society value women is reflected in the population census 2001 showing that only 5% women are “employed” which is a huge mistake. A woman rearing a cow, 7 goats, 14 ducks, 4 hens and producing fruits, vegetables and turmeric in the homestead land must be treated a selfemployed woman farmer *krisani* rather than a housewife or *grihini*. This woman headed household is a good example showing that water management, and even beel management is highly relevant to women. Excess water of gher floods her homestead agriculture and her mud house is at risk to collapse.

In the case of LCS work of the RREMP there was no wage discrimination, both male and female LCS labour paid Tk. 2700 per month. But wage rate of woman in agriculture was Tk. 200 against Tk. 300 for man. In the case of earthwork under 40 days employment support implemented by the UP, both male and female labour got daily wage of Tk. 150 but this was 5 hours work against about 10 hours work in private wage employment.

Conflicts regarding paddy and shrimp farming: The respondents said that some problem arises. Those having land far away from the canal in the danga (elevated) area prefer cultivating aman paddy but the gher owners want to keep water as they do not cultivate aman. Their land is located in the middle or deeper part of the beel not suitable for aman cultivation. Such issues are solved by discussion but in the interest of the gher owners, not aman farmers.

Conflicts regarding high-low elevations: The peripheral high land area farmers want to lift water or retain water to cultivate paddy but the low land farmers want to drain excess water. The beel committee, UP Chairman, members discuss with farmers from both sides. Ultimately decides that drainage must continue until the gher dykes stay about one foot above water level.

Conflict mitigation: Two institutions, the Beel Committee and the UP are involved in conflict mitigation. If some problem arises about opening or closing of the gate, removal of barriers created in the canal or gate that obstructs water flow or creates water logging artificially, the affected people approach the Beel Committee or the UP Chairman, effectively same people. In one instance at Sonnayergacha village, canal was blocked by the fishers that prolonged water logging. The affected people requested the UP Chairman to resolve the problem and he went to the canal area with the affected area people. Then he ordered to remove the barriers and free the canal flow.

9.2. Main Concerns and Suggestions

Concerns

Most respondent appeared pessimist saying like if the present trend of increasing drainage problem continues, the whole area will be flooded and water logged. No crops will be produced and even aquaculture will be impossible. Some said that the riverbed is leveled with adjoining land and higher elevated than the beel. So water cannot be drained. Some said that food crisis is inevitable, even the homestead land will be flooded, sand deposit will make land less productive and salinity will increase. Some said that the crop land will be buried 3 feet below sand deposit. Very few like Alamgir of village Ghaga said that economic condition improved, poverty dedined but gher owners more benefited than others.

Suggestions:

The suggested remedial measures include the following:

1. Re-excavate main rivers by dredging and small ones by excavators
2. Re-excavate canals, deeper excavation of canals
3. Implement TRM properly
4. Demolish old gates which cannot be used any way to keep rivers and canals flowing
5. Implementation of TRM can be supported but not by flooding all areas including homestead land. Elevate homestead land first then implement TRM.
6. Local institutions, UP and WMA (or Beel Committee) be provided regular funding for repair and maintenance
7. Government should make budget in consultation with local people (already started taking peoples opinion in open meeting on UP budget).
8. BWDB must rebuild good relation with local people which is damaged by mishandling the TRM
9. Piling in the riverbank to prevent erosion (this is not a big problem here)
10. Stop implementation of TRM, do it elsewhere (let other people die, not me)
11. One TRM covering about 5,000 ha to be implemented every 4-5 years.
12. Let canals and rivers flow freely (the essence of TRM)

Institutional arrangement

A number of views came about probable institutional arrangement of assigning responsibility of water management. These are:

1. NGOs to be given responsibility of water management to ensure quality of work and accountability
2. WMA and UP to work together with budget coming from the BWDB
3. UP tom have enhanced role in water management
4. BWDB to take responsibility

The job of the study team was to capture information and ideas by FGD and KIIs. We have done that and presented the salient features of the findings in this Situation Analysis report. In this section there are conflicting suggestions both about engineering interventions and institutional arrangement.

The polder development, maintenance and water management, rather water governance could not yet come out of project based solution. The WMA and the WMGs created by the KJDRP became inactive and it happens everywhere. To that is now added politicization to control whatever small resources now exist, the canals and gates. Some respondents were saying “let the rivers and canals flow freely and remove all barriers, the dykes, structures etc”. It should also be said that, “let the local institutions, UP and (may be more stable water management bodies like the Beel Committee) operate freely” with oversight and facilitating role of the relevant GoB agencies but not any motive to “control” and the support not limited to project. Transparency of such institutions must be enhanced and they must be reoriented to enhance participation.

One prevailing notion that the landless and women need not participate in water management as they do not own land must be corrected by proper reorientation. This will enable widening the meaning of water management from the current narrow idea of beel management.

Regarding present weaknesses of the institutions it came up very clearly that, the level of misappropriation increases with hierarchy. It was said, if you place money to the UP, they will eat some and do some work, if you give it to Upazila Parishad, they will eat more do less work and if you place it to the MP, there will be no work but bill paid 100 percent. It could be exaggeration, but of course, people’s perception.

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).

Poder 24/G is a sub polder of the BWDB and they are responsible for its improvement as well as operation and maintenance.

Local Government Engineering Department (LGED)

LGED is not involved in the maintenance of this polder as it belongs to the BWDB.

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. The polder is under the jurisdiction of four Union Parishads in Keshobpur Upazila, district Jessore. The UP is not involved in water management in this polder as the BWDB is doing it. In this polder UP involvement however appeared prominently in the discussion as a part of the Beel Committee and they occasionally supported repair of embankment, re-excavation of canals and in conflict mitigation. UP is strongly involved in providing tube wells for drinking water and ring slab latrines for sanitation. UP has good involvement in disaster response.

Role of 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 assist the Union Parishad for issues they cannot handle alone, as for instance funding required for various development activities (drinking water, emergency, road maintenance) and coordination at the higher levels. Since the Polder falls in just one UP hence there is no issue of inter Union coordination by the UNO. The role of UNO came-up in the FGD and KII discussions. Their role seemed important to enhance better implementation of projects and enhancing participation of and benefits to the marginalized groups. DC's role came up in the discussion regarding canal lease and payment of compensation to the TRM affected farmers.

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 the Sub Project area the participants did not mention of any assistance from the DAE. Despite located very close to the city, DAE officers may have very little interaction in the field level and the farmers may not find interest even to consult them. The DAE could help farmer to resolve shrimp-paddy conflict on drainage and irrigation access.

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.

Department of Public Health Engineering (DPHE)

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

ii) NGOs

As many as 45 NGOs and MFIs are working in Keshobpur Upazila. These include Grameen Bank, ASA, Manab Unnayan Songtha, CARITAS, Bachte Sekha and HEED Bangladesh, involved mainly in providing microfinance. Among other NGOs, Somadhan and ECO are engaged in road repair by earthwork. Somadhan distributed 100 houses to disaster victims. BRAC provides microfinance service as well as disaster relief, Agriculture training, seed and fertilizer and sanitation facility. Dhaka Ahsania Mission provides non-formal primary education and skill training. Jagoroni Chakro provides credit as well as aquaculture training. NGOs did not play any significant role in water management in the polder 24/G area.

iii) Private actors:

Not active in this polder.

B. ANNEX 2: INSTITUTIONS

Authority/ Organization	Concerned Ministry	Field Presence	Relevant Functions	Constraints	Suggested remedial measures
Upazila Bureaucracy: UNO office headed by the UNO	Ministry of Establishment	Up to Upazila level.	* General administration * Development coordination * Conflict resolution	* Inadequate manpower * Low skills of staff * Bureaucratic orientation * Lacks public accountability * Political interference	* Reorientation * Freedom to act professionally, neutrally, guided by law * Enhanced public accountability
Bangladesh Water Development Board (BWDB) 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 * Gate man recruitment stopped but alternative measure to O&M by communities not yet functioning effectively	* Repair, reconstruct polder * Transform BWDB from just line ministry control to a people oriented institution
Local Government Engineering Department (LGED) Main agency relevant to Sub Project	Ministry of Local Government Rural Development and Cooperatives	Up to Upazila level.	* Plan, implement and maintain rural infrastructure (rural roads, bridge, culvert market, ghatetc) * Plan and implement small water sector projects up to 1000 ha in cooperation with local bodies and communities * Provide technical support (design, supervision, accounting) to local government bodies to develop, operate and maintain local infrastructure)	* Inadequate manpower if no project on-going * Political interference	* Freedom to act professionally, neutrally, guided by law * Enhanced public accountability * Local government strengthening
Upazila Land Office headed by the Assistant Commissioner, Land	Ministry of Land	Up to Upazila and Union level.	* Khas land and khasjolmohal management * Leasing out of khas land, khasjolmohal	* Inadequate manpower * Low skills of staff * Bureaucratic orientation * Lacks public	* Reorientation * Freedom to act professionally, neutrally, guided by law * Enhanced public accountability

Authority/ Organization	Concerned Ministry	Field Presence	Relevant Functions	Constraints	Suggested remedial measures
				accountability * Political interference	
Department of Agriculture Extension (DAE)	Ministry of Agriculture	Effectively up to Upazila level. Officially multi village block level below UP	* Provide technical advice * Assist distribution of input subsidies, agr loan etc.	* Sub Assistant Agriculture Officer rarely seen in the village/ UP * Low skills of employees * Political interference * Assigned many work by the government which are not related to agriculture sector	* Establish Union based farmers information and service centre (FIAC) * Ensure presence of SAAOs at least in the UP on a regular basis * Ensure public accountability through reporting to UP and Upazila Chairmen & UNO
Department of Fisheries (DoF)	Ministry of Fisheries and Livestock	Up to Upazila level	* Provide technical advice to fish/ shrimp farmers * Conserve fisheries resources * Inspect quality of shrimp fry supplied to farmers, * Promote hygienic condition of fish/shrimp landing centre/depots, quality of shrimp going to processing centre * Regulate shrimp farming so that it is not damaging environment * Khasjalmohal lease, management. * Report on fisheries/ shrimp area production etc	* Lack of manpower * Political interference * Lack transparency and public accountability	* Introduce local extension agent in fisheries (LEAF) as recommended by the Fourth Fisheries Project (as a community managed but government supported extension system) * Ensure public accountability where UAO and SAAO must report to Upazilla and UP chair respectively
Department of Public Health Engineering (DPHE)	Ministry of Local Government Rural Development and Cooperatives	Up to Upazila level.	Support water supply and sanitation - Tube Well - Pond sand filters - Rain water harvest	* Political interference * Lack transparency and public accountability	* Inter agency coordination * Better interaction with the communities

Authority/ Organization	Concerned Ministry	Field Presence	Relevant Functions	Constraints	Suggested remedial measures
			- Ring slab latrine - piped water supply	* Low coordination with other departments	
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