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Polder Development Plan (PDP) – DRAFT

Polder 28/1

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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
CAWM	Community Agricultural Water Management
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
IPs	Input Providers
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
MFI	Microfinance Institutions
MFS	Market Oriented Farmers Field School
NGO	Non-Governmental Organisation
O&M	Operation and Maintenance
PCD	Program Coordinating Director at BWDB
PD	Program Director at DAE
PDP	Polder Development Plan
PSF	Pond Sand Filter
PTO	Power Tiller Operator
PWMR 2014	Participatory Water Management Rules 2014
RF	Resources Farmers
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 Team of Blue Gold Program
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 (LGIs)	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 in the polder. It is formed by representatives of all WMAs.
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.

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 realized 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 institutions¹.

Objectives of a Polder Development Plan

1. 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;
2. A clear outline for WMOs what type of activities Blue Gold is providing, which helps them to develop their own WMG Action Plans (WAP);
3. 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); and
4. 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.

¹ 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 28/1 was constructed in 1965-70 by the Bangladesh Water Development Board (BWDB) and later on was rehabilitated under the KJDRP project from 1996 to 2002. The polder covers a big portion of Gutudia union under Dumuria upazila and small portion of Jalma union under Batiaghata upazila of Khulna district. The polder is surrounded by the upper Shoilmari (west), lower Shoilmari (south, via 28/2) and Moyuri (east) rivers. The characteristics of the polder can be found in Table 1 and the location map of the polder in respect to Upazilla and Union headquarters is shown in Figure 1.

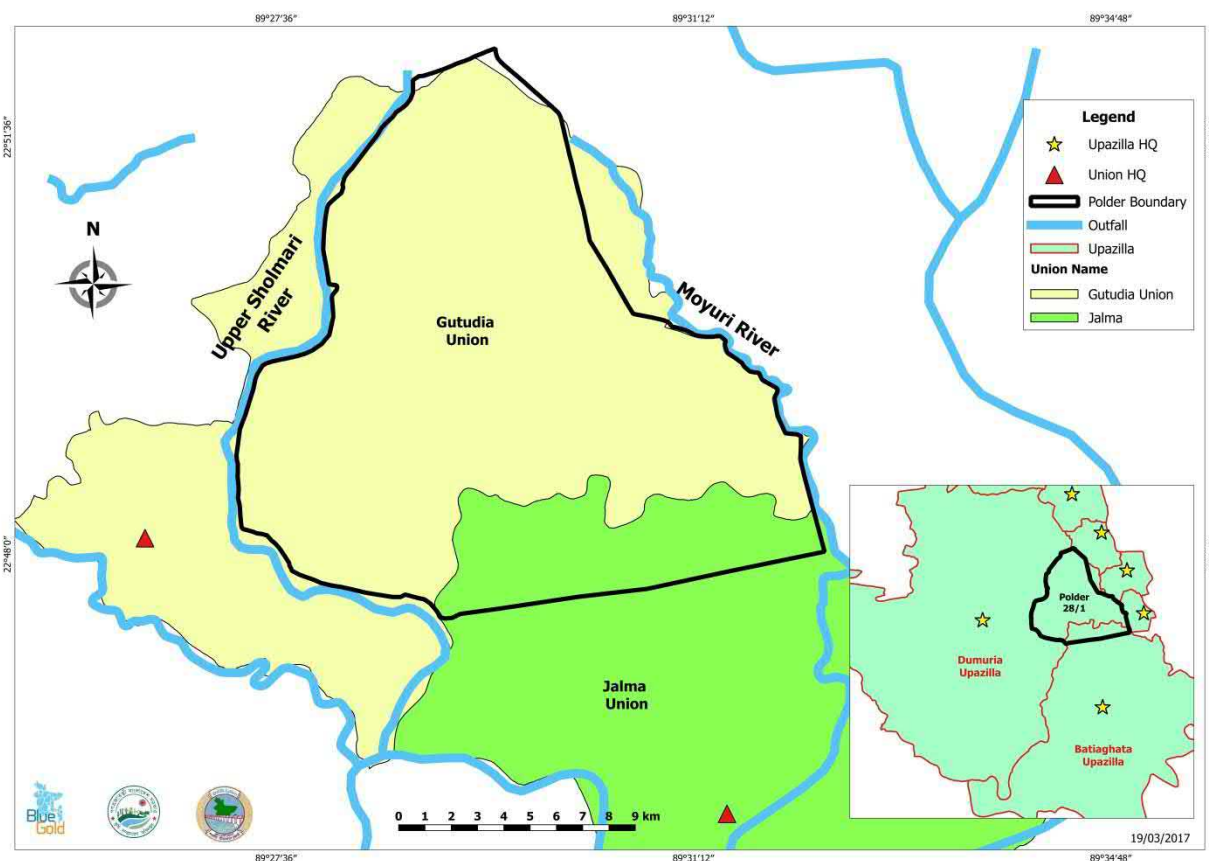


Figure 1: Location of Polder 28/1 in Dumuria and Batiaghata Upazila under Khulna District

Table 1: Main Physical and Demographic Characteristics of polder 28/1

Characteristics	
Included Upazila(s)	Part of Dumuria and Batiaghata
Included Unions	Part of Gutudia and Jalma
Polder boundary (in km)	32.200
Total number of Mouzas	12

Total polder area (in ha)	5600		
Total number of households in the polder	5519		
Total number of catchments	07		
Total cultivable land (in ha)	4500 ha	High land: 25% Medium-high land: 10%	Low land: 65%
Population	20862	Male: 10522	Female: 10340
Literacy rate	70%	Male: 50%	Female: 20%
Major occupations	Agriculture: 80%	Agricultural labour: 5%	Business: 5% Others 10%
Economic condition	Rich: 5%	Middle class: 60%	Poor: 35%
Status of seasonal labour migration	Permanent labour migration is very limited due to the polder is very adjacent to Khulna city corporation, So North-East part of polder area's labour frequently goes to town for doing some cash for work related activities. Beside some of labour goes to outside of polder for involve in T-Aman rice harvesting activities. However, 4-5% labour migrate to outside for certain period, but some of none-agricultural labour frequently move to outside for engage as settlement worker, rickshaw-pulling, and some are engage small business by door to door selling		
Status of internal road communication	Internal road communication is very well and directly linked to two high way roads. The greatest part of the internal road network is carpeted road. Some roads are HBB & BFS. Few earthen roads exist inside the polder. In side the polder 18.5 km road is carpeted, 27.75 km is brick made and 48.75 km is earthen road.		

2.2 Water Resource Management and Infrastructure

Main features of the water resource management and infrastructure in polder 28/1 are highlighted in the Table 2. Figure 2 shows the existing water management infrastructures including khals in polder 28/1. Further details can be found in Appendix 2.

Table 2: Main Features of Water Resource Management and Infrastructure in Polder 28/1

Features			
Length of embankment (in km)	23.18 km (including road embankment)		
No. of drainage/flushing sluices	07	Good condition: 00	Poor condition: 07
No. of inlets	0	Good condition: N/A	Poor condition: N/A
Water Retention Structure (WRS)	01	Good condition: 00	Poor condition: 01
No. of (drainage) outlets	01	Good condition: 00	Poor condition: 01
No. of major khals	34 (7 major and 27 secondary)		
Length of major khals (in km)	72 km		
Main outfall rivers, drainage khals and sluices	<p>Main rivers: Moury on the east, Upper Sholmari on the west and Sholmari River (through polder 28/2).</p> <p>Main drainage khals: Koiyar Khal, Panchur khal, Nalar Khal, Pashkhali khal, Rayer Mahal Khal and Kuloti khal.</p>		

	Sluices: Kalighat Sluice, Khoiramari Sluice, Nalar Sluice, Pashkhali Sluice, Punchur Sluice, Kuluti Sluice, Rayermohol Sluice and Rajband WRS.
Situation of tidal and river flooding	There is no tidal and river flooding effect in polder 28/1. There was no evidence overtopping of the embankment. But there are internal floods due to heavy rainfall in monsoon and upland flow through bridges and culverts in the north and northeastern boundary.
Locations with water logging and siltation.	Northeast and middle part of this polder (major part part Beel Pabla Mouza, Char Kalipur, Shibpur, Chak Ashankhali and Kuloti), are waterlogged due to less drainage facilities, cross dams, private structures, land grabbing etc.. Most of the sluice gates are poorly functioning because of interventions and poor condition of gates. Two sluices are inactive because of private cross dams on the river side channel.
Most river erosion prone area	No such area was reported.
Other relevant water issues	Some times sewage from Khulna city area enters the polder through Aronghata bridge and some other small bridges and polute the water in the polder, which badly affects the fish culture and other household activities.
Key challenges in effective water management	<ol style="list-style-type: none"> 1. Rapidly growing the urban area on the eastern side is now now big challenge for improvement of the internal water management; 2. Influential people are already occupied many khals and fully control the sluice gates; and 3. Silted khals and inactive as well as poorly functioning sluice gates.
Challenges in planning construction of water infrastructures within polder area	<ol style="list-style-type: none"> 1. Culture fish farmer (gher owner) and influential people who illegally occupied khals may create obstructions to planning of water management infrastructure rehabilitation works. 2. Not functioning and dormant WMG/WMA are now big challenge for for proper rehabilitation and water management
Current internal polder water management practices	Sluice gates are fully controlled and operated by Union Parishad and some influential people.
Overall condition of internal polder water management	Very poor
Opportunities for internal polder water management	<ol style="list-style-type: none"> 1. Reorganizing WMOs; 2. Re-excavation of major khals; 3. Repair or re-construction sluice gates; and 4. Improved agricultural practices.

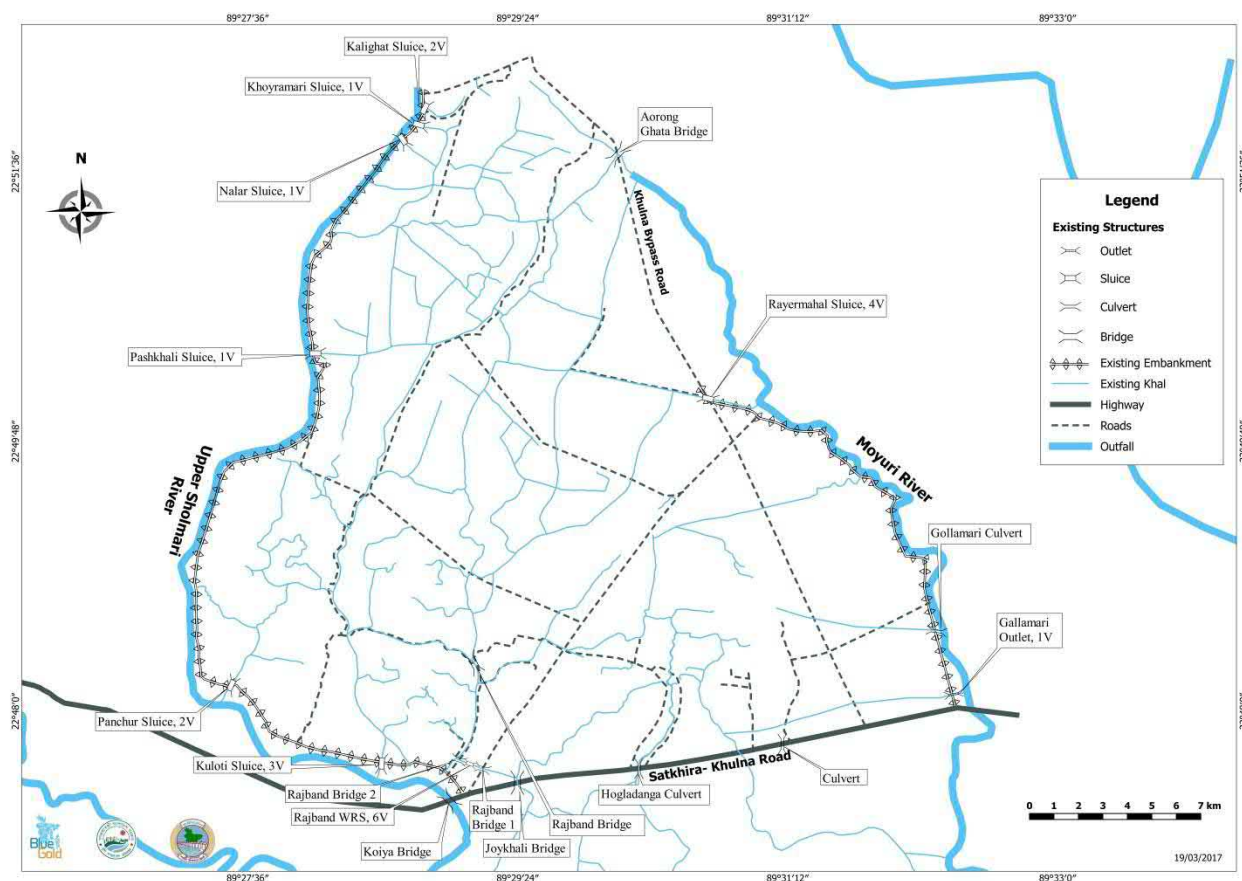


Figure 2: Map of Polder 28/1 showing the existing Water Management Infrastructure

2.3 Institutional Framework for Participatory Water Management

The main institutional actors in polder 28/1 are Union Parishad (UP), its Wards, various Local Governmental Line Departments, a number of 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 28/1

Characteristic			
Number of WMGs	14	Registered: 12	Non-registered: 02
Members of WMGs	298	Female: 80	Male: 218
HHs being part of WMGs	292		
Number of WMAs	1	Registered: 1	Non-registered: 0
Female representation in WMGs	36%		
Total deposited fund (BDT)	12000		
Total savings of WMGs (BDT)	Yet not started		
Total number of WMGs with O&M fund	Yet not started		

Names of projects and organisations with similar /related activities	<ul style="list-style-type: none"> • In our polder area some likeminded project doing the similar activites; • SaFal project is working on nutrition and fish value chain activities which locally implemented by Uttaran; • Rice, wheat, and jute seed production, preservation and distribution project implemented by DAE; • SCDP project is working on vegetable and fruit production and marketing which implemented by DAE; • NATP project working on field crop production and networking which implemented by DAE; and • IFMC project working on business development and collective action activities which implemented by DAE
Existing WMOs linkages with other stakeholders	Not yet done
Number of WMGs member including in UP standing committee	3
O&M agreement signed with BWDB	Not yet done
Current participation of WMOs in O&M	Moderate. WMOs do it as per their need with their own fund.
Existing conflicts on water management	<ol style="list-style-type: none"> 1. Some time make conflict between low and high land farmer for internal water management in terms of drain in and drain out in the polder; 2. Some influential peoples make conflicts among them to control sluice gate operation for their own purpose; and 3. In some cases, culture fisher illegally establish temporary cross dam on the khal for that makes conflicts between fishermen and farmers.
Key challenges in strengthening PWM	<ol style="list-style-type: none"> 1. Silted khals fully interrupt the internal water management system; 2. Some khals illegally occupied by influencing people, who fully closed the water flow system by set up temporary cross dam; 3. Smoothly operate the water infrastructure which fully controlled by influencing people; 4. Inactive WMGs/WMOs; 5. Political influence; and 6. Leadership development
Key challenges in relation to women participation	There is no any major challenges in polder 28/1 in relation to women participation but still now have some challenges for inclusion of rich family's women in WMG/WMO and another is who already got participation those are not play the active role in WMG in terms of taking good decision .
Key opportunities in PWM	<ol style="list-style-type: none"> 1. Strengthening WMG/WNA capacity in terms of Organizational management and leadership development; 2. Introduce CAWM activities; 3. O & M activities continue by active participation of WMG/WMA; 4. Likage and coordination platform among the other institutional actors could be further strengthened; and 5. Initiate collective action

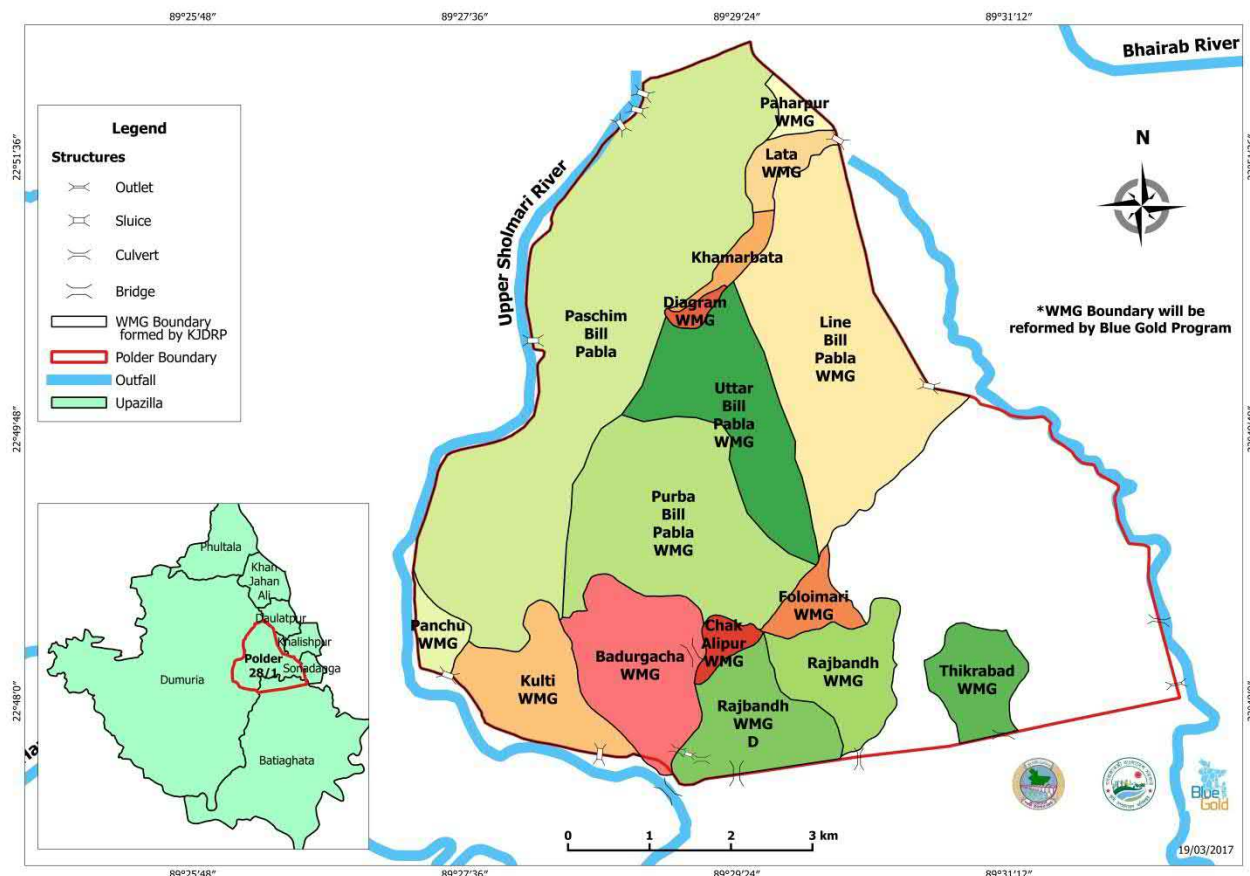


Figure 3: Name of WMG and WMA areas in Polder 28/1

2.4 Agricultural and Marketing Services

In polder 28/1, 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 can be found in Table 4. The main markets of polder 28/1 are shown in Figure 4.

Table 4: Main characteristics of Agricultural and Marketing Services in polder 28/1

Characteristic	1. Local T.Aman	2. Vegetable	3. Sesame
Main crops (top three)	1. Local T.Aman	2. Vegetable	3. Sesame
Current most common cropping pattern	Boro- Fish-Fish (75%) with dike vegetable Boro – Fallow – T-Aman (10%) Vegetable- Vegetable- Vegetable (5%) Potato – Vegetable- Vegetable (5%) Spices – Vegetable – Vegetable (5)		
Current cropping intensity	200 %		
Main vegetables	Okra, Bitter gourd, Sweet gourd, Bottle gourd, Snake gourd, Ash gourd, Ridge gourd, Indian spinach, Red Amaranth, Yard-long bean, Country bean, Cucumber, Chilli, Brinjal, Patato Tomato, Cauliflower, cabbage		

Main fruits	Mango, Guava, Sapodilla, Grape Fruit, Wood apple, Coconut, Jackfruit, Lemon, Banana and Jujube
Available agricultural machinery	Polder 28/1 has sufficient agricultural machineries to manage the agricultural activities. Specially farmers used power tiller, thresher machine, irrigation pump, spray machine etc. In side the polder area total of 40 semi deep tube-well, 40 power pump, 84 power tiller, 187 thrasher machines, and 900 low lift pump are available to provide farm mechanization service to the farmers as their requirement.
Present irrigation practices	In polder 28/1 approximately 55% lands come under the irrigation facilities especially for cultivate Robi crops (Boro rice and Robi vegetable). Mainly surface water (cannel, Gher and pond water) and deep water is used for irrigation. Total of 940 irrigation machine with Low Lift Pump, and 800 semi deep tube-well and manmade agri equipment use for properly managed the irrigation facilities.
Availability of inputs	Seed, fertilizer, pesticide, farm machineries, irrigation facilities and new agricultural technology & information is the main input of agriculture sector. Most of the input company and private sector have been working in this upazilla and also they are established close connection with farmers through the dealership system. In side the polder area total of 7 dealer and about 35 retailer are available for providing input services.
Current knowledge on proper input use	Some of farmers have lack of knowledge to identifying quality seed especially on rice seed. In rice production, farmers have not follows the actual fertilizer doze in all required fertilizer. Beside vegetable farmers also used the high volume of pesticide and farmer always used high number of seeding (8-10 plants) for T-Aman rice production.
Important business trend in crop production	Vegetable, Boro Rice, Golda, White fish and fruit production are rapidly increasing. Farmers sell about 90-100% 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 product.
Key challenges in agriculture	<ol style="list-style-type: none"> 1. Major percentage land is irrigated but during dry season water scarcity is the big challenge; 2. General lack of knowledge on improved agricultural production technology, in combination with a lack of extension services; 3. Due to poor drainage facilities, some areas created deep water logging and as a result after harvesting T-aman, field does not come under tillage condition; and 4. Farmers always use long duration local rice variety which is the major problem to cultivate the subsequent crop (Robi crops) in timely as a result huge amount of lands remains in fallow.
Percentage of households owning livestock	<p>65-70 % cattle</p> <p>20-25 % goats</p> <p>80-85% poultry</p>
Availability of inputs for livestock	The farmers of the polder 28/1 rear poultry (Broiler and layer). They collect poultry feed from the local agents/traders in polder area as well as Dumuria. They also collect the chicks from the local agents who collect from Khulna.. Other feeds for the livestock, the farmers collect from the local traders/markets.
Important business trend in livestock	There are some local buyers/business men who buy local poultry, goats and cattle from the farmers. The demand of local breed of poultry is increasing day by day as well as its price is increasing. The farmers of layer and broiler are selling eggs and broiler birds to the local agents, in the local hat/market in polder area and also in Dumuria Bazar.
Key challenges in	<ol style="list-style-type: none"> 1. Unavailability of improved breed for cattle;

livestock	<ol style="list-style-type: none"> 2. Lack of vaccines facilities and medicines; 3. No fodder cultivation; and 4. Poor housing and management of livestock.
Percentage of households involved in fish culture	80 % areas are covered by fish culture (White fish and Golda)
Types of fish	Fish farming thorough gher is being widely practiced in the Polder. Golda and others mixed fish cultivated in the gher.
Availability of inputs	There is no hatchery in the area. Fish feed is available in the local market of the polder and also in Dumuria.
Important business trend in fisheries	The fish farmers sell their fishes and prawns, Golda etc. in the market Baniakhali, Dumuria and Gollamari. Some traders also procure fishes from the farmer's pond directly by visiting the areas. The production of fishers are increasing day by day, as a result the market establishment is important.
Key challenges in fisheries	<ul style="list-style-type: none"> • Quality fingerlings are not available; • Low fish production; and • Infectious diseases of fish;
Existing extension services	Upazila Fisheries dept. provide training to the selected farmers.They have some local extension agents who provide technical support to the farmers.
Name and location of markets	East part of polder is very adjacent to city corporation and west part nearby the Upazila head quarter. So that farmers have easily access to the all type marketing facilities at Gallamari bazer, Mostafa matsha arot, Koya bazer, Solua bazer and Kultia bazer. Beside, well developed transportation facilities help to ensure product marketing to Koya bazer and Dumuria bazer.
Products provided	T-Aman, boro rice, golda, sweet water fish and vegetable are the major products of this polder and backyard poultry and different types of fruits are also the minor products.
Surplus destination of products outside polder	The Polder has mainly surpluses for Paddy, Vegetables, Backyard poultry, Golda and captured fish. Paddy mainly sold at Local Hats or via Koya and Dumuria to Outside polder. Vegetable directly goes to Hasem ali Arot or Sonadanga Arot, Khulna. Large fish producers can reach Dumuria fish Arot or Gollamari. Rupsaarot, Khulna.
Main value chain actors	Not yet selected
Key challenges in marketing	<ol style="list-style-type: none"> 1. Limited skill and knowledge on market orientation is the big challenge to establish networking among the actors; 2. Without forming producers group, it is very big challenges to initiate collective action; 3. No any big market inside the polder just located in the corner of the Polder; and 4. Unethically happened market fluctuation.

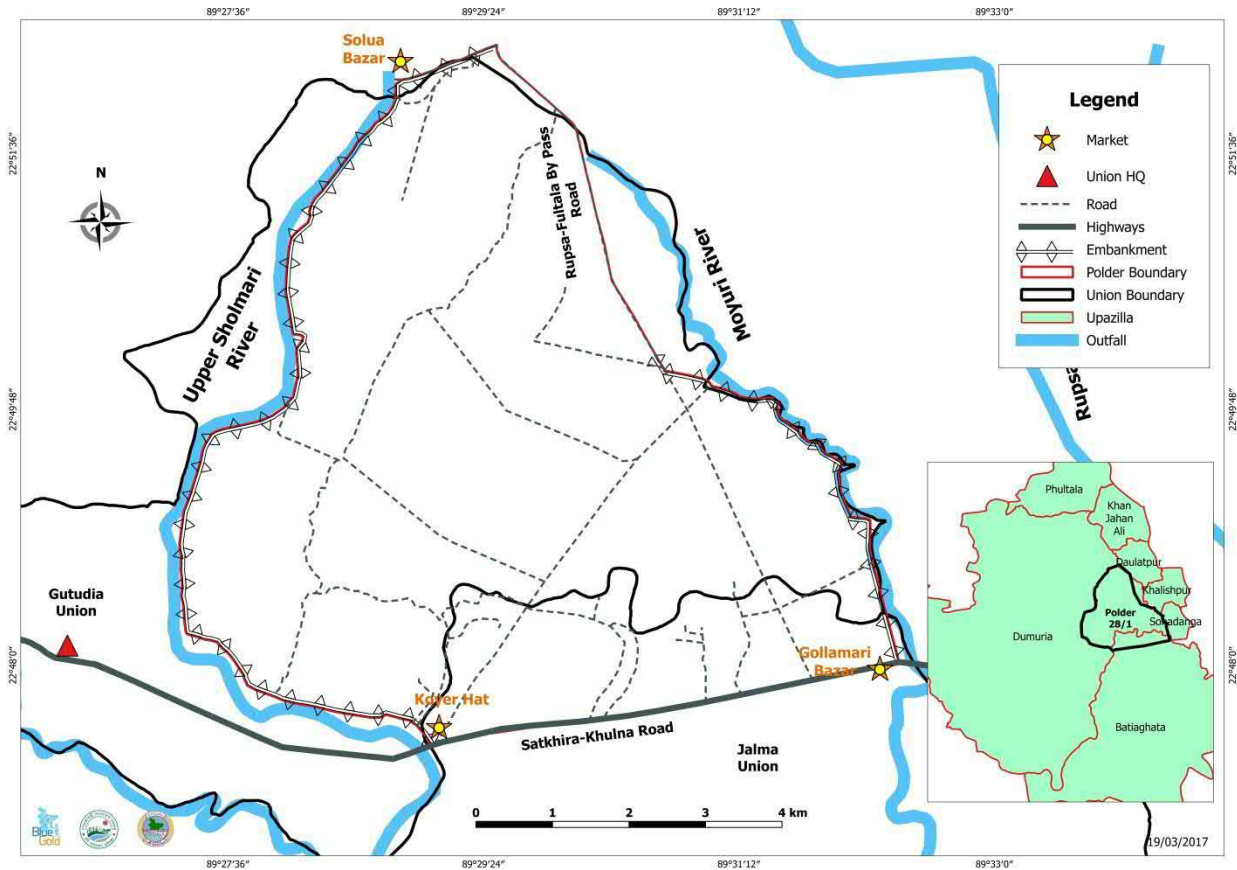


Figure 4: Markets and Union headquarters in Polder 28/1

2.5 Environmental Sustainability and Disaster Risk Reduction

Table 5: Main environmental and DRR characteristics of polder 28/1

Characteristics	
Existing environmental problems	<ol style="list-style-type: none"> 1. Drainage system is almost closed due to silting up and encrossing the internal khals. Among the 34 khals only 7 khals are active which contained year round water. On the other among 7 sluice gates 3 are blocked and 4 are functioning poorly which interrupt the internal water management system; 2. The uttor beel pabla, paschim beel pabla and lata khamarbari beel are mostly prone to water logging. It suffers people severely for 3-6 months (July-December) particularly for T-Aman and seed bed for boro rice; 3. As the polder is very close to Khulna city, so the polluted water and urban substances come from town and it is directly affect the crop field as well as very harmful for fish culture; 4. The women, children and elderly are at great risk of different water born and dietary diseases as becuses this areas is the duming ground (both by government and private) for urban waste and discharge; 5. Some time farmers widely used pesticide without maintain any precaution; and

	6. The east and southern part of the polder is converting into housing land, and north and western part of the polder is converting into fish farms. So the natural beel and khal are losing their habitat and ecosystem.
Common hazards	In polder 28/1, water logging and flooding still now major hazards. The local people not experienced with cyclone or tidal surge as the area is inside of Khulna-satkhira highway. In some areas faced draught problem but it should not consider as hazard condition.
Cyclone shelters	There is one school cum cyclone shelter located at the Line Beel Pabla
Obtained environmental clearance certificate (ECC)	Not yet conducted the EIA
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	Not yet
Members of WMOs included in UDMC	0
Opportunities for environmental and DRR activities	<ol style="list-style-type: none"> 1. There are good numbers of community groups have been formed by different NGOs/projects (i.e. SaFal, NATP, IFMC, BRAC etc.). As the groups are currently active so we could utilize the flatforms for dessimination of awareness messages on environment and DRR; 2. The Union Disaster Management Committees and Upazila Disaster Management Committees are very active in the area, as the PROSHAR program and Trust Fund program revitalized them in recent earlier. We could make a joint collaboration with them for DRR activities; 3. Mass awareness on health safety, drainage congestion and sanitation is essential as it is the peri-urban area, kind of dumping ground of urban waste and on the other hand the land is converting into housing land by the influential.

3. 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 which is presented in this chapter.

3.1 Water Resources Management and Infrastructure

Special attention has been paid to plan from a catchment perspective and on the basis of hydrological boundaries as well as social-institutional (village) boundaries. A consultation meeting with the UPs and existing WMOs was held on 15 and 17 November 2016 at Gutudia and Jalma UPs. After thorough discussion and arguments with the local stakeholders the following infrastructures were identified and validated for inclusion for rehabilitation. Khal re-excavation for drainage purpose, the repair of existing structures, repair/re-sectioning of embankment and re-construction of damaged sluice were considered as priority-1 work. Re-excavation of secondary khals for drainage was considered as priority-2, and construction of drainage pipes were considered as priority-3 works².

3.1.1 Summary of Rehabilitation Works

SL. No.	Name of Work	Units	Quantity	Estimated Total Cost, BDT
Priority 1				
1.0	Embankment Re-Sectioning	km	10.00	12,000,000
2.0	Khal Re-excavation	km	11.00	16,500,000
3.0	Repair of Sluices and WRS	nos	8	20,000,000
4.0	Repair of Outlets	nos	1	1,250,000
5.0	Construction/ Re-construction of Sluice	nos	1	16,500,000
Priority 1 Total=				66,250,000
Priority 2				
6.0	Khal Re-excavation	km	7	10,500,000
7.0	Provision of pipes	m	400	800,000
Priority 2 Total=				11,300,000
Total cost for Rehabilitation Works in Polder 28/1=				77,550,000

Note: The items and quantities for rehabilitation works for this polder may change after WMO formation and field assessment by BWDB engineers.

A map showing proposed rehabilitation plan is given in Figure 5

² Actually all works are needed for efficient water management and to reduce health and environmental hazards in the polder. However, since fund is limited, prioritization will give a scope for phasing out the work depending on DPP provision and availability of fund. Priority-1 works include activities that are related to the safety/ immediate problem solution of the polder. Priority-2 works include activities that are required for proper functioning of the polder. Priority-3 works are not immediately needed but are desired for further improvement of the water management and environmental conditions in the polder. If DPP allows and fund is available all works will be done.

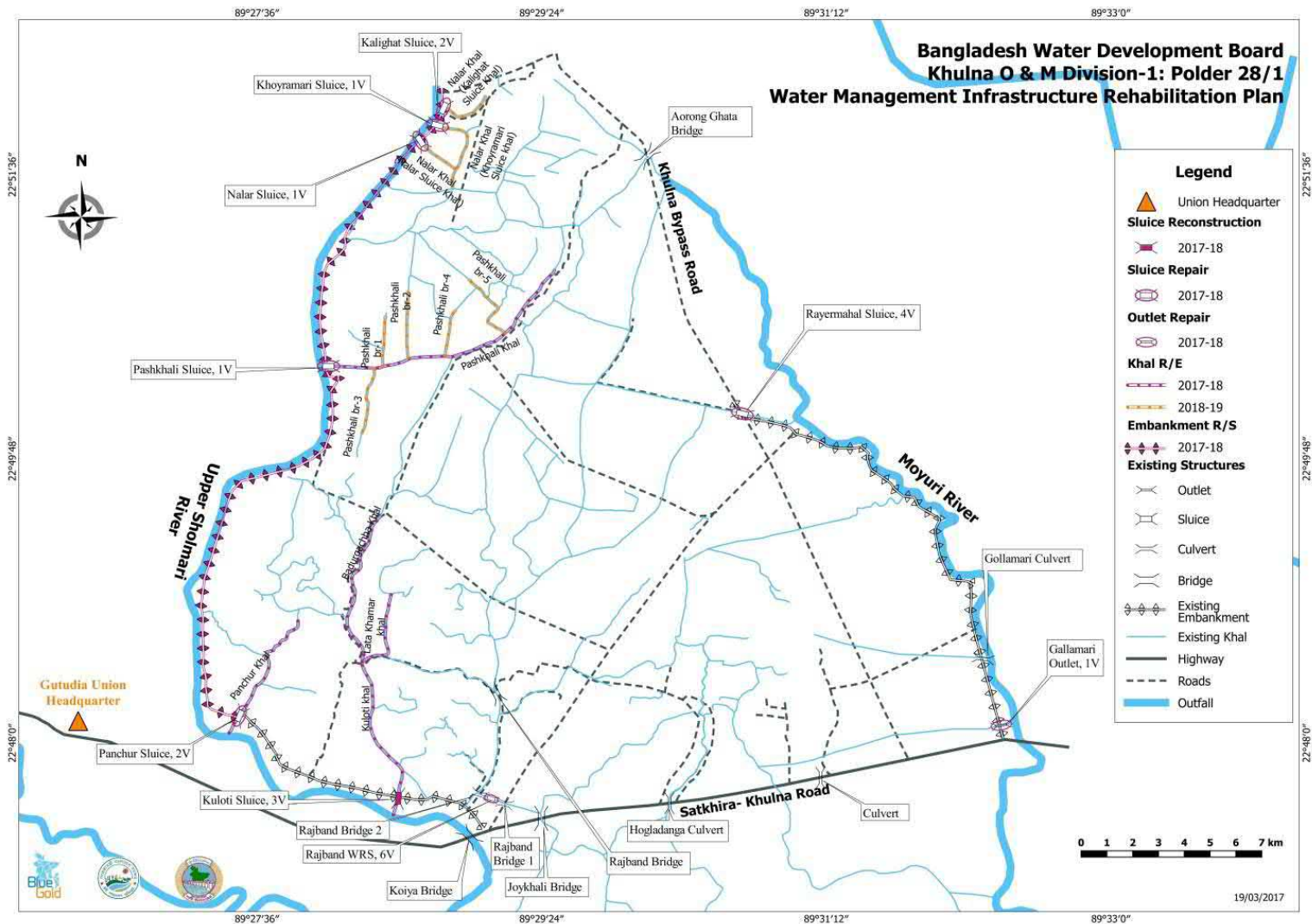


Figure 5: Proposed Rehabilitation Plan

3.1.2 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 institutional basis which will encourage effective commitment to and action for fulfilling the BWDB commitments under the O&M agreement with the WMA.

No.	Activity	Time Frame	Responsible Actors	People to involve
1.0	Engineering assessment and topographic surveys	2016-2018	BWDB, TA-Engineering staff, Socio-Economists and CDFs	UP, WMO members and local elites
1.1	Site survey, design data collection, detailed design and preparation of work packages			
1.2	Pre-work measurements			
2.0	Formation of Labor Contracting Societies (LCS)	2017-2018	WMG, BWDB, TA- Engineering staff, Socio-Economists and CDFs	LCS, WMA Monitoring Committee, WMA
2.1	LCS training (WMG) and contractor orientation			
2.2	Construction monitoring training to WMAs			
3.0	Draft contract, tendering and work award	2017-2020	BWDB, TA-Engineering Staff, Socio-Economists, CDFs	WMA Monitoring Committee, WMA and WMG Executive Committee
3.1	Resource mobilization and implement physical works like embankment re-sectioning/ construction, khal re-excavation and repair/construction of structures			
3.2	Construction monitoring			
4.0	Polder inspection and identification of O&M requirements	Before implementation of O&M works		
4.1	O&M agreement			
4.2	Implement catchment level water management and O&M plan			
5.0	Internal Polder Water Management	After main WRM infrastructure is	SAAOs (DAE), XOs (BWDB), TA-Socio-Economists,	WMA and WMG Executive Committee
5.1	Identify WMGs interested to work along Community Agricultural Water Management (CAWM) model.			

5.2	CAWM planning	implemented	Engineering staff COs and PFs	
5.3	CAWM implementation			
5.4	Monitoring of CAWM			
6.0	Back-up support in the yearly joint polder inspection and assessment of O&M requirements and CAWM	2017-2020	BWDB, TA-Socio-Economists, COs and Engineering Staff	WMA and WMG Executive Committee, BWDB

3.2 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) 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
1.0	Consultation meeting for Engineering Assessment	January 2017	Central, Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
2.0	Conduct UP & Upazila orientation	January 2017 to April 2017	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
3.0	Identify and support existing collective actions (CA) and liaise with their leadership	January 2017 to April 2017	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
4.0	Conduct walk-through, mapping with CA leadership & key informants and data collection (household survey)	January 2017 to May 2017	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
5.0	Form core group of interested CA leadership and organise horizontal learning	January 2017 to April 2017	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
6.0	Conduct WLUA workshop with core group	January 2017 to May 2017	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
7.0	Prepare PDP and submit to BWDB	January 2017 to March 2017	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
8.0	Conduct catchment-level planning meetings to define WMG boundaries and collective actions	January 2017 to May 2017	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
9.0	Facilitate and expand existing CAs	January 2017 to June 2017	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
10.0	WMG EC formation and Registration	May 2017 to February 2018	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
11.0	Promote and implement new CAs with WMG as identified in the catchment level planning meetings	January 2017 to March 2020	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
12.0	Provide selective WMG foundation	July 2017 to	Zonal and polder	WMG and WMA

	courses using experiential learning methods	April 2018	TA team, BWDB and DAE	members UP, BWDB, DAE
13.0	Support WAP formulation and implementation of CAs with relevant sub-groups	July 2017 to June 2020	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
14.0	Facilitate LCS implementation with WMGs	December 2017 to June 2020	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
15.0	Organise CA exchange visits/horizontal learning	January 2017 to June 2020	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
16.0	Facilitate networking and partnerships	January 2017 to April 2018	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
17.0	WMG Sub Committee formation(O&M Catchment Level & others in WMG Level)	July 2017 to July 2018	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
18.0	Regular catchment-level water management and O&M planning	January 2018 to July 2019	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
19.0	Continue assisting WMGs to improve performance	June 2017 to May 2020	Zonal and polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
20.0	Gender Workshop with LGI and other Stakeholders	May 2017 to June 2020	Zonal and polder TA team	WMG, UP, BWDB, DAE

3.3 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. no	Activities	Time frame	Responsible actors	People to involve
	Agricultural Services			
1.0	Tree plantation and homestead gardening for the utilization of homestead area through farmers field school	2017-2019	DAE, TA-CDFs, Master Trainers, Agricultural Expert, FTs	WMG and WMA members
2.0	Activities to improve crop production: a. FFS on , homestead garden (vegetables) and nutrition, b. Women focused FFS c. Demonstrations / trials on winter vegetables d. Field day on home garden and nutrition activities of FFS.	2017-2019	DAE, TA-CDFs, Master Trainers, Agricultural Expert, FTs	WMG and WMA members
3.0	Activities to improve livestock production: a. Poultry and nutrition FFS b. Livestock vaccine cold chain at	2017-2019	DAE, TA-CDFs, Master Trainers, Agricultural	WMG and WMA members

	WMG/WMA level c. Community Livestock Worker training d. Community Poultry Worker Training e. Field day on livestock activities		Expert, FTs	
	Business Development			
1.0	Workshop with WMOs to promote CA, Business Planning and private company linkage	July-Aug 17	BDC, CDFs	WMG/WMA
2.0	Linkage Building meeting/Workshop with VC actors	July-Aug 17,18,19	BDC, CDFs, RFs	WMG/WMA
3.0	Workshop with GL/RF /FT/LF on agriculture development (FFS with market orientation) business networking and Linkage	July-Aug 17	BDC, CDFs, RFs	WMG/WMA
4.0	Linkage workshop between RF/ CF/LF/FT & Market actors	June 17, 18,19	BDC, CDFs, RFs	WMG/WMA/IP
5.0	Actors meeting with WMO for Linkage, Discussion negotiation and Intervention designing	Nov- 17,18,19	BDC, CDFs, RFs	WMG/WMA
6.0	Promote and implement new CAs with WMG as identified in the catchment level planning meetings	2017-2019	BDC, CDFs, RFs	BWDB/DAE/UP/DLS/
7.0	Organise CA exchange visits/horizontal learning	Apr 17-Mar 20	BDC, CDFs, RFs	BWDB/DAE/UP/DLS
8.0	Input traders capacity building	Nov17	BDC, CDFs, RFs	PS/DAE/DLS

3.4 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
1.0	Obtaining Environmental Clearance Certificate from DoE	2017-2018	Outsourcing SPs	BWDB, TA-Env. Expert, TA-Engineer Team, Polder Team
2.0	Environmental compliance monitoring and quarterly reporting to DoE	2018-2020	BWDB field staffs, TA-Env. Expert	TA-Engineer Team, Polder Team, XEN of BWDB
3.0	Formulation of Environmental and Social Management Plan (ESMP)	2017-2018	TA-Env. Expert, Polder Team	Socio-Economists, TA-Engineer Team,
4.0	Reconstitution of UDMCs	2018-2019	Outsourcing SPs/Training Team	TA-Env. Expert, Socio-economists, Institutional Advisor,
5.0	Recruit WMG's Environment and DRR Counsellors	2017-2018	WMGs, Polder Team	TA-Env. Expert, Socio-economists, Institutional Advisor,
6.0	Formulation of Community Based Disaster Risk	2017-2018	TA-Env. Expert, Polder Team	Socio-Economists, TA-Engineer Team,

	Reduction (CBDRR) plan			
7.0	Disaster Preparedness and implementation of CBDRR plan	2017-2020	WMGs, Polder Team	TA-Env. Expert, Socio-economists, Institutional Advisor,
8.0	Training to Env. and DRR Counselors and UDMCs on Env Safeguard and Dis. Mgmt.	2018-2019	Outsourcing SPs/Training Team	TA-Env. Expert, Socio-economists, Institutional Advisor,
9.0	Orientation to LCS leaders and Contractors and WMA leaders on environmental clearance Certificate.	2017-2018	Engineer Team, TA-Env. Expert,	XEN of BWDB
10.0	Awareness raising program	March 2017 to June 2020	Env. and DRR Counselors, TA-Polder Team	Env. Expert, Zonal Socio-Economists
10.1	Discussion reducing excessive using of fertilizer and pesticide and indiscriminate fishing practices from the natural wetlands at WMG meeting, FFS & MFS session and FFD			
10.2	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.)			
10.3	Integrate ESMP and CBDRR with the WAP, Annual Polder Action Plan and UDMC's DRRAP	2017-2020	TA-Env. Expert, ZSEs, COs	WMA & WMG executive committee and DRR Counselors.

4. Planning Timeline

Blue Gold Program, BWDB Polder Completion Timeline

Polder - 28/1

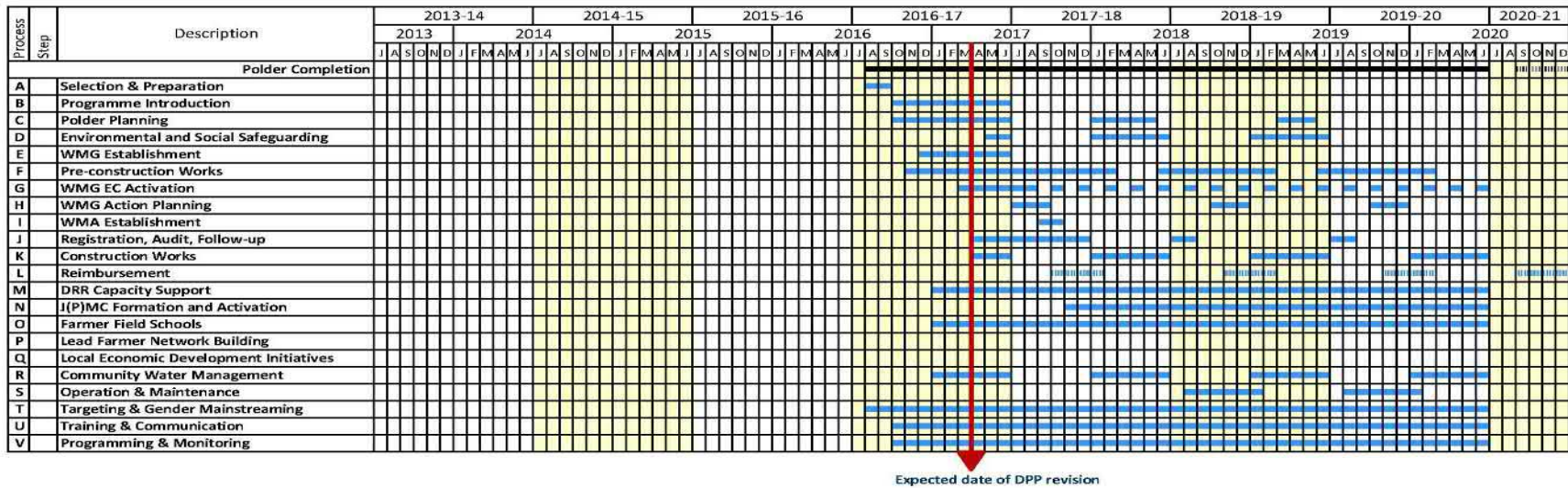


Figure 6: Polder Completion Timeline

5. Polder Budget

The overview of the estimated budget for the polder activities in polder 28/1 is presented in Table 6.

Table 6: Polder 28/1 Budget

S.N	Task Name	Total Amount	
		BDT* ^{x100000}	EUR** ^{x1000}
1.0	<i>Institutional Framework for Participatory Water Management</i>	7.50	8.82
2.0	<i>Main Infrastructure</i>	775.50	912.35
3.0	<i>Internal Water Management</i> <i>(Polder-wise budgets are based on an average amount per CWM-site. In reality budgets will vary per CAWM-site)</i>	9.0	10.5
4.0	<i>Agriculture & Marketing Services</i> <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>	25.00	29.41
5.0	<i>Environmental & Social Management / Disaster Risk Reduction (DRR)</i>	35.00	41.18
6.0	<i>Training</i>	34.90	41.06
	TOTAL	886.90	1043.32

Note: Exchange rate is 1 EURO=85 BDT

Appendix 1. PDP Formulation Process³

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 4th 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)

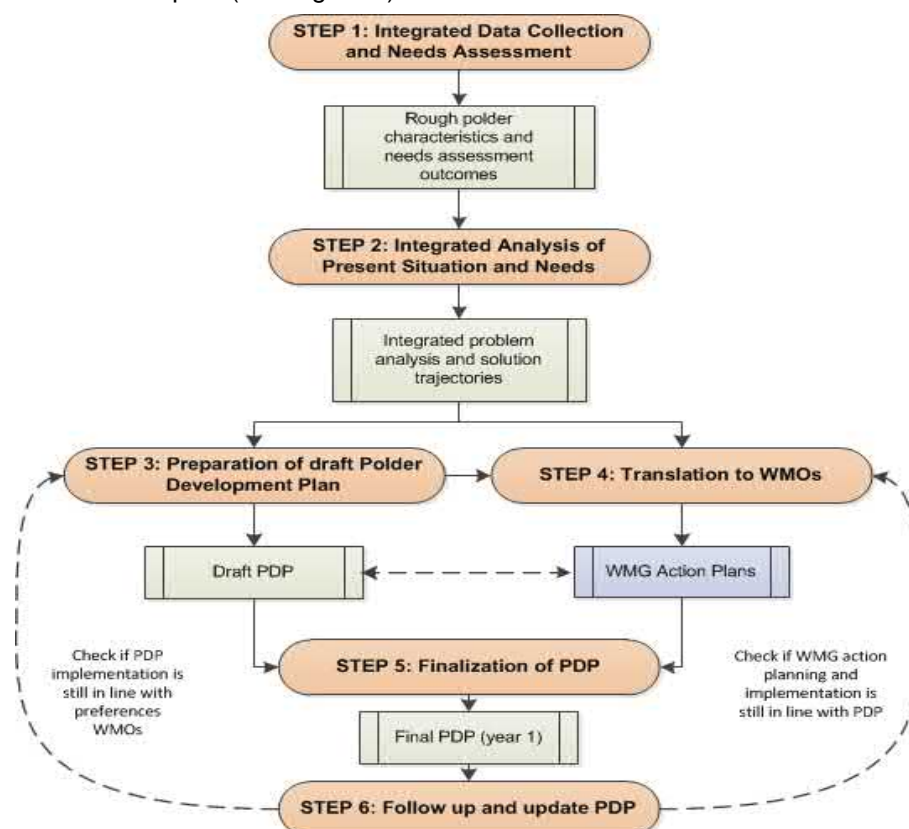


Figure 7: The steps of the PDP Formulation Process

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, 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 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:

³ 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 to in the process of specific data collection. In the case of polder 28/1, after drafting the PDP it was shared with the representatives of WMOs and UPs for data validation and updating

- 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 28/1

Embankment

Total length of the embankment around polder 28/1 is about 23.00 km. The entire embankment is an interior embankment with a crest width of 4.27m and crest level of 4.27m PWD.

Sluices

There are 07 sluices and 01 WRS in this polder. These are:

S.N.	Name of Sluices	Number of Vents	Size, (mxm)	Location, km
1.	Kalighat Sluice (S-1)	2	1.50 m X 1.80 m	
2.	Khoiramari Sluice (S-2)	1	1.50 m X 1.80 m	
3.	Nalar Sluice (S-3)	1	1.50 m X 1.80 m	
4.	Pashkhali Sluice (S-4)	1	1.50 m X 1.80 m	
5.	Kuloti Sluice (S-6)	3	1.80 m X 1.20 m	
6.	Rayermohol Sluice (S-9)	4	1.50 m X 1.80 m	
7.	Rajband/Koiya Bazar Hydrolic Structure (WRS)	6	1.20 m X 1.80 m	
8.	Punchur Pipe Sluice (S-5)	2	900 mm	

Drainage Outlets

There is one outlet in this polder. The following in details:

S.N.	Name of Outlets	Number of Vents	Size, (Dia)	Location, km
1.	Gollamari Outlet (S-7)	1	900 mm	

Irrigation Inlets

There are no Inlets in this polder.

Khals

There are about 34 recognizable khals with branches and having a total length of above 90.00 km. The main khals are shown in Figure 2.