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Kingdom of the Netherlands



Department of Agricultural Extension (DAE)



Polder Development Plan (PDP) – DRAFT

Polder 28/2

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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
KJDRP	Khulna-Jessore Drainage Rehabilitation Project
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 28/2 was constructed in 1973-75 by the Bangladesh Water Development Board (BWDB) and later on was rehabilitated under the KJDRP project from 1996 to 2002. The polder falls at Jalma union under Batiaghata upazila of Khulna district. It is surrounded by the Shoilmari (south), Kazibacha (south-east), Upper Shoilmari (south-west) and Alutola/Moyuri river at the east part. 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.

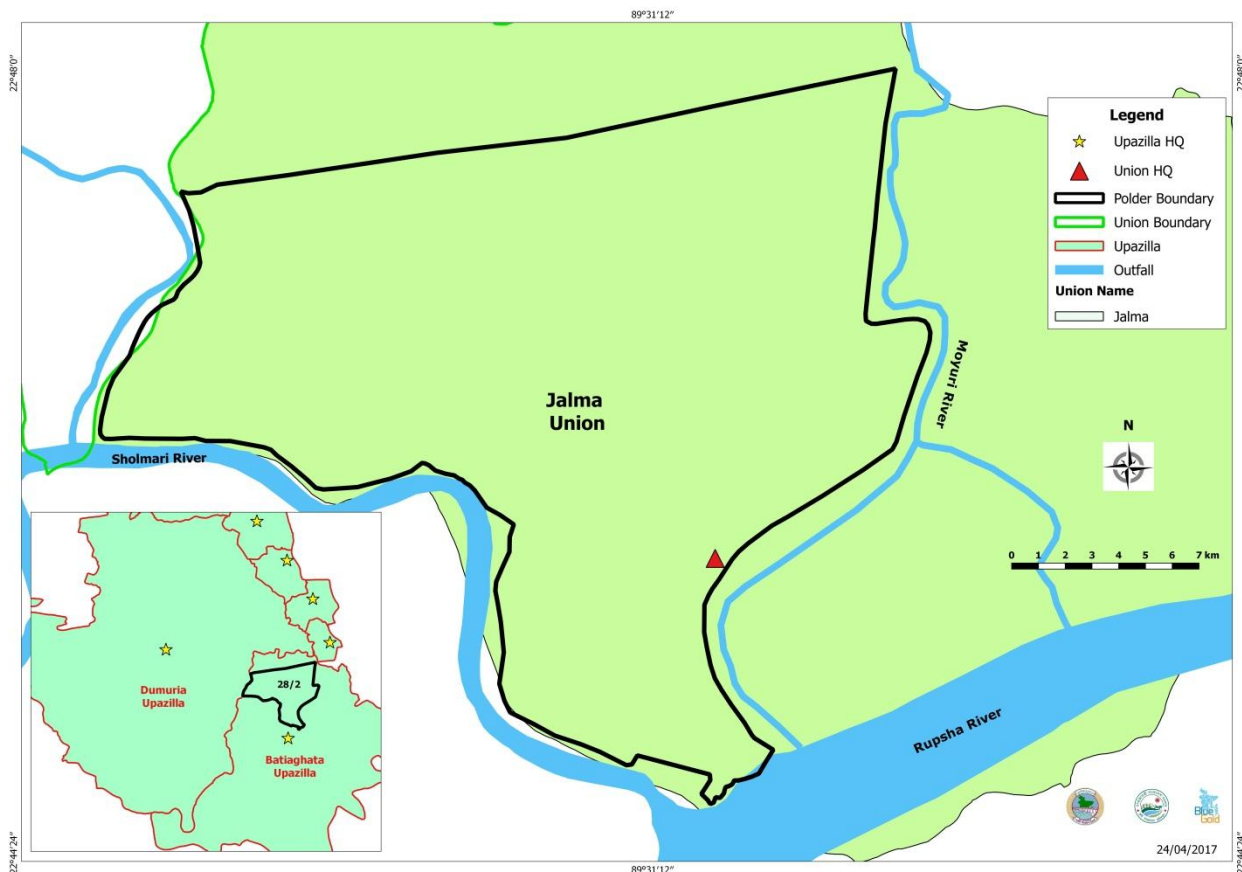


Figure 1: Location of Polder 28/2 in Batiaghata Upazila under Khulna District

Table 1: Main Physical and Demographic Characteristics of polder 28/2

Characteristics	
Included Upazila(s)	Batiaghata (P)
Included Unions	Jalma
Polder boundary (in km)	30

Total number of Mouzas	12		
Total polder area (in ha)	2480		
Total number of households in the polder	7628		
Total number of catchments	07		
Total cultivable land (in ha)	1048 ha	High land: 144 ha Medium-high land: 603 ha	Low land: 300 ha
Population	40680	Male: 20540	Female: 20140
Literacy rate	72%		
Major occupations	Agriculture: 38%	Agricultural labour: 19%	Business: 11% Others 32%
Economic condition	Rich: 5%	Middle class: 50%	Poor: 45%
Status of seasonal labour migration	This polder is very much adjacent to Khulna city, so very negligible percentage of labour migration is happened in this polder especially agricultural labours who become workless for certain period (December to February). They go to town for doing some cash for work related activities. However, approximately 4-5% labour migrate to outside for certain period, but some of non-agricultural labour frequently move to outside for engage as household worker, rickshaw-pulling, and some are engaged in small business going door to door for product selling.		
Status of internal road communication	Well-developed internal road communication in this polder area. Northern side of this polder has better communication facilities. There are two high way roads and many branch roads in the polder. The greatest part of the internal road network is <i>Carpeting</i> road. Some roads are HBB & BFS. Few earthen roads exist inside the polder. The roads comprise 12 km high way roads, 14 km carpeted branch roads, 48 km brick soling roads and only 7 km is earthen roads. All kinds of transports are available in in this polder.		

2.2 Water Resource Management and Infrastructure

In the main characteristics of the water resource management and infrastructure of polder 28/2 are highlighted in the Table 2 and Figure 2 shows the existing infrastructure and khals in polder 28/2. Further details can be found in Appendix 2.

Table 2: Main Water Resource Management and Infrastructure characteristics of polder 28/2

Characteristics			
Length of embankment (in km)	30 km		
No of drainage/flushing sluices	07	Good conditioned: 00	Poor conditioned: 07
No of inlets	0	Good conditioned: N/A	Poor conditioned: N/A
No of (drainage) outlets	0	Good conditioned: N/A	Poor conditioned: N/A
No of canals	35		
Length of canals (in km)	88		
Main outfall rivers and khals	<p>Main river: Shoilmari, Upper Shoilmari, Rupsha/Kazibacha and Alutola/Moyuri river.</p> <p>Main khals: Ghola khal, Sindurtala khal, Ramdia khal, Joypur khal, Thakrunbari khal, Badaler khal, Guptamari khal, Rangemari khal, Bidurer khal, Jharbhanga khal, Barui khal, Vakotmari khal, Joykhali khal, Kadomtala khal, and Bashbaria khal.</p>		
Situation of tidal and river flooding	Sometimes tidal floods occur from Rupsha/Kazibacha river and Upper Shoilmari river, but not that frequent and severe. In some		

	cases upstream water flow and heavy rainfall cause flooding in the polder area. The duration of inundation is about 3 to 4 months.
Locations with water logging and siltation.	Southern part of the polder is mostly waterlogged due to less drainage facilities and becomes worst when there is additional flooding due to heavy rainfall in the upland area. Especially in Joykhali, Bashbaria, Shoilmari, Ghola, and Sachibunia some crop fields (beels) are waterlogged for 3-4 months. Most of the sluice gates are of poor condition.
Most river erosion prone area	Near the Kachubunia/Jalma village area there is a most river erosion point which is in the Kazibacha river (it is at meeting point of three river i.e. Kazibacha, Rupsha and Shoilmari river).
Other relevant water issues	Sometime dirty water comes from town and it is very harmful for the crop field as well as for fish culture.
Key challenges in effective water management	<ol style="list-style-type: none"> 1. Rapidly growing the urban area is now big challenge for improvement of the internal water management; 2. Influential people already occupied khals and are fully controlling the sluice gates; and 3. Silted khals and inactive sluice gates.
Challenges in planning construction of water infrastructures within polder area	<ol style="list-style-type: none"> 1. Some culture fisher (Gher owner) and influential people who illegally occupied the canals, may create problems in planning for construction of water infrastructures; and 2. Poorly functioning and inactive WMG/WMA are now big challenge for LCS work.
Current internal polder water management practices	Canals are fully silted and sluice gates are not functioning and in some cases these are controlled and operated by some influential people.
Overall condition of internal polder water management	Inactive water management group (WMG) cannot play the active role to manage the operational and maintenance activities. Beside water flow system and drainage facilities are fully closed.
Opportunities for internal polder water management	<ol style="list-style-type: none"> 1. Re-excavation of canal; and 2. Repair or Re-construction the sluice gate

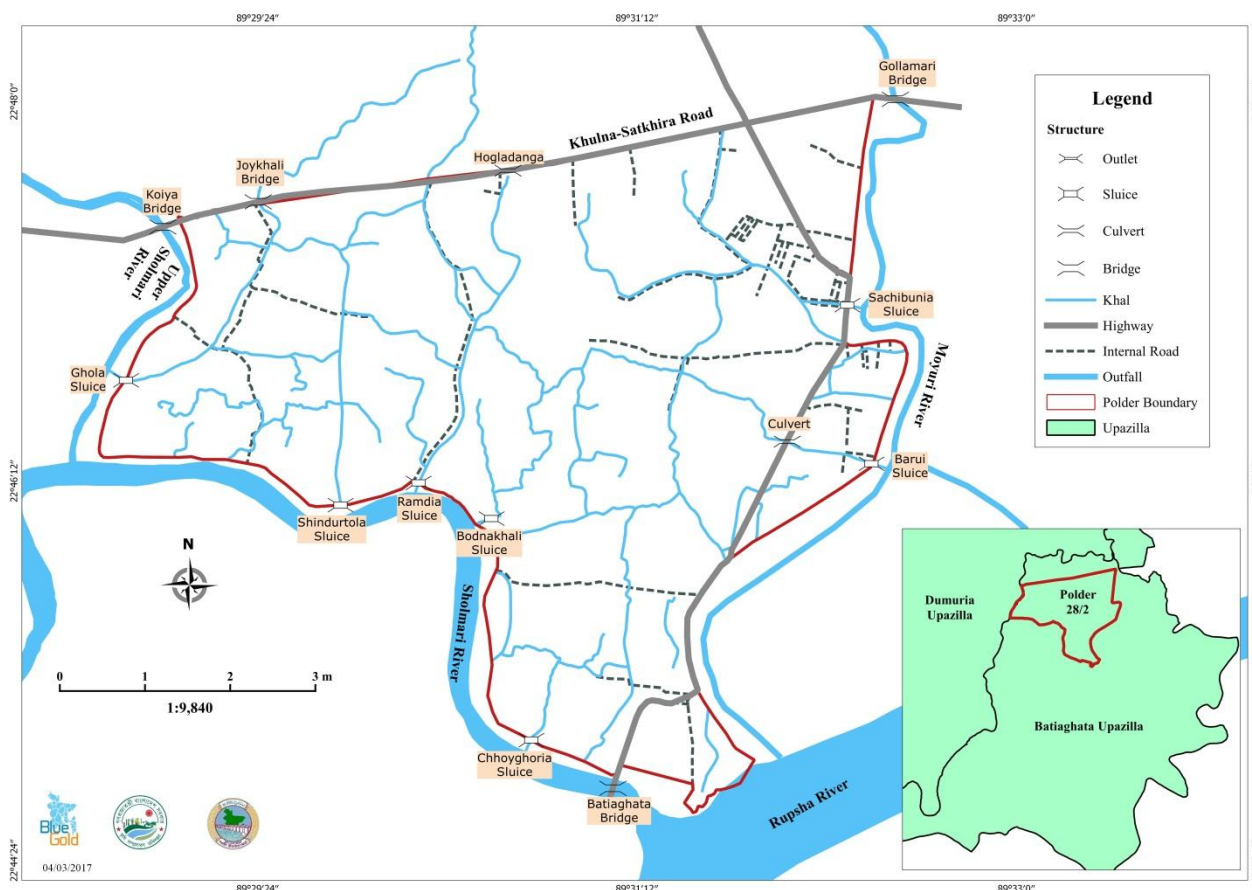


Figure 2: Map of Polder 28/2 showing the existing Khals and Water Management Infrastructure

2.3 Institutional Framework for Participatory Water Management

The main institutional actors in polder 28/2 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.

Table 3: Main characteristics of the Institutional Framework of PWM in polder 28/2

Characteristic			
Number of WMGs	12	Registered: 9	Non-registered: 3
Members of WMGs	369	Female: 121	Male: 248
HHS being part of WMGs	306		
Number of WMAs	1	Registered: 1	Non-registered: 0
Female representation in WMGs	36%		
Total deposited fund (BDT)	710247		
Total savings of WMGs (BDT)	375318+ 118072		
Total number of WMGs with O&M fund	Yet not started		
Names of projects and organisations with similar	In our polder area some likeminded project doing the similar activities; <ul style="list-style-type: none"> • SaFal project is working on nutrition and fish value chain activities 		

/ related activities	<p>which locally implemented by Uttaran;</p> <ul style="list-style-type: none"> • 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	0
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. Khas khals are taking lease by the outsider who are making blockage on the khals which sometimes making problem; 2. Gate connecting khals are leasing out by the DC office/ UNO office without considering the water management; 3. Rapid growing of urbanization causing conversion of wetlands into settlement land; and 4. In some cases, culture fisher illegally establish temporary cross dam on the canal for that makes conflicts between fishermen and farmers.
Key challenges in strengthening PWM	<ol style="list-style-type: none"> 1. Silted canals fully interrupt the internal water management system; 2. Some canals 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 28/2 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. Linkage and coordination platform among the other institutional actors could be further strengthened; and 5. Initiate collective action

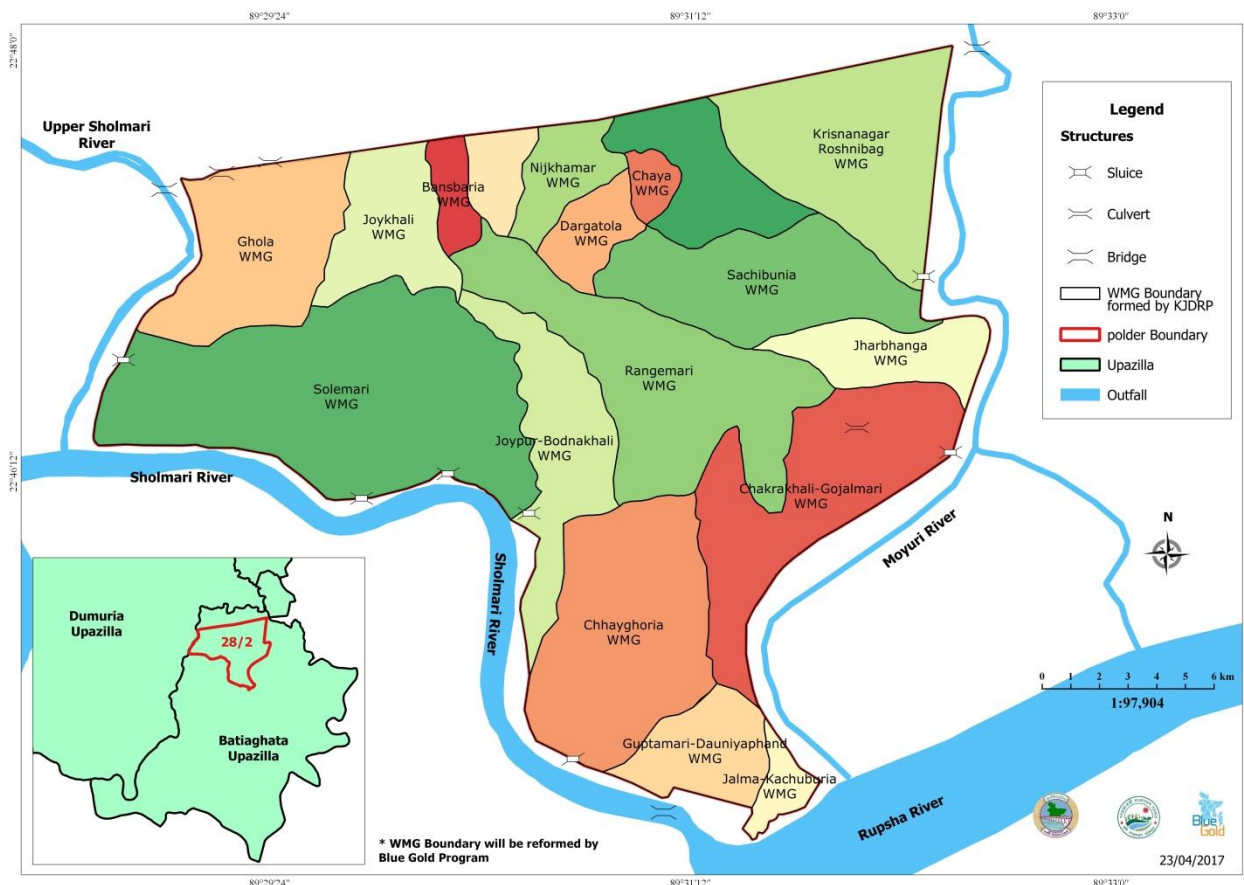


Figure 3: Name of WMG and WMA areas in Polder 28/2

2.4 Agricultural and Marketing Services

In polder 28/2, 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.

Table 4: Main characteristics of Agricultural and Marketing Services in polder 28/2

Characteristic	1. T.Aman	2. Vegetables	3. Sesame
Main crops (top three)	1. T.Aman	2. Vegetables	3. Sesame
Current most common cropping calendar(s)	Boro rice – Fallow – T.Aman (30%) Fallow-Sesame-T.Aman (45%) Pulse crops- Fallow-T.Aman (13%) Vegetables- Vegetables - Vegetables (3%) Fallow – Fallow – T.Aman (1%)		
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, Potato Tomato, Cauliflower, Cabbage..		
Main fruits	Mango, Tamarind (Tetul), Coconut, Guava, Sapodilla, Grape Fruit, Wood apple, Coconut, Jackfruit, Lemon, Banana and Jujube.		
Available agricultural	Polder 28/2 has sufficient agricultural machineries to manage the agricultural		

machinery	activities. Particularly farmers used power tiller, thresher machine, irrigation pump, spray machine etc. Inside the polder area a total of 26 semi deep tube-wells, 660 power pumps, 84 power tiller with some thresher machines, are available to provide farm mechanization service to the farmers as their requirement.
Present irrigation practices	In polder 28/2, approximately 60% lands come under the irrigation facilities especially for cultivate Rabi crops (Boro rice and winter vegetables). Mainly surface water (cannel, gher and pond water) and ground water is used for irrigation. Total 850 irrigation machines with low lift pump, and 26 semi deep tube-well and manmade agricultural equipment's are used for ensuring proper irrigation facilities.
Availability of inputs	Seed, fertilizer, pesticide, farm machineries, irrigation facilities and new agricultural technology & information are the main inputs of agriculture sector. Most of the input company and private sector have been working in this Upazila and also they have close connection with farmers through the dealership system. Inside the polder area total of 11 dealers and about 40 retailers are available for providing input services.
Current knowledge on proper input use	Some of farmers have lack of knowledge to identify quality seed especially rice seed. In rice production, farmers do not follow the actual fertilizer doze. Beside vegetable farmers also used the high dose of pesticide. Farmer always used high number of seeding (8-10 seedlings) for T.Aman rice production.
Important business trend in crop production	Vegetables, Boro rice, Golda, White fish and fruit production is 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 of land is irrigated but during dry season water scarcity is the big challenge; 2. 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 subsequent crop (Rabi crops) timely, as a result huge amount of lands remains in fallow.
Percentage of households owning livestock	Cattle: 65-70 % Goats:20-25 % Poultry:80-85%
Availability of inputs for livestock	The farmers of the polder 28/2 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 is some local buyers/business who buys 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 livestock	<ol style="list-style-type: none"> 1. Lack of cow raring field and fodder cultivation practices; 2. Lack of medical treatment and vaccination facility; 3. Inadequate price of cow milk; 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 Koiya Bazar 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. provides training to the selected farmers. They have some local extension agents who provide technical support to the farmers.
Name and location of markets	North part of Polder is very adjacent to city corporation and west part nearby the Upazila head quarter. Gallamari bazar is the big market is placed in the north-east part of polder and this market is connected with city corporation. Batiaghata bazar is very adjacent from this polder (just cross the bridge) So that farmers have easily access to the all type marketing facilities at Gallamari bazar and Batiaghata bazar. Beside Koiya bazar, Krishno Nagar bazar, Sachibunia bazar, Bashbaria bazar etc. provide the marketing facilities for polder dwellers. In addition well developed transportation facilities help to ensure product marketing to outside the polder area.
Products provided	T.Aman rice, Boro rice, sesame, 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, sesame, vegetables, backyard poultry, golda and captured fish. Paddy mainly sold at Local Hats or via Koiya and Dumuria to outside polder. Vegetable directly goes to Hasemali Arot or Sonadanga Arot, Khulna. Large fish producers can reach Dumuria fish Arot or Gollamari. Rupsa arot, Khulna.
Main value chain actors	Not selected yet.
Key challenges in marketing	<ol style="list-style-type: none"> 1. Virus attack in the culture fish ponds mostly at Golda fisheries; 2. Contamination of urban waste at the natural water bodies; 3. Limited skill and knowledge on market orientation is the big challenges to establish networking among the actors; 4. Without forming producers group, it is very big challenges to initiate collective action; and 5. No any big market inside the polder just located in the corner of the polder;

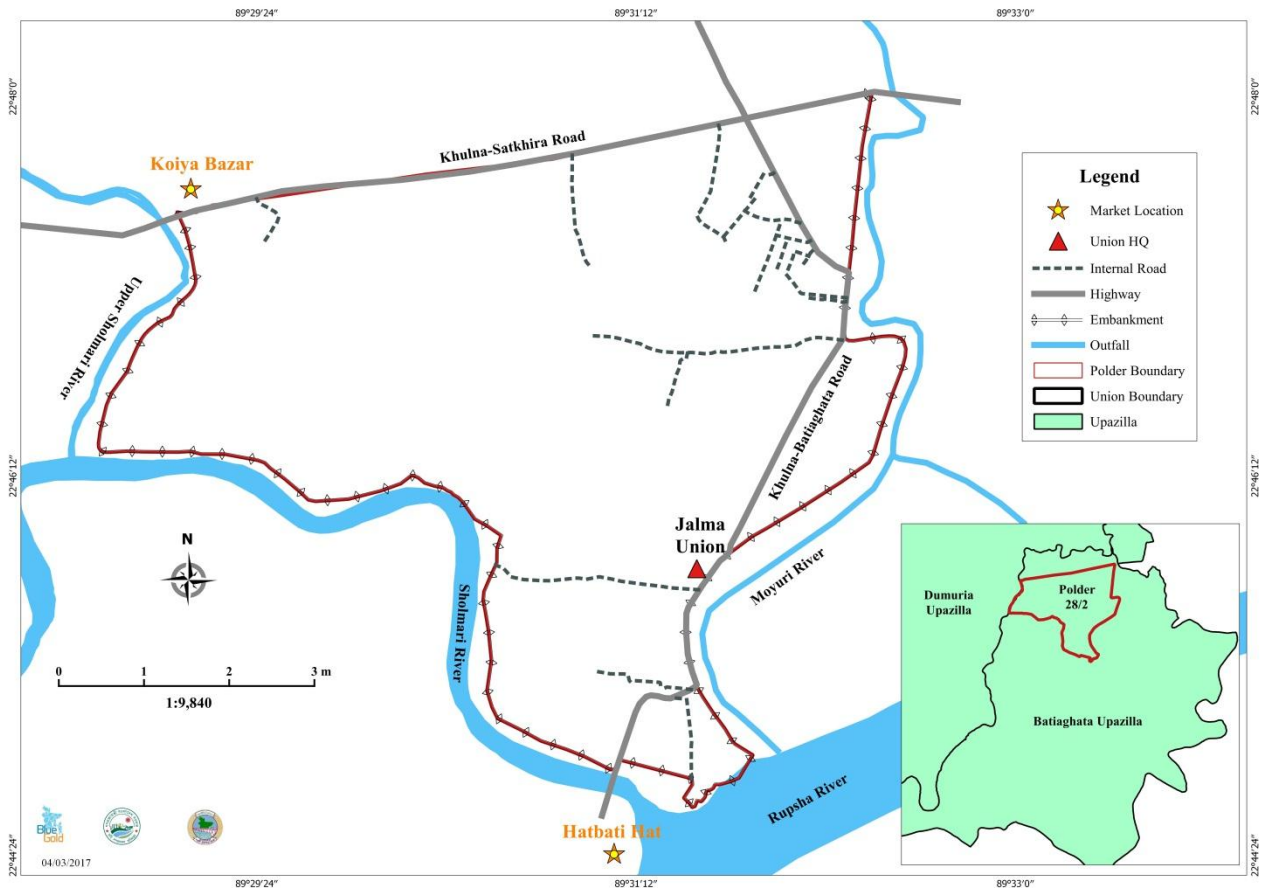


Figure 4: Markets and Union headquarters in Polder 28/2

2.5 Environmental Sustainability and Disaster Risk Reduction

Table 5: Main environmental and DRR characteristics of polder 28/2

Characteristics	
Existing environmental problems	<ol style="list-style-type: none"> 1. In the polder area there are 3 pocket areas where waterlogging happen very frequently and severely. The areas are among Jalma beel near Kochubunia village (due to silting up the Katakhal khal and Guptomari khal), Rangemari beel (due to Baroikhali sluice and Bodnakhali sluice cannot drain-our water) and Shoilmari beel (due to illegal blockage at Pramanik khal). The duration of the water logging is around 3-4 months (from July-October) which basically affects the cultivation of Aman rice; 2. There are many internal khals (Barui khal, Rangemari khal, Bidurer khal, Pramanik khal etc.) are converted illegally into fish farms by the outside people which hampering internal polder water management; 3. As reported by the leaders of WMGs and WMA the rate of using insecticides and pesticides is huge in the vegetable gardens compare to rice fields, which directly affecting to the human health.
Common hazards	In polder 28/2, water logging and flooding still now major hazards. The

	local people not experienced with cyclone or tidal surge as the area is close to Khulna city.
Cyclone shelters	There is one school cum cyclone shelter located at the Sachibunia
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	Not yet
Members of WMOs included in UDMC	0
Opportunities for environmental and DRR activities	<ol style="list-style-type: none"> 1. The Union Disaster Management Committees and Upazila Disaster Management Committees are very active in the polder area, as the PROSHAR program and Climate Change Trust Fund program revitalized them and provided capacity in recent earlier. We could make a joint collaboration with the committees for DRR activities; 2. 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 platforms for dissemination of awareness messages on environment and DRR; and 3. Mass awareness on health safety, drainage congestion and sanitation is essential as it is the peri-urban area. We could utilize the 108 trained volunteers (PROSHAR volunteers) in this regard.

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 paid attention to social-institutional (village) boundaries. A consultation meeting was held at Jalma union parishad hall room on 13 November, 2016. The chairman and some members of Jalma union were also present in that meeting. After thorough discussion and arguments with the local stakeholders the following infrastructures were identified and validated for inclusion in the Blue Gold implementation program. Priorities of rehabilitation works were based on immediate requirement and importance. 2nd and 3rd priority works² will be implemented subject to availability of fund.

3.1.1 Summary of Rehabilitation Works

SL. No.	Name of Work	Units	Quantity	Estimated Total Cost, BDT
Priority 1				
1	Embankment Re-Sectioning	km	1.20	1,800,000
2	Embankment Retirement (Jalma)	km	1.00	11,000,000
3	Canal Re-excavation	km	16.00	25,600,000
4	Repair of Sluices	nos	6	15,000,000
5	Construction/ Re-construction of Sluice	nos	1	17,000,000
				70,400,000
Priority 2				
6	Embankment Re-Sectioning	km	5.80	8,700,000
7	Embankment Retirement (Choighoria)	km	0.50	5,500,000
8	Canal Re-excavation	km	4.00	6,400,000
Priority 1 Total=				20,600,000
Priority 3				
9	Canal Re-excavation	km	15.50	24,800,000
10	Provision of pipes	m	400	800,000
Priority 3 Total=				25,600,000
Total CDFst for Rehabilitation Works in Polder 28/2=				116,600,000

Note: The items for rehabilitation works for this polder may change after WMA formation and field assessment by Zonal TA & BWDB engineers

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.

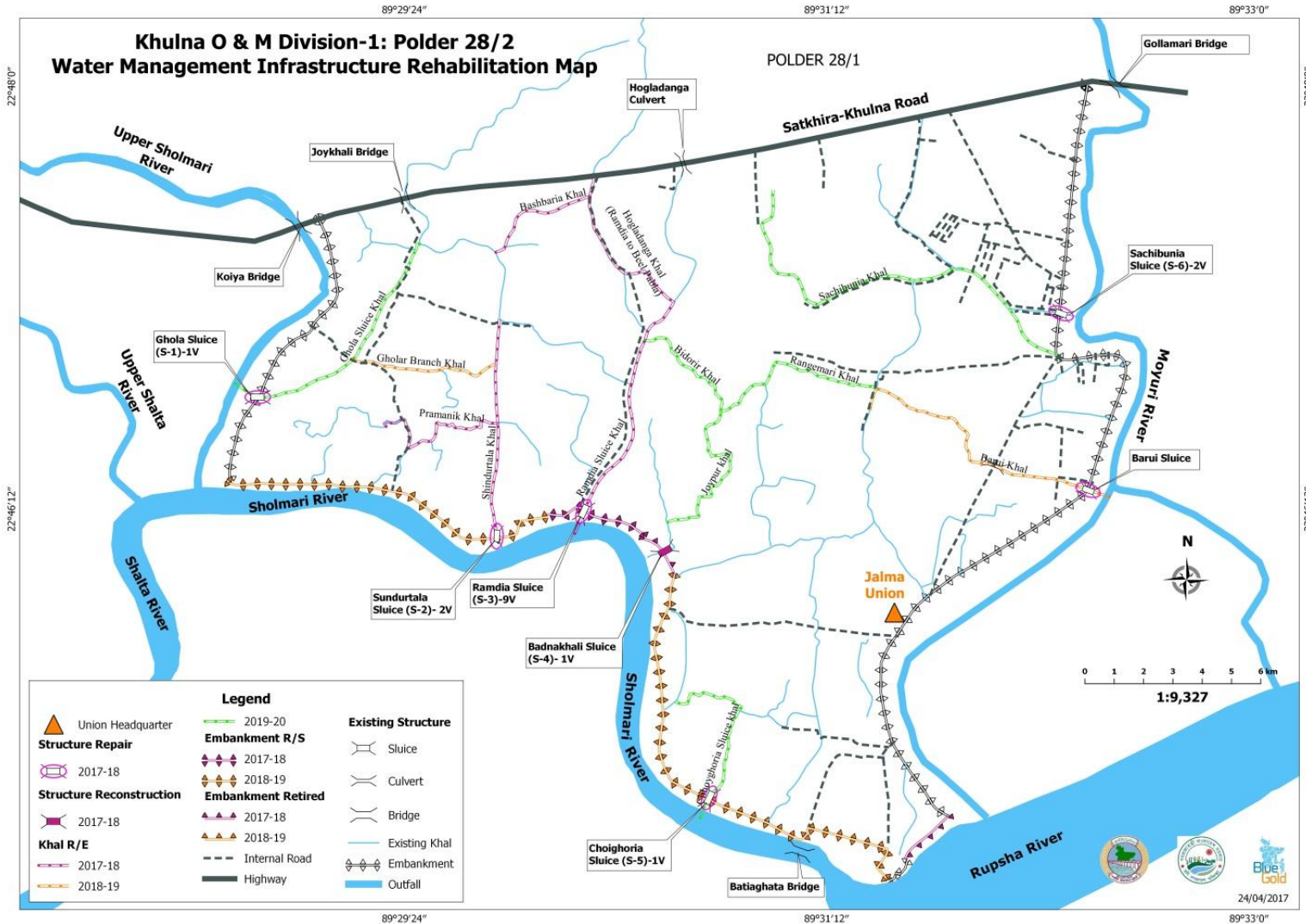


Figure 5: Proposed Rehabilitation Plan

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 institution 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	OCWM, BWDB, TA-WRM Team, TA-Socio-Economists and CDFs	WMO members and vulnerable groups including women willing to do earthwork
1.1	Site survey, design data collection, detailed design and preparation of work packages			
1.2	Pre-work measurements			
2.0	Formation of LCS	2017-2018	BWDB, TA-WRM Team, TA-Socio-Economists	LCS, WMA Monitoring Committee, WMA and WMG Executive Committee, BWDB
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	TA-WRM Team, BWDB, TA-Socio-Economists, CDFs	WMA Monitoring Committee, WMA and WMG Executive Committee, BWDB
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	WMOs	BWDB, UPs, TA Team
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 CDFs 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, CDFs and TA-WRM Team	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	November 2016	Zonal and Polder TA team	WMG and WMA members UP, BWDB, DAE
2.0	Conduct UP & Upazila orientation	February – June 2017	Zonal and Polder TA team	WMG and WMA members UP
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
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	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	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, DAE	WMG and WMA members UP.
7.0	Prepare PDP and submit to BWDB	April-May 2017	Zonal and Polder TA team	WMG and WMA members UP, BWDB, DAE
8.0	Conduct catchment-level planning meetings to define WMG boundaries and collective actions	June, 2017 to August, 2017	Zonal and Polder TA team, BWDB and DAE	WMG and WMA members UP
9.0	Facilitate and expand existing CAs	January 2017 to June 2010	Zonal and Polder TA team	WMG and WMA, 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
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
12.0	Provide selective WMG foundation courses using experimental learning methods	September 2017 to June 2018	Zonal and Polder TA team	WMG and WMA members UP, BWDB and DAE

13.0	Support WAP formulation and implementation of CAs with relevant sub-groups	January 2017 to June 2020	Zonal and Polder TA team, BWDB and DAE	WMG and WMA members UP
14.0	Facilitate LCS implementation with WMGs	January 2018 to June 2020	Zonal and Polder TA team, BWDB	WMG and WMA members UP
15.0	Organise CA exchange visits/horizontal learning	January 2017 to June 2010	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)	October 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	July 2017 to June 2019	Zonal and Polder TA team, BWDB and DAE	WMG and WMA members UP, BWDB, DAE
19.0	Continue assisting WMGs to improve performance	May 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	October, 17 to June, 2018	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	Vegetables production and tree plantation in homestead areas through farmers field school	2017-2019	DAE, TA-CDFs, Master trainers, Agricultural Expert	WMG and WMA members
2.0	Activities to increase production: FFS on beef fattening, pond fish, poultry, homestead garden and nutrition; women focused FFS; demonstrations / trials on winter vegetables; field day on home garden, poultry, beef fattening, pond fish and nutrition activities of FFS.	2017-2019	DAE, TA- CDFs, Master Trainers, Agricultural Expert, Livestock Experts, Fisheries Expert, Farmers Trainers	WMG and WMA members
3.0	Activities to improve livestock production : Livestock vaccine cold chain at WMG/WMA level; Community Livestock and Poultry Worker training.	2017-2019	DLS, TA- CDFs, Master Trainers, Livestock Experts, Agricultural Expert	WMG and WMA members
	Business Development			
1.0	Workshop with WMOs to promote CA, Business Planning and private company linkage	July-Aug 17	TA-BDC	WMG/WMA

2.0	Linkage Building meeting/Workshop with VC actors	July-Aug 17,18,19	TA-BDC	WMG/WMA
3.0	Workshop with GL/RF /FT/LF on agriculture development (FFS with market orientation) business networking and Linkage.	July-Aug 17	TA-BDC	WMG/WMA
4.0	Linkage workshop between RF/ CF/LF/FT & Market actors	June 17 18,19	TA-BDC	WMG/WMA/IP
5.0	Actors meeting with WMO for Linkage, Discussion negotiation and Intervention designing	Nov- 17,18,19	TA-BDC	WMG/WMA
6.0	Promote and implement new CAs with WMG as identified in the catchment level planning meetings	2017-2019	TA-BDC	WMG/WMA
7.0	Organise CA exchange visits/horizontal learning	Apr 17-Mar 20	TA-BDC	BWDB/DAE/UP/DLS/
8.0	Input traders capacity building	Nov17	TA-BDC	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 Reduction (CBDRR) plan	2017-2018	TA-Env. Expert, Polder Team	Socio-Economists, TA-Engineer Team,
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, CDFs	WMA & WMG executive committee and DRR Counselors.

4. Planning Timeline

Blue Gold Program, BWDB Polder Completion Timeline

Polder - 28/2

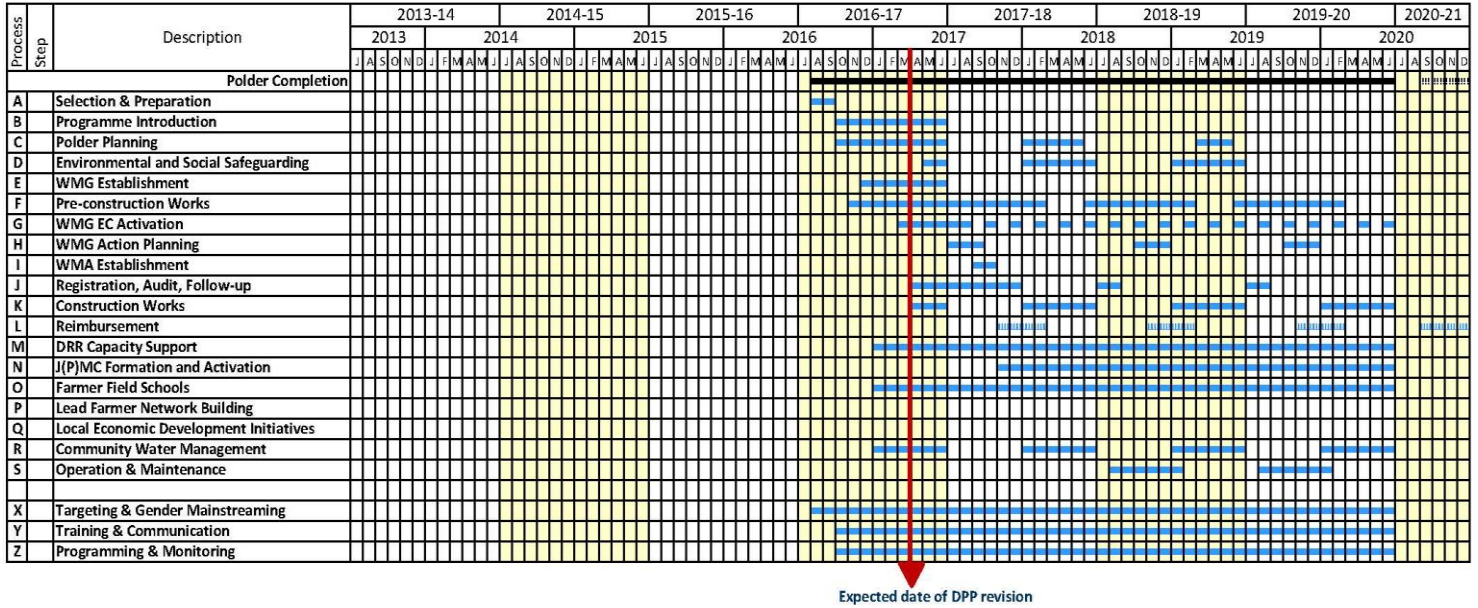


Figure 6: Polder Completion Timeline

5. Polder Budget

The overview of the estimated budget for the polder activities in polder 28/2 is presented in Table 6.

Table 6: Polder 28/2 Budget

S.N	Task Name	Total Amount	
		BDT* ^{x100000}	EUR** ^{x1000}
1.0	<i>Institutional Framework for Participatory Water Management</i>	7.50	8.52
2.0	<i>Main Infrastructure</i>	1166.00	1371.76
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	10.2
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	28.40
5.0	<i>Environmental & Social Management / Disaster Risk Reduction (DRR)</i>	30.00	35.29
6.0	<i>Training</i>	37.49	44.10
	TOTAL	1274.99	1498.27

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)

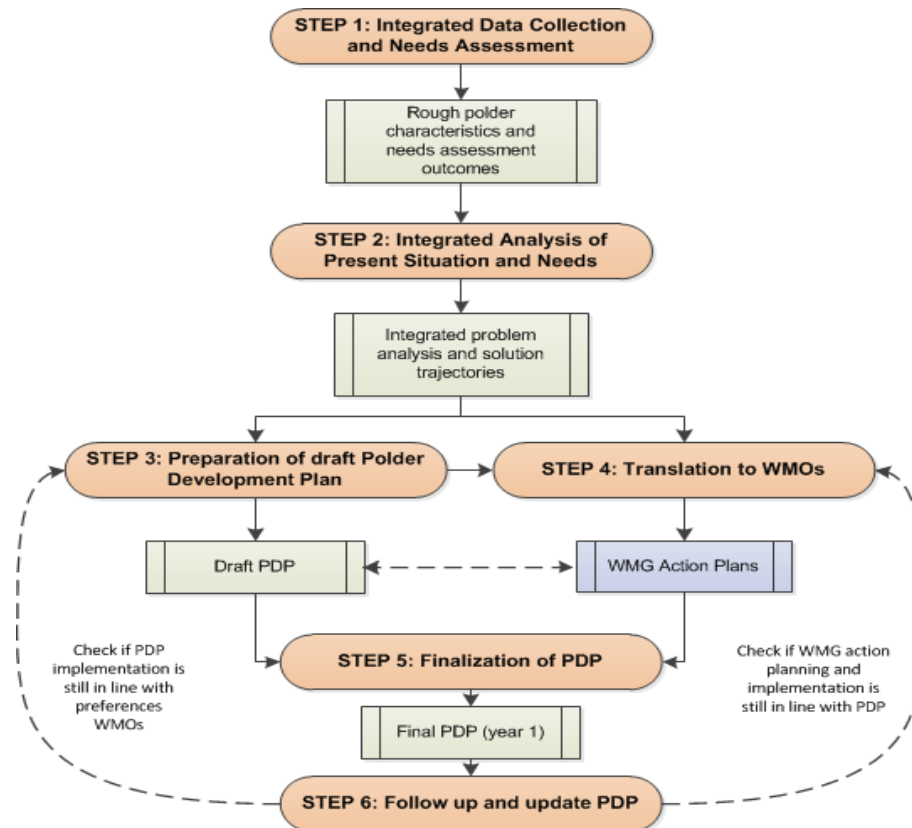


Figure 7: The steps of the PDP Formulation Process

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).

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 28/2, after drafting the PDP it was shared with the representatives of WMOs and UPs for data validation and updating

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 28/2

Embankment

Total length of the embankment around polder 28/2 is about 20.12 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 in this polder. These are:

S.N.	Name of Sluices	Number of Vents	Size, (mxm)	Location, km
1.	Ghola Sluice (S-1)	1	1.50 x 1.80	
2.	Sindurtala Sluice (S-2)	2	1.50 x 1.80	
3.	Ramdia Sluice (S-3)	9	1.20 x 1.50	
4.	Badnakhali Sluice (S-4)	2	1.20 x 1.50	
5.	Choighoria Sluice (S-5)	1	1.20 x 1.50	
6.	Barui khal Sluice (S-6)	2	1.20 x 1.50	
7.	Sachibunia Sluice (S-7)	2	1.50 x 1.80	

Drainage Outlets

There is no Outlet in this polder.

Irrigation Inlets

There is no Inlet in this polder.

Khals

There are about 35 recognizable khals with branches and having a total length of above 88.00 km.