



Bangladesh Water Development Board (BWDB)



Kingdom of the Netherlands



Department of Agricultural Extension (DAE)



# Polder Development Plan (PDP) – DRAFT

## Polder 55/2A

June, 2017



# Program Data

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## Contact Details

### **Blue Gold Program - BWDB**

**Address** 23/1 Motijheel Commercial Area, Hasan Court, 8<sup>th</sup> Floor, Dhaka 1000  
Phone: +88 02 7111525; +88 02 9569843

**Email** BWDB Program Coordinating Director (PCD): [dp3.bwdb@gmail.com](mailto:dp3.bwdb@gmail.com)  
DAE Program Director: [kbtahmina@gmail.com](mailto:kbtahmina@gmail.com)  
Blue Gold Program Team Leader: [guy.jones@bluegoldbd.org](mailto:guy.jones@bluegoldbd.org);  
[guy.jones@mottmac.com](mailto:guy.jones@mottmac.com)  
Embassy of the Kingdom of the Netherlands: [dha-OS@minbuza.nl](mailto:dha-OS@minbuza.nl)

**Website**



<http://bluegoldbd.org/>

**Facebook**



<https://www.facebook.com/bluegoldprogram>



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# Issue and revision record

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# List of Abbreviations

BADC	Bangladesh Agricultural Development Corporation
BBS	Bangladesh Bureau of Statistics
BRRRI	Bangladesh Rice Research Institute
BWDB	Bangladesh Water Development Board
CAHW	Community Animal Health Worker
CBO	Community-Based Organisation
CDMP	Comprehensive Disaster Management Program
CO	Community Organizer
DAE	Department of Agricultural Extension
DLS	Department of Livestock Services
DOC	Day Old Chicks
DPP	Development Project Proforma
DoC	Department of Cooperatives
DoE	Department of Environment
DoF	Department of Fisheries
DP III	Director of Planning III of BWDB
DPHE	Department of Public Health Engineering
DRR	Disaster Risk Reduction
DTL	Deputy Team Leader
EIA	Environmental Impact Assessment
EKN	Embassy of the Kingdom of the Netherlands
FCD	Flood Control and Drainage
FCDI	Flood Control, Drainage and Irrigation
FFS	Farmers Field School
FGD	Focus Group Discussion
FO	FFS Organiser
FT	Farmer Trainers
GAP	Gender Action Plan
GIFT	Genetically Improved Farm Tilapia GIFT
GoB	Government of Bangladesh
GoN	Government of Netherlands
GPWM	Guidelines for Participatory Water Management
Ha	Hectare
HH	Household
HYV	High Yielding Variety
IGA	Income Generating Activity
IAPP	Integrated Agriculture Productivity Project
IPM	Integrated Pest Management
IPSWAM	Integrated Planning for Sustainable Water Management
IPSWARM	Integrated Planning for Sustainable Water Resources Management

IRRI	International Rice Research Institute
KII	Key Informant Interview
LCS	Landless/Labour Contracting Societies
LGED	Local Government Engineering Department
LGI	Local Government Institutions
M&E	Monitoring and Evaluation
MRL	Monitoring Reflection and Learning
MFI	Microfinance Institutions
MFS	Market Oriented Farmers Field School
NGO	Non-Governmental Organisation
O&M	Operation and Maintenance
PCD	Program/Project Coordinating Director
PD	Program/Project Director
PDP	Polder Development Plan
PSF	Pond Sand Filter
PWMR 2014	Participatory Water Management Rules 2014
SAAO	Sub-Assistant Agricultural Officer
SaFaL	Sustainable Agriculture, Food Security and Linkages
SMART	Specific Measurable Attainable Relevant Time Bound
SRDI	Soil Resources Development Institute
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TA	Technical Assistance
TL	Team Leader
TOT	Training of Trainers
UP	Union Parishad
VC	Value Chain
VCA	Value Chain Analysis
VCD	Value Chain Development
VCS	Value Chain Selection
WASH	Water Sanitation and Hygiene Education
WMA	Water Management Association
WAP	Water Management Group Action Plan
WMF	Water Management Federation
WMG	Water Management Group
WMO	Water Management Organisation
XEN	Executive Engineer
ZSE	Zonal Socio Economist

# Glossary

Arotdar	Service provider to Bepari and Pikers in wholesale markets. Facilitates the buy/sell process. May provide purchase negotiation assistance, storage space, selling space, short term and seasonal credit, and arrange truck transport of goods purchased by Bepari to markets.
Beel	Naturally depressed land inundated under water for at least one season
Bepari	Key wholesaler in the supply chain. Moves goods between markets buying in source markets and selling in destination markets. Exerts the main influence on price earned by farmers.
BKash	BKash Limited is a joint venture between BRAC Bank Limited, Bangladesh, and Money in Motion LLC, USA. Less than 15% of Bangladeshis are connected to the formal banking system whereas over 68% have mobile phones. bKash utilize these mobile devices and the omnipresent telecom networks to extend financial services to the under-served remote population of Bangladesh.
Business service	Service that is sustainable through private sector transactions and that improves the performance of the value chain, its access to markets, and its ability to compete.
Capture Fisheries	Capture fisheries refer to open water fisheries resources in both marine and freshwater environments. Capture fisheries is exploitation of aquatic organisms without stocking the seed. Recruitment of the species occurs naturally. This is carried out in the sea, rivers, reservoirs, khal, beel, floodplain etc.
Climate Change	Climate change refers to any change in climate (average weather) over time, whether due to natural variability or as a result of human activity. Average weather includes temperatures, wind patterns and precipitation.
Cross-cutting issues	Issues that affect all areas of concern within their context.
Culture Fisheries	Culture fisheries are the cultivation of selected fishes in confined areas with utmost care to get maximum yield. The seed is stocked, nursed and reared in confined waters, and then the crop is harvested. Culture takes place in ponds, ditches, rice fields which are fertilized and supplementary feeds are provided to fish to get maximum yield.
Disaster Risk Reduction (DRR)	DRR is a conceptual framework intended to systematically avoid (prevent) and limit (prepare/mitigate) disaster risks with regard to losses in lives and the social, economic and environmental assets of communities and countries.
Embankment	An embankment is a high earthen dike surrounding an area in order to protect it from external floods and salinity.
Enabling environment	Environment favourable to working, participating and demonstrating potentials
Farmers Field School (FFS)	FFS is a participatory group based learning approach where farmers can learn by doing and share their experiences.
Governance	Description of the dynamic distribution of power, learning, and benefits among participants in a value chain.
Inlet	Inlets are small structures across the embankment to take in fresh water for irrigating high lands along the periphery of the polder. Outlets are small structures across an embankment to drain out local pockets in the polder.
Landless/Labour Contracting Societies	It is an approach to engage local poor people/labourers as a group for construction of rural infrastructures. The group is treated by the development authorities/project as a contractor for the work allocated.
Local governmental institutions (LGI)	The institutions formulated under different Acts/Ordinances to run the different administrative unites of Local Government system by the Government
Kharif-I	Pre-monsoon season, from March to half July

Kharif-II	Monsoon and post-monsoon season, from July to October.
Khal	Excavated or natural routes across any land area for draining out excess water and flushing in required water.
Market Actor	Smallholder, input supplier and output market players directly participating the value chain.
Market development based	Activities that try to make the interaction between demand and supply more effective
Market transaction	The exchange between demand and supply is at full market price (the price at which suppliers are prepared to sell and consumers are prepared to buy, in an unsubsidized situation.
Market	A set of arrangements by which buyers and sellers are in contact to exchange goods or services—the interaction of demand and supply.
Needs Assessment	It is an assessment of the needs and priorities of local population in a polder.
Piker	Buys directly from various farmers to ensure a bulk. Bulk is sold to Arotder or to destination market. Exerts the main influence on price earned by farmers.
Polder	A polder is an area protected by embankment all around, having necessary structures across the embankment to drain out excess rain water and flush in required fresh water for irrigation.
Rabi	Dry season, from November to March.
Standing Committees of UP	Standing Committee means the Standing Committee formulated under the Local Government (Union Parishad) Act, 2009.
Sluice	A sluice is a structure constructed across an embankment to drain out excess water from a polder and / or flush in required water in to the polder.
Union Parishad (UP)	Union Parishad means the Union Parishad formulated under section 10 of the Local Government (Union Parishad) Act, 2009.” It is the lowest tire of the Local Government system in Bangladesh.
Value Chain	A ‘value chain’ can be defined as all the actors who buy and sell from each other in order to supply a particular set of products or services to final consumers.
Water Management Group Action Plan (WAP)	It is the plan and strategy of the WMG, to address issues and problems of their area at a given time as well as to implement their actions as part of the polder development planning.
Ward	Ward means the Ward of Union Parishad. Each Union Parishad consists of 9 Wards
Water Management Organisations (WMO)	It is a common name for all organizations formed for the purpose of water management in a polder, namely WMG, WMA and WMF.
Water Management Group (WMG)	Local people organized within a hydrological unit or at village level to manage water resources are collectively called Water Management Group.
Water Management Association (WMA)	It is a higher tier of water management organization formed by representatives of WMGs.
Water Management Committee (WMC)	It is a committee to initiate and coordinate operation and maintenance activities in a catchment area. It is formed by representatives of WMGs.
Water Management Federation (WMF)	This is the highest tier of water management organization of the Project. It is formed by representatives of all WMAs under the Project.
Zonal level	Blue Gold has three field offices in Patuakhali, Khulna and Satkhira to coordinate and manage the project interventions; these are sometimes called zonal offices.



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# 1. Introduction

## 1.1 Blue Gold Program Context

The overall objective of the Blue Gold Program is to reduce poverty in the coastal area by enhancing the livelihood of the rural population, through more efficient water resources management and increase productivity of mainly crops, fishery and livestock in the polders and by empowering the communities to be the driving force.

The specific objectives of the Program are to:

- Increase sustainability of the development of the polders through effective community participation. The community organizations will become the driving force for the natural resources based development, whereby environment, gender and good governance are effectively addressed in their operations;
- Protect floods and use water resources effectively;
- Increase farmers' income and strength livelihood through improved productivity (For each Polder a Business Plan will be developed with the value chain analysis); and
- Improve environment, drinking water and sanitation. The living environment will be realised and sexual reproductive health rights (SRHR), balanced nutrition, and good governance issues are well understood and applied.

## 1.2 Definition and Objective of a Polder Development Plan

### *Definition of a Polder Development Plan*

A Polder Development Plan (PDP) contains an integrated analysis and planning for developing a polder in relation to community mobilization, water management, agriculture, business development, environment, gender, and institutions<sup>1</sup>.

### *Objectives of a Polder Development Plan*

- i) The provision of an internal discussion document for the Blue Gold TA team and the implementing agencies (BWDB and DAE) to plan, design and implement at polder level in an integrated manner;
- ii) A clear outline for WMOs what type of activities Blue Gold is providing, which helps them to develop their own WMG Action Plans (WAP);
- iii) A starting point for BWDB to prepare detailed rehabilitation plans and for DAE to fine-tune the FFS modules and stimulate business activities as well as a strategy to strengthen institutions like Union Parishad (UP);
- iv) Linkages with Blue Gold's logical frameworks and M&E activities, to ensure that the proposed interventions at polder level are contributing to the overall program objectives and can be justified towards stakeholders and donors.

<sup>1</sup>An important consideration is that a polder is a multi-dimensional geographical unit delineated by water in which various and continuously changing development processes take place. Polder boundaries do not always coincide with administrative boundaries. The PDPs developed by the Blue Gold Program therefore do not capture the full picture. They zoom in on specific water and production related features of polders and try to make a dynamic analysis of the water management organisations operating in that sphere, their resources, their activities and their needs. Other Local Government Institutions (LGIs), NGOs and donors are operating in the same polders and they have their own sphere of interest, scope, analysis, plans and programs within or even beyond the physical boundaries of these polders. A Blue Gold PDP is thus not a substitute or umbrella plan for all types of activities and programs taking place in the polder.

## 2. Present Situation and its Challenges

### 2.1 Physical Features and Demography

Polder 55/2A is managed by the Bangladesh Water Development Board (BWDB) and was constructed during the Early Implementation Project from 1988-89 to 1993-94. The characteristics of the polder can be found in Table 1 and the location map of the polder with respect to Upazilla and Union headquarters is shown in Figure 1.

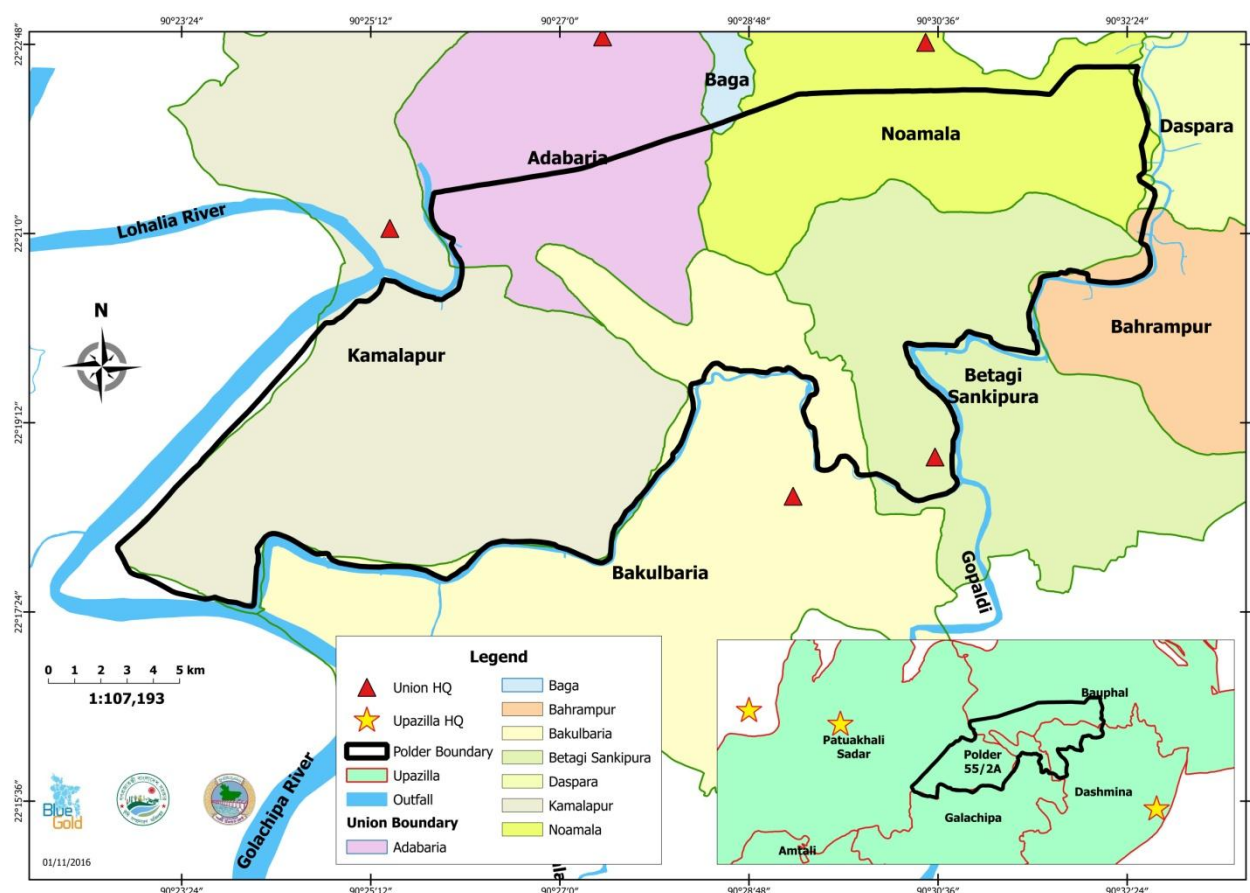


Figure 1: Location of Polder 55/2A in Patuakhali Sadar, Dashmina, Bauphal and Galachipa Upazila

Table 1: Main Physical and Demographic Characteristics of polder 55/2A

Characteristics	
Included Upazila(s)	Patuakhali Sadar, Dashmina, Bauphal and Galachipa
Included Unions	Kamlapur (Patuakhali sadar), Adabaria & Nawmala (Bauphal), Bakulbaria (Galachipa) and Betagi-Sankipur (Dasmina).
Polder boundary (in km)	45 km
Total number of Mouzas	33
Total polder area (in ha)	7,166
Total number of households in the polder	13,966
Total number of	13

catchments			
Total cultivable land (in ha)	5,570	High land: 25% Medium-high land: 60%	Low land: 15%
Population	69,130	Male: 33,504	Female: 35,625
Literacy rate	68%	Male: 62%	Female: 66%
Major occupations	Agriculture	Agricultural labour	Services
Economic condition	Rich: 11%	Middle class: 24%	Poor: 65%
Status of seasonal labour migration	Seasonal labour migration is very frequent phenomena under males in the months of June to August there is no work as agricultural day labourer. The majority of those who temporarily migrate to Dhaka for work; other places that they temporarily migrate to include Patuakhali sadar, Barisal and Chittagong. The activities they engage in are rickshaw-pulling, selling fruit, carpentry, and road construction, brick-making, pottering in launch terminals or steel rod and cement shops, building construction, and hawking in towns.		
Status of internal road communication	The greatest part of the internal road network is kaacha (earth made) road. During monsoon it is difficult to communicate through earthen roads inside the polder due to heavy mud formation. About 54 km road is Pacca out of 250 km.		

## 2.2 Water Resource Management and Infrastructure

In Table 2 the main characteristics of the water resource management and infrastructure of polder 55/2A are highlighted and Figure 2 shows the existing infrastructure and khals in polder 55/2A. Further details can be found in Appendix 1.

**Table 2: Main Water Resource Management and Infrastructure characteristics of polder 55/2A**

Characteristics	
Length of embankment (in km)	45
No of drainage/flushing sluices	13
No of inlets	10
No of (drainage) outlets	5
No of canals	61
Length of canals (in km)	211
Main outfall rivers and khals	Bhuria river, Joinkati river, Kalagachia and Baloikati ( <i>partially silted up</i> ), Patabunia khal (highly silted up), Mohisdanga khal, Kharizza Betagi ( <i>partially silted up</i> ), Moishadi and Nawmala khal ( <i>partially silted up</i> ).
Situation of tidal and river flooding	There is no tidal flooding in polder 55/2A. River flooding takes place in monsoon. Expected depth of inundation is about 0.60m to 0.75m in monsoon. The duration of inundation about 1 month.
Locations with water logging and siltation.	In Adabaria, Atoshkhali, Shaplaza, Mohathradi, Nawmala, Chaddabhuria, Char Moishadi, Maddy Dharandi and Akhoibaria the drainage congestion is slightly higher than other areas. In these areas, drainage congestion affects the transplantation period of the Aman season. In the dry season, scarcity of irrigation water effects Rabi crop cultivation.
Most river erosion prone area	Slightly erosion in Char Moishadi and near Bhuria launch ghat but not affect the embankment to till now.
Other relevant water issues	Polder 55/2A falls in the wind risk zone which possesses some vulnerability to strong winds and surge heights associated with cyclones. Three major cyclones have hit this polder during the recent years; Sidr in 2007, Aila in 2009 and Mohasen in 2013.

Key challenges in effective water management	<ul style="list-style-type: none"> <li>- Ten khals and two outfall rivers have been silted up. One sluice and two outlets have been damaged to a minor extent. This leads in Adabaria, Atoshkhali, Saplaza and Akhoibaria area to drainage congestion and water stress.</li> <li>- Poor operation and maintenance (O&amp;M) of structures. Not much maintenance of structures, except routine maintenance, after Sidr and Aila cyclones in 2007 and 2009 respectively though these structures were damaged to a certain extent.</li> <li>- Extensive presence of water hyacinths in many water bodies.</li> </ul>
Challenges in planning construction of water infrastructures within polder area	<ul style="list-style-type: none"> <li>- Many khals are obstructed by cross dams and other informally created structures to cultivate fish or retain water for other productive uses. Most of those obstructions are illegally created by influential people without taking permission from governmental authorities.</li> <li>- Unplanned road networks are obstructing water flow. This results in waterlogging and poor drainage in some areas, and is causing water shortage in other areas.</li> </ul>
Current internal polder water management practices	There is no internal Polder Water Management system practices in the Polder
Overall condition of internal polder water management	Very Poor
Opportunities for internal polder water management	Plan to establish one Community led Agriculture Water Management (CAWM) for the fiscal year 2017-2018 which create opportunities for internal Polder Water Management.

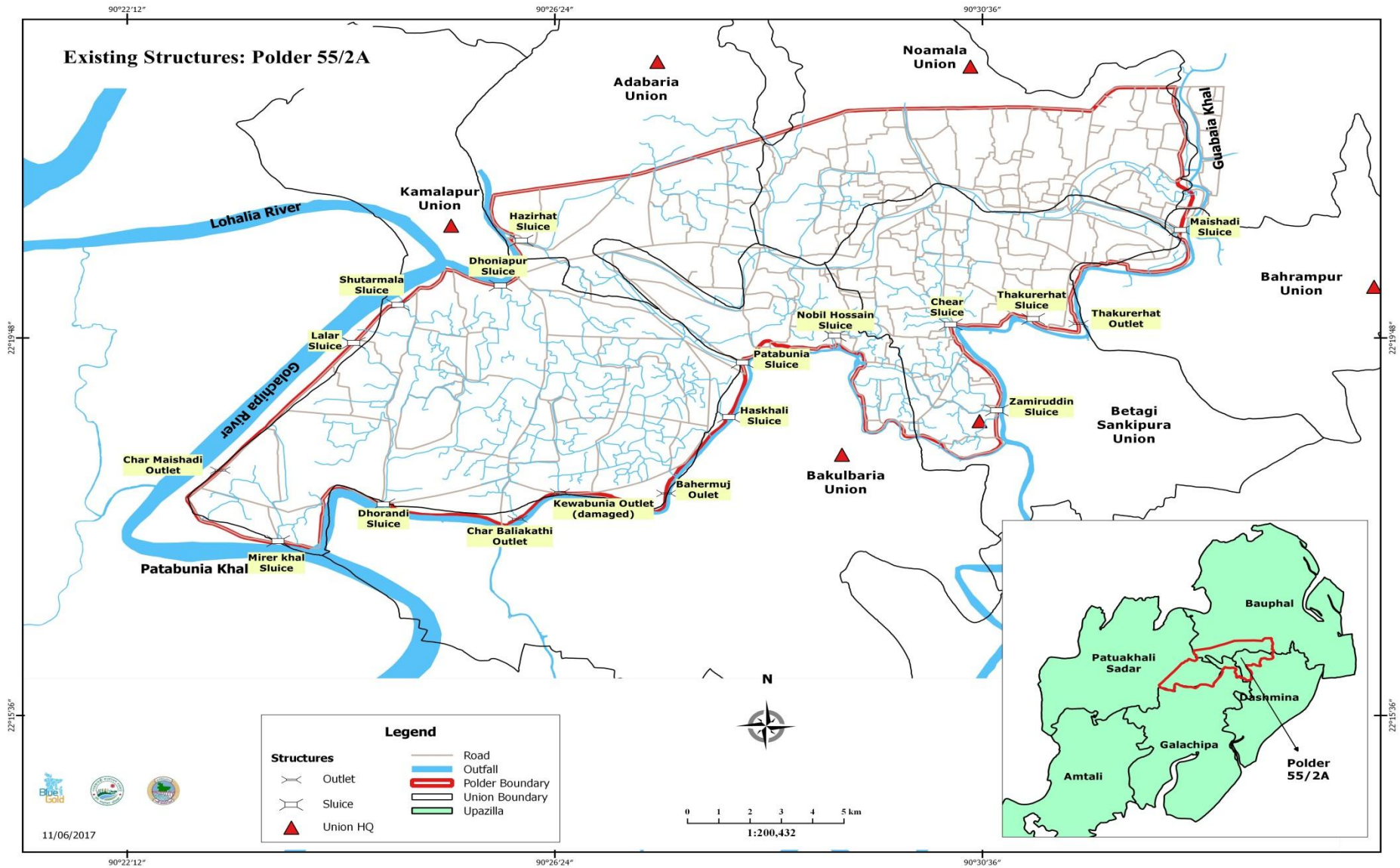


Figure 2: Map of Polder 55/2A showing the existing khals and Water Management Infrastructure

### 2.3 Institutional Framework for Participatory Water Management

The main institutional actors in polder 55/2A are Union Parishad (UP), its 9 Wards, Local GO/NGOs, Micro-finance Institutions, Market Committees, Water Management Groups (WMGs), Water Management Associations (WMAs) and Union Disaster Management Committees (UDMC). Main characteristics of the WMGs and WMAs and other institutional actors are highlighted in the Table 3. The boundaries and names of the WMG and WMA are shown in Figure 3.

**Table 3: Main characteristics of the Institutional Framework of PWM in polder 55/2A**

Characteristic			
Number of WMGs	14	Registered: 13	Non-registered:1
Members of WMGs	5,668	Female: 2846	Male: 2822
HHS being part of WMGs	5,668		
Number of WMAs	1	Registered: 1	
Female representation in WMGs	50%		
Total deposited fund (BDT)	200,400		
Total savings of WMGs (BDT)	0		
Total number of WMGs with O&M fund	14		
Names of projects and organisations with similar / related activities	<ul style="list-style-type: none"> <li>• Integrated Farm Management Component (IFMC) – DAE (DANIDA funded)</li> <li>• Quality Seeds Production at Farm Level-DAE</li> <li>• South-West Region Small Holder Farmers Assistance Project-DAE</li> <li>• Safe crop production (IPM) project- DAE</li> <li>• Seed Exchange Project-DAE</li> <li>• IPM- DAE (Danida)</li> <li>• Agriculture Extension Support Project- USAID</li> <li>• PROOPS- ECO</li> </ul>		
Existing WMOs linkages with other stakeholders	Generally strong linkage with UPs, however linkages with other service providers like DAE, BWDB, LGED and NGOs		
Number of WMGs member including in UP standing committee	0		
O&M agreement signed with BWDB	No		
Current participation of WMOs in O&M	Poor		
Existing conflicts on water management	No major conflicts		
Key challenges in strengthening PWM	<ul style="list-style-type: none"> <li>• Adopt Collective Action</li> <li>• Financially strengthening</li> <li>• Keep continuous liaison with UP, BWDB, DAE</li> <li>• Good Leadership</li> <li>• Regular O&amp;M activity</li> <li>• O&amp;M fund collection</li> <li>• Regular Record keeping</li> <li>• Involvement of rich farmer in WMGs.</li> </ul>		
Key challenges in relation to women participation	A general rather 'conservative' view on women participation in marketing activities, including active participation in WMGs decision making.		
Key opportunities in PWM	<ol style="list-style-type: none"> <li>1. Linkages with other institutional actors could be further strengthened.</li> <li>2. Percentage of women participating in WMGs is above 40%, BGP has</li> </ol>		



3. Proper use of water Agriculture and Economic development may be ensured.

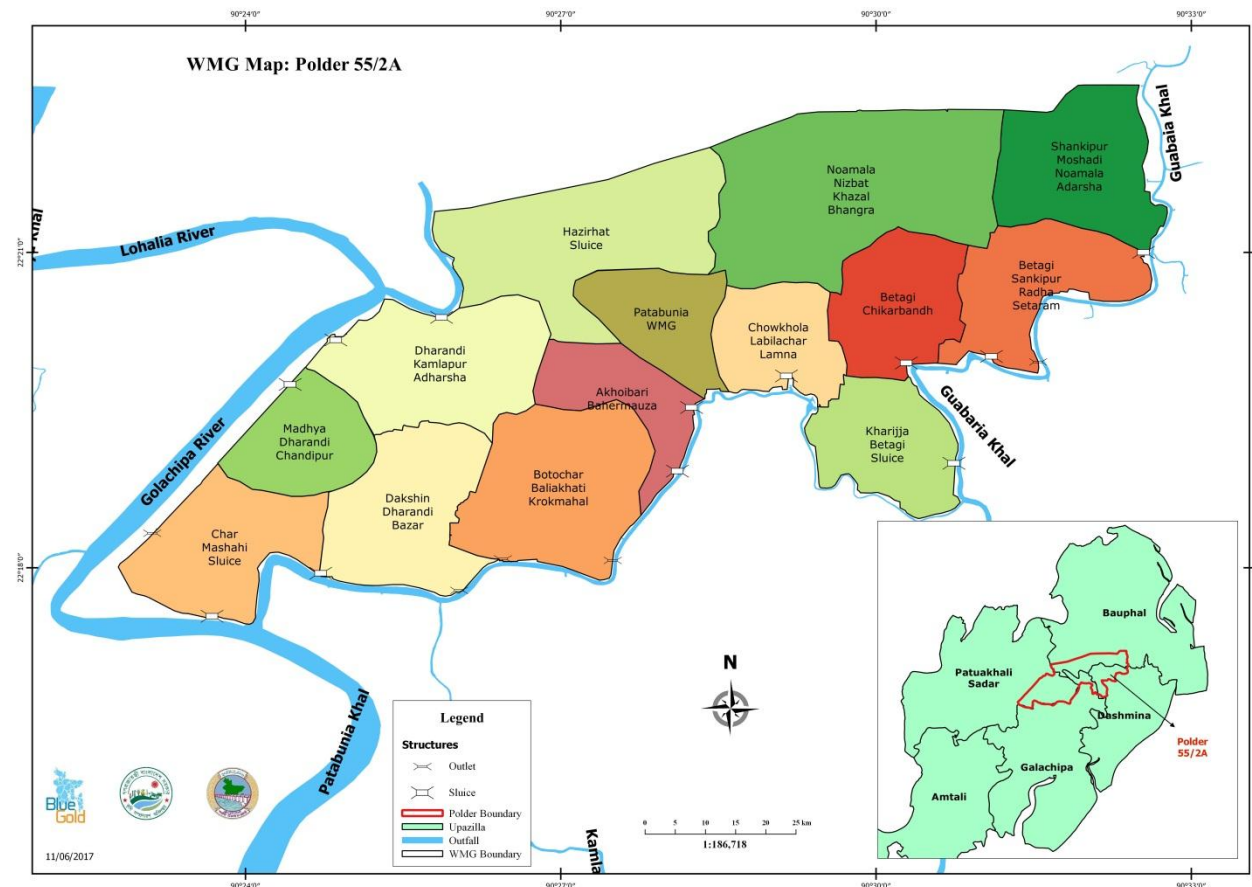


Figure 3: Name and areas of WMGs and WMAs in polder 55/2A

### 2.4 Agricultural and Marketing Services

In polder 55/2A, most polder dwellers are involved in crop production and fish culture. Livestock keeping is to a certain extent important. The most important characteristics and challenges of agricultural production and marketing services and main markets can be found in the following Table 4..

Table 4: Main characteristics of Agricultural and Marketing Services in polder 55/2A

Characteristic	1. Mungbean/Pulses	2. T. Aman	3. Ground nut
Main crops (top three)	1. Mungbean/Pulses	2. T. Aman	3. Ground nut
Current most common cropping calendar(s)	Mungbean – Fallow-T. Aman Fallow – Fallow-T. Aman Ground nut – Fallow–T. Aman Grass Pea- Fallow —T. Aman		
Current cropping intensity	215 %		
Main vegetables	Sweet gourd, bottle gourd, snake gourd, white gourd, ridge gourd, bitter gourd, spinach, yard-long bean, country bean, cucumber, potato, chilli, brinjal		
Main fruits	Guava, mango, coconut, jackfruits, betel nut, lemon, banana, water melon and jujube		
Available agricultural	Agri-machineries are used for tillage, threshing, spray of pesticide etc. Power		

machinery	tiller-105 and Tractor 5, LLP 95 and power threshers 54 are available in the Polder area.		
Present irrigation practices	About 8-12% land has been brought under irrigation facilities. A total of 95 LLP are used for surface water irrigation.		
Availability of inputs	<p>The availability and quality of inputs is low, as the polder mainly consist of small-scale farmers renowned input companies are not interested to sell high quality inputs. 85% of the farmers use their own preserved seeds (local and HYV) for rice production. The rest from BADC or private companies.</p> <p>Most of the vegetables produced at homestead level are mainly hybrid. Hybrid vegetable seeds are collected from different seed company agents/local shops and from the local weekly market. LalTeer, ACI and Metal seeds are the hybrid seed suppliers.</p>		
Current knowledge on proper input use	A big portion of crop producing farmers have a lack of understanding on optimal fertilizer dose. In homestead gardens farmers are using a low dose or no fertilizer.		
Important business trend in crop production	Mungbean and vegetable production are rapidly increasing. Farmers sell about 90% of their production. Road communication is improving, services and modern technologies are becoming relatively better available and the knowledge of farmers is increasing. Moreover, high market demand is making the farmers interested in producing market-based. In the recent years cropping intensity and per unit production volume has increased.		
Key challenges in agriculture	<ul style="list-style-type: none"> <li>- The polder has a substantial number of fallow lands during the Rabi season.</li> <li>- Lack of knowledge on improved agricultural production technology, in combination with a lack of extension services.</li> <li>- Not much vegetable production in summer due to scarcity of high land and waterlogging in low land areas. However, some high land pockets nearby sluices gates could be used and irrigated.</li> <li>- Lack of availability of water in the Rabi season for high value crops.</li> </ul>		
Percentage of HH owning livestock	40% cattle	10% buffalo	80-90% poultry
Availability of inputs for livestock	Weak or no formal livestock market chains exist in the polder, which causes a large fodder and feed unavailability. Some input traders sell loose feed, like till oil cake, rice bran and low quality veterinary medicines, but for commercial feeds one needs to travel to Patuakhali, Bauphol, Dasmina, Kalia and Hazirhat bazar. Even in the urban areas of Patuakhali the quality, number and timely supply of for example 'Day Old Chick' (DOC) is found to be difficult.		
Important business trend in livestock	<p>An interesting business trend is the demand of native poultry. It is gradually augmenting and the market price is about double compared to commercial birds. The surrounding industrial setup is still moderate, but quality services are gradually coming closer to the farmers and farmers slowly get more skilful in poultry rearing.</p> <p>Duck rearing also has potential due to the easy access to water bodies, but duckling hatcheries are still absence in the district</p>		
Key challenges in livestock	<ol style="list-style-type: none"> <li>1. Low production of livestock</li> <li>2. Lack of knowledge about improved technology</li> <li>3. Lack of vaccine, medicine and fodder</li> </ol>		
Percentage of HH involved in fish culture	50-60% of the households have culture ponds		
Types of fish	There are more than 36 species of fresh water fish, and four species of exotic carp, one species of cat fish and two species of tilapia. Shell fish is represented by several species of fresh water prawns, including Golda. The common open water resident fishes are Pangus, Bele, Chanda, Mola, Boal, Sing, Magur, Koi, Puti, Taki, small Chingri, Baim and Kholisha fish.		
Availability of inputs	Fry hawkers collect fingerlings from Jessore area and surrounding hatcheries of the polder within the Patuakhali district and sell them. Sometimes they create		

	<p>temporary nurseries inside the polder area for Genetically Improved Farm Tilapia (GIFT) production. There are a lot of small nurseries for rearing Indian major carps to fulfil the local demand of the polder.</p> <p>Three renowned fish feed sellers' products (e.g. C.P. Bangladesh Ltd, Nourish, Paragon, Quality, and Godrej Agro vet Pvt. Lt. and Aftab) are readily available in polder area. Fish feed is available on a credit basis, in some cases also for fingerlings. Fish medicines are available in Patuakhali sadar.</p>
Important business trend in fisheries	As a secondary source of income fish cultivation in ponds and ditches has recently gained popularity in the polder, because of the DANIDA's Fishery Extension Program. Tilapia and Pangash culture are increasing, while at the same time the utilization of quality inputs and number of nurseries is growing.
Key challenges in fisheries	Low fish production per hectare. This is caused, among other problems, by a lack of quality hatcheries and supply of quality fingerlings as well as a lack of knowledge on proper management.
Existing extension services	DAE has 6 Sub Assistant Agriculture Officers (SAAOs) assigned. Some of the NGOs and different companies are also providing extension services. There are 2 Paravet at polder level. DoF has one Upazila fisheries officer and one or two field staff to assist in fisheries extension services providing new technologies. Overall, their services are not sufficient due to lack of manpower and funds, also the services mostly address big and medium sized farming households.
Name and location of markets	Hazirhat, Kashipur Bazar, Noya Hat & Milghor Bazar (Adabaria Union), Dhalu Fakirer Hat & Patabunia (Bakulbaria Union), Jamir Mridha Bazar, Thakurer Hat, Betagi Bazar, Nagorer Hat & Siddiker Bazar (Betagi Sankipur Union), Dharandi Bazar, Babur Hat, Moisadi Algi Badher Hat & Hoglabunia Bazar (Kamlapur Union).
Products provided	Till oil seed, Mung bean, Betel vine, Peanut, Keshari pulse are the main market products. Besides, different vegetables and fruits are sold.
Surplus destination of products outside polder	The Polder has mainly surpluses for paddy, betel vine, mung bean, native poultry and captured fish. The primary destination of products is Kashipur bazar but it differs from product to product. Paddy goes to northern part directly or via to Kalia. Mung bean goes to Patuakhali sadar, Barisal or Dhaka. Betel vine goes to different districts via Bauphol/ Kalia. Vegetable trade is usually restricted to this district. Most produced fishes are consumed by polder dwellers, but large producers can reach Patuakhali market.
Main value chain actors	There are about 5-6 permanent input traders located at different markets. 5-8 local Bepari or Paiker and most of them are seasonal. Besides, there are about 10-15 fish Arotdars in this polder; they have a permanent setup.
Key challenges in marketing	<ul style="list-style-type: none"> <li>- A general lack of capital for income generating activities, in combination with high interest rates for loans. Most farmers depend on informal circuits to get a loan, which account for interest rates around 20%. Loans (with favourable terms) could be used to invest in crops, livestock or fisheries, and could create more income generation.</li> <li>- Lack of collective action among farmers. By collective action farmers could buy inputs cheaper and sell products in bulk and get higher revenues. The WMGs are not yet acquainted with collective action for productive purposes and evaluation of loan options is a new to them. It will take a while to change their mind-sets.</li> <li>- Farmers pay high prices for low quality inputs and get low prices for their products, as they mostly sell at farm gate and syndicates control the market. Also market distortion by other projects/NGOs and donors form a threat. Middlemen may not welcome the market orientation of farmers and influential landlords may oppose the mechanization of agriculture.</li> </ul>

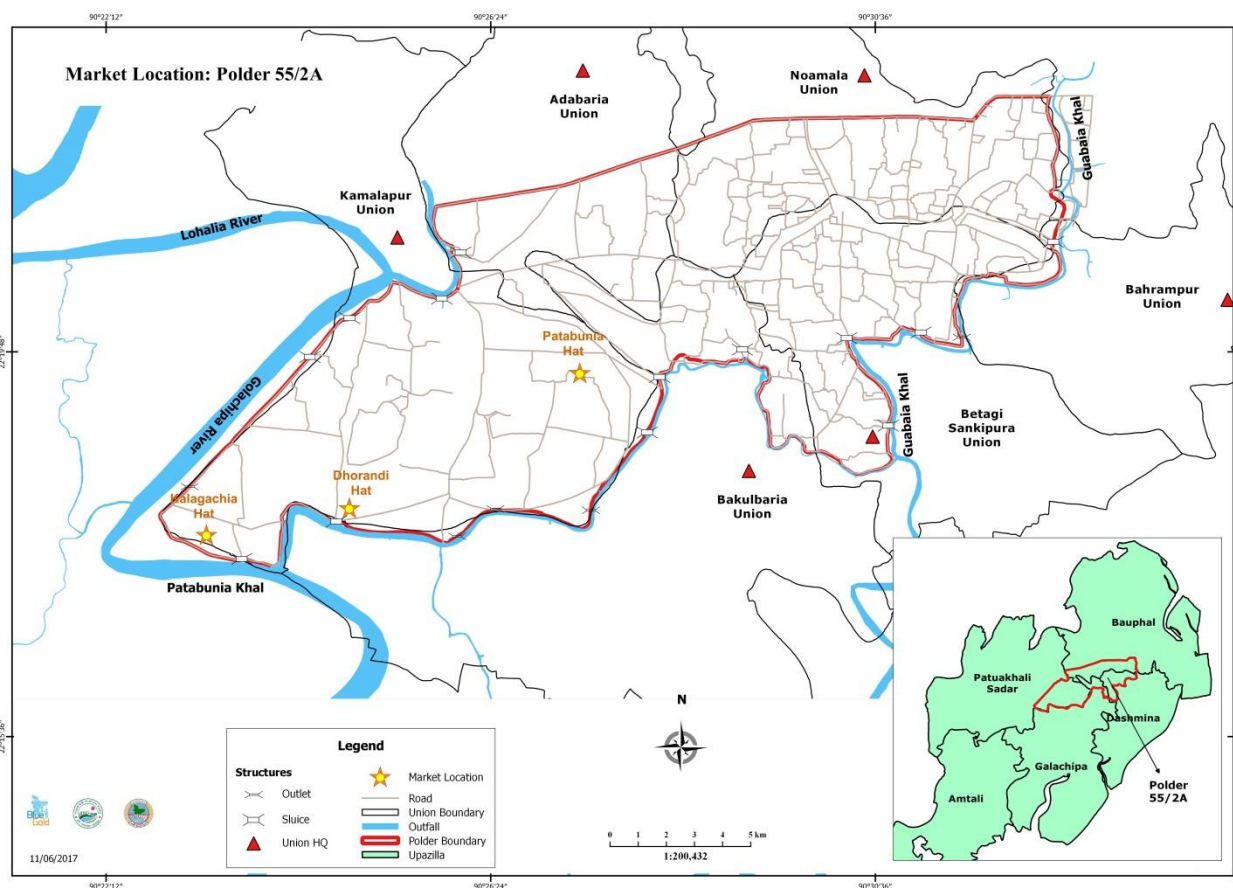


Figure 4: Markets and Union headquarters in polder 55/2A

## 2.5 Environmental Sustainability and Disaster Risk Reduction

Table 5: Main environmental and DRR characteristics of polder 55/2A

Characteristics	
Existing environmental problems	<ol style="list-style-type: none"> <li>1. The environmental problems are including siltation of internal drainage facilities, drainage congestion, congestion of water hyacinth, embankment erosion, changes of water and land courses, indiscriminate use of chemical fertilizer and pesticides, scarcity of drinking water, lack of shelter place during any emergency etc.;</li> <li>2. Water Logging is the major problem which occurs at Nijbat Mouza and Char Maishadi Mouza for 4 months (from July to October), Dakshin Dharandi Mouza, Dalikati, Akhoibaria and Patabunia Mouza for 2 months (September-October);</li> <li>3. Most of the canals are silted up and some canals are blocked due to road construction, cross dam or blocked by the influential people for their fish farming;</li> <li>4. Salinity intrusion which affect the land and water mostly by tidal water. Inundation by tidal water during the transplanting of Aman season;</li> <li>5. Local farmer reported that they are using different types of pesticides namely Basudin, Furatar, Fighter, Rovral, Ridomil gold etc. Both liquid and granular pesticides are being used to prevent pest infestation in the rice, watermelon and groundnut cultivation. In most cases about 50% of farmers use fertilizers in unbalanced way.</li> </ol>
Common hazards	Tropical cyclones, water logging, tidal and river flooding and salinity intrusion are very common phenomena in the polder area.

Cyclone shelters	There are 3 cyclone shelters which are two schools cum shelter and one Union Parishad cum shelter.		
Obtained environmental clearance certificate (ECC)	Not yet done		
Formulated environmental and social management plan (ESMP)	Not yet done		
Formulated community based disaster risk reduction (CBDRR) plan	Not yet done		
Recruited WMG environment and DRR counselor	28 counselors	14 environmental counselors (female)	14 DRR counselors (male)
Members of WMOs included in UDMC	0		
Opportunities for environmental and DRR activities	<ol style="list-style-type: none"> <li>1. The social forestry program of the department of forest is working in the polder area. They have planted trees in beside of the embankment in the north and north-west part, we could make partnership for plantation for the southern part after completion of the rehabilitation works;</li> <li>2. Awareness raising and encouragement of balanced fertilizer use; disaster preparedness before, during and after the disaster to cope with and recover from any disaster; WatSan etc.</li> </ol>		

### 3. Achievement as of May 2017

The achievement which made as of May 2017 on the area of Water Resources Management and Infrastructure, Institutional Framework for Participatory Water Management, Agricultural and Marketing Services, and Environmental Sustainability and Disaster Risk Reduction is summarized below in the table-

Sl. No.	Activities completed	Time Frame	Remarks
<b>A. Water Resources Management and Infrastructure</b>			
A-1	Embankment Re-Sectioning	2016-May 2017	3.00 km
A-2	Formation of Labour Contracting Societies (LCS): a. Formation and Registration of WMGs b. Formation of LCS c. Mobilize for earthwork	2016-May 2017	
<b>B. Institutional Framework for Participatory Water Management</b>			
B-1	a. WMO (WMG & WMA) Formation & strengthening Activities Arrange registration with BWDB and conduct new elections: b. Register WMGs & WMAs with BWDB	2015-May 2017	1 WMA were formed under WMIP
B-2	Organize orientation training for UP and stimulate WMG members to participate in various UP committees to advocate for financial and in kind support: a. Union Development and Coordination Committee b. UP Standing Committees c. Ward Shova (contribute in planning and budgeting) d. Union Disaster Management Committee e. Also stimulate UP members to participate in WMO meetings	2015-May 2017	Continues process
B-3	Stimulate as much as possible participation of WMG members in Farmer Field Schools (FFS), especially females and vulnerable members, ask regular feedback on preferred FFSs.	2015-May 2017	
<b>C. Agricultural and Marketing Services</b>			
C-1	Activities to improve crop production: a. FFS on crops (Rice and other field crops by DAE), homestead garden (vegetables) and nutrition, dyke vegetable production b. Women focused FFS c. Nursery management training d. Demonstration and trial on potential crops and vegetables e. Field day and farmers rally as follow-up of FFS and trials	2015-May 2017	12 FFS completed
C-2	Activities to increase fish production: a. Pond/ditch aquaculture FFS and trial b. Fish culture (Tilapia) c. Trial on fish culture d. Fish Field days after FFS as a follow-up	2015-May 2017	12 FFS completed on fish culture and beef fattening
C-3	Activities to improve livestock production a. Polder level beef fattening b. Field day on livestock activities	2015-May 2017	12 FFS completed on fish culture and beef fattening
C-4	Linkage workshop between WMGs and different service provider	2015-May 2017	
<b>D. Environmental Sustainability and Disaster Risk Reduction</b>			
D-1	Awareness on Disaster Preparedness and WatSan through WMOs regular meeting and day observance programs	2015-May 2017	
D-2	Recruit WMG's Environment and DRR Counselors	2015-May 2017	
D-3	Orientation to LCS Leaders, contractors & WMA leaders regarding Env. Safeguards & Conditions of Env. Clearance certificates.	2015-May 2017	
D-4	Orientation to UDMCs about their role on disaster management as specified in the standing order.	2015-May 2017	

## 4. Development Action Plan

On the basis of the present situation and its key challenges as presented in chapter 2, a Development Action Plan has been prepared by the Blue Gold program, and is presented in this chapter.

### 4.1 Water Resources Management and Infrastructure

A general meeting of the WMG representatives of polder 55/2A was held on 04 April 2016 in Adabaria Union Parishad. The chairman and some members of Adabaria, Kamlapur, Betagi and Sankipur Union were also present in that meeting. Blue Gold TA Team including BWDB officials actively participated in the water management related need assessment in the polder. After thorough discussion and arguments with the local stakeholders the following infrastructures were identified and validated for inclusion in the Blue Gold implementation program. Embankment re-sectioning, Construction/repair/reconstruction of structures with gates and re-excavation of main khals were considered as priority.

Parties directly involved in implementation will be BWDB, LCSs, Contractors and Blue Gold staff (mainly Equitable Water Management and Water Resources Management). LGIs/ WMOs will be involved in conflict resolution in water management, and facilitating land availability for implementation of rehabilitation activities.

#### 4.1.1 Summary of Rehabilitation Works

SL. No.	Name of Work	Units	Quantity	Estimated Total Cost, BDT	Remarks
1	Retired embankment	Km	0.5	4,000,000	
2	Embankment sectioning	Km	15	15,000,000	3.0 Km already completed
3	Khal re-excavation	Km	25	30,000,000	
4	Repair of Sluices	Nos.	13	30,000,000	
5	Repair of Drainage Outlets	Nos.	05	5,000,000	
6	Repair of Irrigation Inlet	Nos.	10	1,000,000	
7	Construction of Sluice	Nos.	02	55,000,000	
8	Construction of Outlet	Nos.	02	12,000,000	
9	Provision of Pipes	m	300	900,000	
10	Temporary Protection Works	Km	0.15	1,500,000	
<b>Total cost for Rehabilitation Works in Polder 55/2A</b>				<b>154,400,000</b>	

- A map showing proposed rehabilitation plan is given in Figure 5

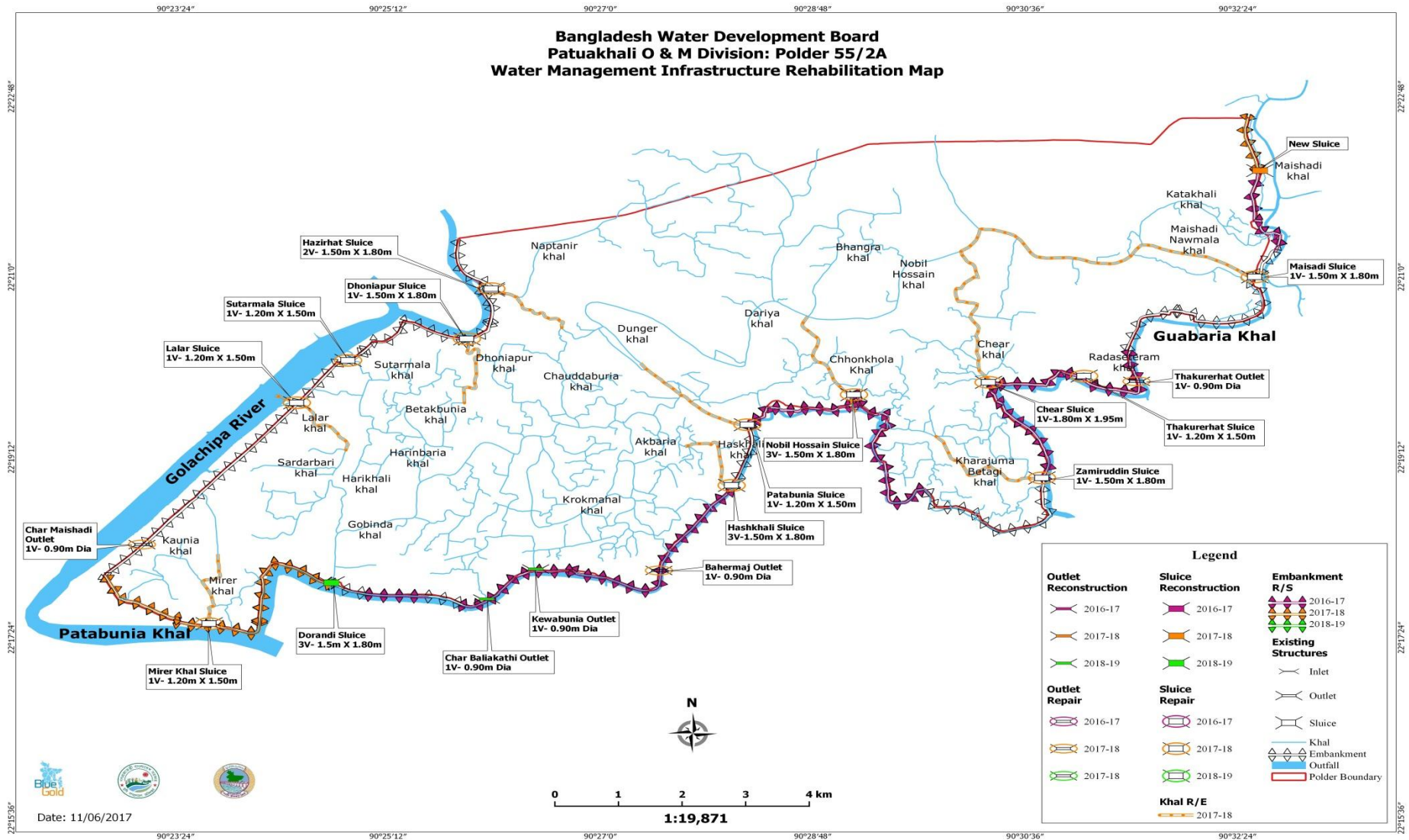


Figure 5: Proposed rehabilitation plan



#### 4.1.2 Operation and Maintenance and Internal Polder Water Management

After rehabilitation the Water Management Association (WMA) will play an important role in operation and maintenance, on the basis of an agreement between the WMA and the concerned BWDB field Executive Engineer, to be finalised before the execution of the rehabilitation works. The O&M agreement will identify all operation and maintenance activities in the polder and delineate sharing of the responsibilities between BWDB and WMA. Small routine maintenance works will be implemented by WMA; and larger routine and periodic maintenance works implemented by BWDB. However, the real sharing can be anything according to the terms of agreement and mutual concurrence. The O&M agreement may also identify BWDB resources in the polder that can be used by WMA to partly or wholly mobilize resources for operation and maintenance. Technical knowledge will be provided by Blue Gold through training.

Based on this, in the first year after completion of rehabilitation, WMA's along with BWDB and TA Team will make operation and maintenance plans, implementation budget and resource mobilization plan. The WMGs will develop Internal Polder Water Management plans as part of their WMG Action Plans. All plans will be implemented by WMOs and BWDB with direct assistance from TA Team. In the second year after completion, as part of the exit strategy, WMOs and BWDB will make their plans as usual, but TA team will provide only backstopping support as and when required. At the end of the second year, there will only be TA support for monitoring of O&M and internal polder water management, and WMO's along with BWDB will continue the O&M activities in line with the agreement.

In the meantime, the TA team will continue to work with the BWDB at different levels to find an institution basis which will encourage effective commitment to and action for fulfilling the BWDB commitments under the O&M agreement with the WMA.

Sl. No	Activity	Time Frame	Responsible Actors	People to involve
1.	Formation of Labour Contracting Societies (LCS) a. Formation and Training of LCS b. Mobilize for earthwork c. Stimulate women participation	2017-2020	OCWM, Zonal & Polder TA staffs	WMO members and vulnerable groups including women willing to do earthwork
2.	Implementation works like Embankment Re-sectioning/Construction, Khal Re-excavation and Repair/Construction of Structures	2017-2020	BWDB, TA- WRM Team	LCS, WMA Monitoring Committee, WMA/WMG Executive Committee, BWDB
3.	Support the monitoring of implementation works by LCS/Contractor and issue Satisfactory Completion Certificate after completion of the works.	2017-2020	TA- WRM Team, Socio-Economists, CDFs	WMA Monitoring Committee
4.	Participation in routine O&M: a. Signing of O&M agreement b. Follow O&M training by Blue Gold c. Polder inspection and identification of O&M requirements d. Plan O&M activities e. Resource Mobilization for O&M	Before implementation of O&M works	BWDB, TA-Socio-Economists, CDFs and WRM Team	WMA and WMG Executive Committee, BWDB
5.	Internal Polder Water Management: a. Identify WMGs interested to work along Community Agricultural Water Management (CAWM) model. b. CAWM planning c. CAWM implementation d. Monitoring of CAWM	After main WRM infra is implemented: 2017-2020	SAAOs(DAE), XOs (BWDB), TA-Socio-Economists, WRM Team, CDFs	WMA and WMG Executive Committee
6.	Back-up support in the yearly joint polder inspection and assessment of O&M requirements, CAWM by BWDB and WMA	2017-2020	BWDB, TA-Socio-Economists, CDFs and WRM Team	WMA and WMG Executive Committee, BWDB

## 4.2 Institutional Framework for Participatory Water Management

Activities to strengthen the Institutional Framework for PWM have been planned with multi-fold objectives: (i) to help the WMOs to become active and sustainable organizations, and able to participate responsibly in polder development activities (ii) to stimulate effective women's participation (iii) to orient Union Parishads and other relevant stakeholders to support planned activities effectively.

Sl. No.	Activity	Time Frame	Responsible Actors	People to involve
1.	WMO (WMG & WMA) Formation & strengthening Activities Arrange registration with BWDB and conduct new elections: <ol style="list-style-type: none"> <li>Form Ad Hoc Committees</li> <li>Review and update/amend by-laws in accordance with Participatory Water Management Rules 2014</li> <li>Update records/books/ ledgers</li> <li>Firming-up membership list and membership enrolment with at least 55% households represented and increase female membership to at least 40%</li> <li>Prepare and conduct new elections for Executive Committee</li> <li>Register WMGs &amp; WMAs with BWDB</li> </ol>	2015-2017 onwards	OCWM, TA-CDFs, ZSEs	WMOs, BWDB
2.	Organize various training for WMO Strengthening: Organizational Management and Leadership, Financial management, O&M, Ensure the formation of sub-committees after training: O&M, Business, Audit.	2017-2018 Onward	TA-CDFs, ZSEs. Training Team, WRM Team	WMOs, BWDB,
3.	Stimulate WMOs to identify BWDB unutilized land and water bodies and to apply to XEN for obtaining use-right of those resources for income generation	2017-2018 Onward	WMOs, BWDB	WMOs, BWDB,
4.	Stimulate women participation in elections of WMA and WMG committees and increase their membership to at least 33% of which at least one in key-position through Gender & Leadership training for males and females	Next elections, regular follow-up	TA-CDFs, Gender Expert and Training Team	WMOs, OCWM
5.	Actively share PDP with Union Parishad (UP), organize orientation training for UP and stimulate WMG members to participate in various UP committees to advocate for financial and in kind support: <ol style="list-style-type: none"> <li>Union Development and Coordination Committee</li> <li>UP Standing Committees</li> <li>Ward Sabhas (to contribute in planning, budgeting of UP)</li> <li>Union Disaster Management Committee</li> <li>Also stimulate UP members to participate in WMO meetings</li> </ol>	2016-2017, with regular follow-ups	TA-CDFs, Institutional Expert, and Training Team	UP and WMG EC members, UZ officers
6.	Support WMGs with WMG Action Plans (WAPs) formulation and implementation: <ol style="list-style-type: none"> <li>formulation of WAPs</li> <li>ensure incorporation of WMG strengthening plan, O&amp;M plan, Gender action plan, Business dev. plan,</li> <li>organizes regular meetings with WMGs to update WAPs.</li> <li>Also invite UP members to attend meetings.</li> </ol>	2017-2018 onwards	OCWM, TA-CDFs and ZSEs, Gender expert	WMGs, UP, BWDB
7.	Stimulate as much as possible participation of WMG members in Farmer Field Schools (FFS), especially females and vulnerable members, ask regular feedback on preferred FFSs.	2015-2017 Onward	DAE, TA-CDFs	WMGs, DAE
8.	Organise regular discussion / coordination meetings with other organisations working in polder area	2016-2020	TA-Zonal team	WMOs, UP, BWDB, DAE

### 4.3 Agricultural and Marketing Services

The agricultural production and business development aspects of the Development Action Plan focus on the development potentials and required actions in relation to crops, fisheries and livestock while taking into account development potentials of specific value chains.

Sl.	Activities	Time frame	Responsible actors	People to involve
1	Activities to improve crop production: a. FFS on crops (Rice and other field crops by DAE), homestead garden (vegetables) and nutrition, dyke vegetable production b. Year round cropping intensity demo. by TA c. Women focused FFS d. Nursery management training e. Demonstrations / trials on summer vegetables f. Demonstration and trial on potential crops and vegetables g. Field day and farmers rally as follow-up of FFS and trials h. Participatory action research on underutilized and potential vegetable and fruit cultivation at homestead level	2016-2020	DAE, TA-CDFs, Agriculture Expert, Polder Coordinator, Agriculturists Bangladesh Agricultural University (BAU)	WMG and WMA members
2	Activities to improve livestock production: a. Livestock vaccine cold chain at WMG/WMA level c. Community Animal Health Worker training d. Recruitment of Farmers Trainers e. Training of Farmers Trainers f. Motivational tour for good knowledge sharing	2016-2020	DLS, TA-CDFs, Polder Coordinator, Jr. Master Trainers, Livestock Experts, Agriculturists	WMG and WMA members
3	Activities to improve fish production: a. Community led Fisheries c. Recruitment of Farmers Trainers d. Training of Farmers Trainers e. Training for Nurserers f. Fish sanctuary	2016-2020	DoF, TA-CDFs, Agriculture Experts, Polder Coordinator Fish Experts, Agriculturists	WMG and WMA members
<b>Business Development</b>				
1	Select or prioritize value chains for analysis (VCA) and consult the actors for VCA	2017-2020	BDCs & Polder Coordinator	Relevant actors
2	Collective Action (Economic)	2017-2020	BDCs, Polder Coordinator & CDFs	Relevant actors
3	Workshop with WMO to promote C/A Business planning and /or private Co.	2017-2020	TA-CDFs, BDCs, Project Extension staff	WMGs, DAE, DLS, DoF
4	GL+CF+RF+PF+FT linkage workshop	2017-2020	TA-CDFs, BDCs and CFs,RFs,FTs	WMG
5	Promote collective actions by WMG members to overcome problems related with low quality inputs (fingerling/seed etc.), high price of input and low price of produce	2017-2020	TA-CDFs, BDCs	WMG, private company, other NGOs
6	Follow-up agricultural and business activities on the basis of farmer's needs	2017-2020	DAE, TA-Project Extension Staff, Project Value Chain staff	WMG and FFS members
7	Input Trader Capacity Building	2017-2020	Outsourcing Training Unit, TA-CDFs & BDCs	Relevant actors
8	Linkage meeting/workshop/seminar with VC actors	2017-2020	TA-CDFs, BDCs and CFs,RFs,FTs	Relevant actors
9	Actor Meeting (Linkage/discussion/negotiation/intervention designing)	2017-2020	TA-CDFs, BDCs and CFs,RFs,FTs	Relevant actors

#### 4.4 Environmental Sustainability and Disaster Risk Reduction

The environmental sustainability and DRR aspects of the Development Action Plan focus on: i) compliance with social and environmental management regulations; and ii) strengthening DRR activities.

Sl. no	Activities	Time frame	Responsible actors	People to involve
1	Awareness on Disaster Preparedness and WatSan through WMOs regular meeting and day observance programs	2017-2020	WMOs	Upazila PIO office, BRAC WASH program, DPHE, UP, Upazila Health Office
2	Conduction of EIA and obtaining Environmental Clearance Certificate	2017-2018	Outsourced Organization/Consultant	TA- Env. Expert, Polder Team, Zonal Team
3	Environmental Compliance Monitoring and reporting to DoE	2018-2020	TA- Env. Expert, Polder Team, Zonal Team	BWDB
4	Reconstitution of UDMCs and provide them capacity building support on disaster management	Jan-Feb, 2018	Polder Team	TA- Env. Expert, Zonal Team
5	Implementation of CBDRR and ESMP	2017-2020	WMOs	Upazila PIO office, BRAC WASH program, DPHE, UP, Upazila Health Office
6	Training to Env. and DRR Counsellors and UDMCs on Env Safeguard and Dis.Mgt.	July 2017 to Dec 2018	Hired SPs/Training Team	Polder Team, Zonal Team, and Env. Expert
7	Organize manual removal of hyacinth by villagers (through WMA/WMGs) where there is large scale hyacinth issue.	July 2017 to June 2018 (during dry months)	WMA/WMG, Upazilla, UP	Polder Team, Engineer team and Env. Expert
8	<b>Awareness raising program</b> a. Discussion on using fertilizer and pesticide use, and reducing indiscriminate fishing practices from the natural wetlands at WMG meeting, FFS & MFS session and FFD b. National and International Day observance related to environment and DRR (i.e. World Environment Day, National Disaster Preparedness Day, and International Day for Disaster Reduction etc.)	July 2017 to June 2020	Env. and DRR Counselors, TA-Polder Team	Env. Expert, Zonal Socio-Economists

# 5. Planning Timeline

## Blue Gold Program, BWDB Polder Completion Timeline

Polder - 55/2A

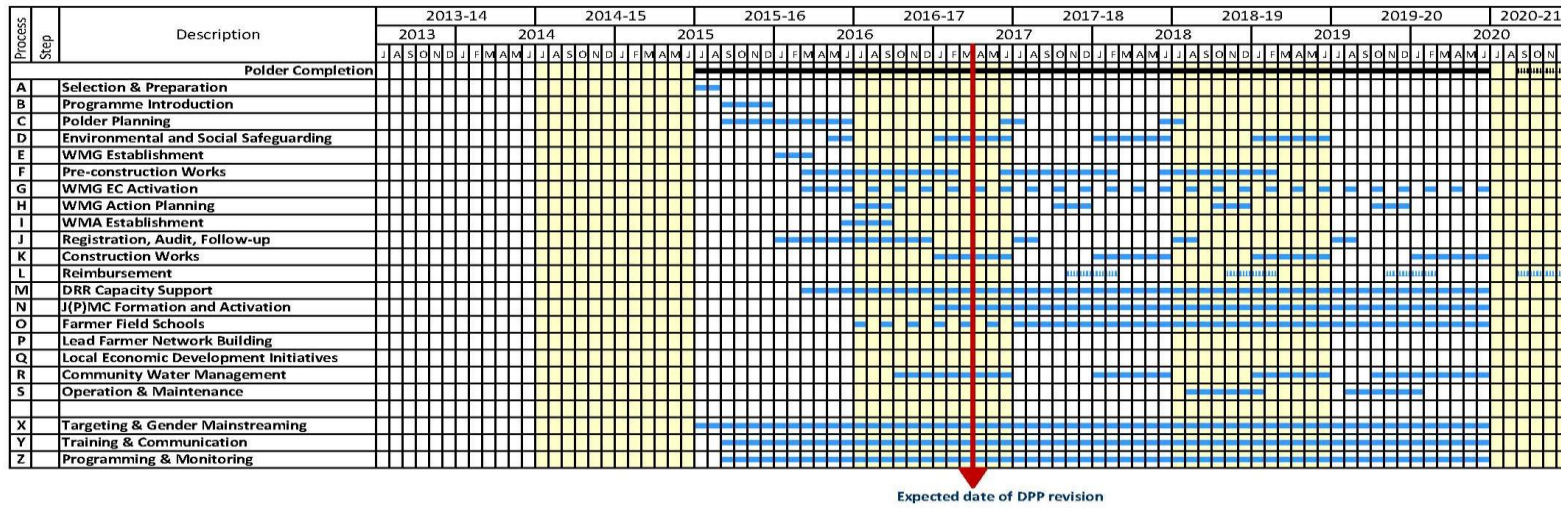


Figure 6: Polder Completion Timeline

## 6. Polder Budget

The overview of the estimated allocated budget for the polder activities in polder 55/2A is presented in the following Table 6.

**Table 6: Polder 55/2A Budget**

Sl.	Task Name	Total Amount	
		BDT* <sub>x100000</sub>	EUR** <sub>x1000</sub>
1	<b>Institutional Framework for Participatory Water Management</b>	03.20	03.76
2	<b>Main Infrastructure</b>	1544.00	1816.47
3	<b>Internal Water Management</b> <i>(Polder-wise budgets are based on an average amount per CAWM-site. In reality budgets will vary per CAWM-site)</i>	25.00	29.40
4	<b>Agriculture &amp; Marketing Services</b> <i>(Actual polder-wise budgets will be higher as exact # FFS per polder will be determined later, estimated DAE contributions have been included in these estimations)</i>	50.00	58.82
5	<b>Environmental &amp; Social Management/Disaster Risk Reduction (DRR)</b>	30.00	35.29
6	<b>Training</b>	34.80	40.94
	<b>Total:</b>	<b>1687.00</b>	<b>1984.68</b>

Note: Exchange rate is 1Euro=85 BDT

## Appendix 1. PDP Formulation Process<sup>2</sup>

The Blue Gold Program makes use of the 6-step planning approach described in the Guidelines for Integrated Planning for Sustainable Water Resources Management (IPSWARM) that was adopted by the BWDB in 2008 for its medium sized existing Flood Control and Drainage schemes. Polder Development Plans are the 4<sup>th</sup> step which follows after the participatory data collection and needs assessment (step 2) and the formation of WMOs (step 3).

In the PDP Formulation Process one can distinguish the following activities/tasks and their outputs (see Figure 6)

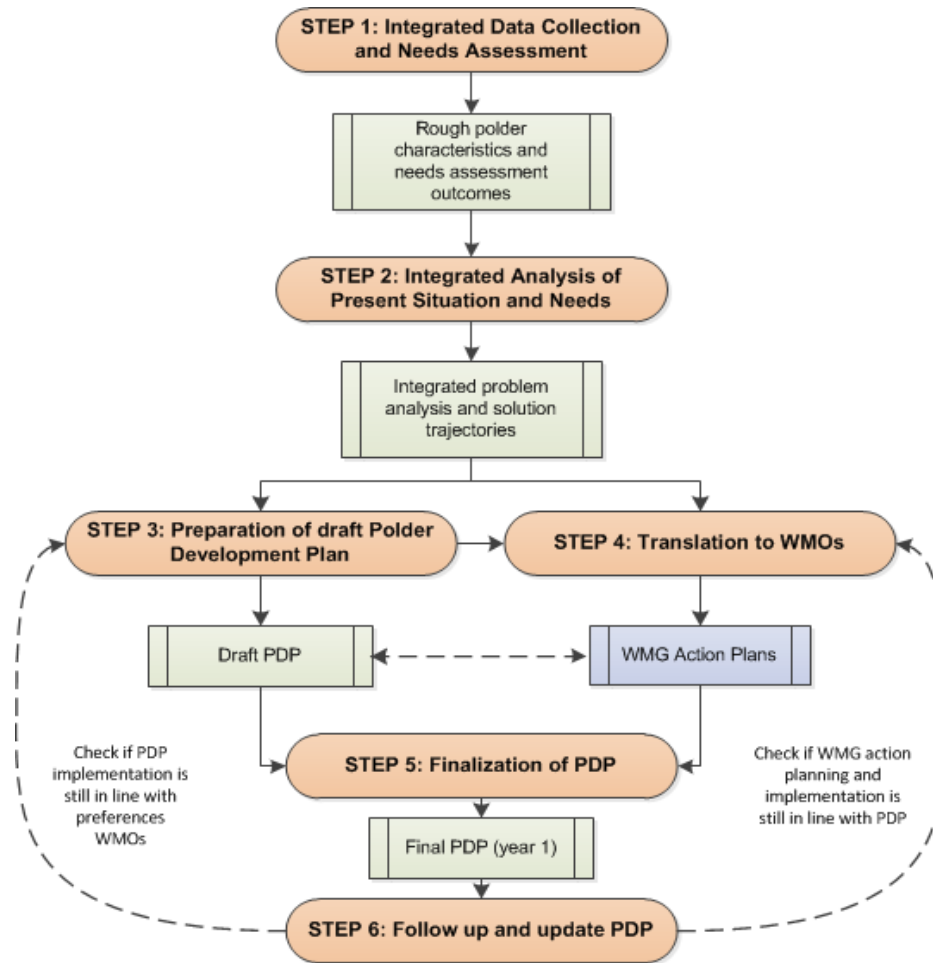


Figure 7: The steps of the PDP Formulation Process

### Explanation of the different steps:

**STEP 1: Integrated Data Collection and Needs Assessment:** For the purpose of planning, data is collected through various methods: collection of existing information from governmental departments, observations in the field and informal interviews with people living in the polder area and key stakeholders, focus group discussions, consultation meetings, engineering surveys, agricultural surveys and value chain mapping and analysis. The various components do their field data collection individually, but coordinate their work to avoid overlap, gaps and misunderstanding among WMOs. The results and outcomes of each

<sup>2</sup> For the preparation of this PDP, focus group discussions were conducted with the existing WMOs and UPs. Polder Team and Zonal Experts were actively involved in the process of specific data collection. In the case of polder 55/2A, after drafting the PDP it was shared with the representatives of WMOs and UPs for data validation and updating

field visit, meeting, interview or focus group discussion are recorded. Data among others includes the Integrated Needs Assessment executed by component 1 and 2 (WMO strengthening); engineering survey details collected by component 2 and data collected by component 4 in relation to the value chain selection and analysis. The rough data are managed by the GIS specialist and used to generate specific geo-information maps or figures, which are published on an open source website (Lizard Portal)

**Outputs:**

- Rough data of polder characteristics
- Needs assessment report

**STEP 2: Integrated Analysis of Present Situation and Needs:** The integrated data collection and needs assessment is used to describe the present situation of the polder by summarizing the collected info in tables, figures, pie charts and maps with supporting text, as one of the core chapters of a PDP. The present situation in combination with the Needs Assessment is an input for a joint SWOT (strengths, weaknesses, opportunities, threats) analysis workshop within the Blue Gold Team. The outcomes of this SWOT exercise are used in a second workshop at polder level to formulate solution trajectories and activities for polder development. Extra attention is paid to address the severity of problems and the potential of opportunities while selecting activities. The fact that Blue Gold has a limited scope and budget, and cannot address all needs, only those connecting to program objectives and those financially feasible are taken in consideration.

**Output:**

- An integrated problem analysis and solution trajectories

**STEP 3: Preparation of draft Polder Development Plan:** After the integrated analysis, a draft Development Action Plan (including actions related to strengthening WMOs; water resources management; agricultural production; business development; sustainable environmental management; community based disaster risk management; gender and institutional strengthening) is developed. The Blue Gold Team organises an internal meeting to make sure the planned activities across components are coherent and support each other and cross-cutting issues are integrated well (avoid overlaps and gaps). The draft Development Action Plan is integrated with the present situation and the integrated problem analysis and solution trajectories to result in a draft PDP.

**Output:**

- Draft PDP

**STEP 4: Translation to WMOs:** While the draft PDP is being developed, WMG Action Plan (WAP) meetings are organised for all WMGs. The proposed PDP activities of Blue Gold are presented and the potential actions for the community are discussed. The Blue Gold staff support the WMG to prepare a WAP on the basis of their preferred actions and the draft PDP.

**Output:**

- WMG Action Plans (WAPs)

**STEP 5: Finalization of PDP:** On the basis of feedback provided by the WMA and possibly other stakeholders like UP, the Blue Gold Team finalises the PDP. The PDP is forwarded to interested stakeholders and a limited campaign for awareness creation at local level is planned and carried out.

**Outputs:**

- Final PDP

**STEP 6: Follow-up and update of PDP:** Field staff of Blue Gold initiates the implementation of activities with WMOs. Regular follow-up meetings are held, participatory monitoring to keep track of implementation is stimulated and the WAPs are regularly updated by the WMGs. Furthermore the developments of specific value chains, gender issues, disaster risk reduction and environment actions, which are to be incorporated in the WAPs, are discussed. If required, PDPs are updated after 1 or 2 years.



## Appendix 2. Water Management Infrastructure of Polder 55/2A

### Embankment

Total length of the embankment around polder 55/2A is about 45 km. The entire embankment is an interior embankment with a crest width of 4.27 m, marginal embankment with a crest width of 2.44 and crest level of 4.30 m PWD.

### Sluices

There are 13 drainage/ flushing sluices in this polder:

Sl.	Name of Sluices	Number of Vents	Size, (mxm)	Location, km
1.	Hazirhat Sluice	2-V	1.5x1.8	Ch- 1.0
2.	Dhoniapur Sluice	1-V	1.5x1.8	Ch- 2.2
3.	Shutarmala sluice	1-V	1.2x1.5	Ch- 4.0
4.	Lalar Sluice	1-V	1.2x1.5	Ch- 5.7
5.	Mirer khal Sluice	1-V	1.2x1.5	Ch- 11.4
6.	Dhorandi Sluice	3-V	1.5x1.8	Ch- 15.2
7.	Haskhali Sluice	3-V	1.5x1.8	Ch- 22.8
8.	Patabunia Sluice	1-V	1.2x1.5	Ch- 23.97
9.	Nobil Hossain Sluice	3-V	1.5x1.8	Ch- 26.0
10.	Zamiruddin Sluice	1-V	1.5x1.8	Ch- 32.0
11.	Chear Sluice	1-V	1.8x1.95	Ch- 34.0
12.	Thakurerhat Sluice	1-V	1.2x1.5	Ch- 36.10
13.	Moishadi Sluice	2-V	1.5x1.8	Ch- 41.2

### Drainage Outlets

There are 5 outlets in this polder:

Sl.	Name of Outlet	Size, mm	Location, km
1.	Bahermuj Outlet	900	Ch- 20.9
2.	Kewabunia Outlet	900	Ch- 18.8
3.	Char Baliakathi Outlet	900	Ch- 17.7
4.	Char Moishadi Outlet	900	Ch- 9.2
5.	Thakurerhat Outlet	900	Ch- 37.4

### Khals

There are about 61 recognizable khals with 1 or more branches and having a total length of about 211.0 km, which are shown in Figure 2.