Ministry of Water Resources

Bangladesh Water Development Board

Report on Regional Stakeholder's Consultation Workshop, Khulna Zone

Study of Long Term Monitoring, Research and Analysis of Bangladesh Coastal Zone (Sustainable Polders Adapted to Coastal Dynamics)

Coastal Embankment Improvement Project (CEIP-1)

Venue: Hotel City Inn Auditorium, Khulna

Dated: 27th April 2019

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Mr. Habibur Rahman. Chief Engineer and Project Director, CEIP-1 (Coastal Embankment Improvement Project), BWDB, in his welcoming speech mentioned that there exists 139 BWDB constructed polders in the coastal region of Bangladesh. The peripheral embankments of the existing polders were designed based on the natural high tide level. These embankments were not capable of facing impacts of the cyclone, storm surge and seal level rise. The trend of Natural disaster and cyclone in these days have increased due to the changes in climate. Other than that population including economic activities in the coastal region have been increased. Therefore, to protect the polders from the influence of these natural and manmade problems, sustainable and long-term development of the coastal areas in Bangladesh has become extremely essential. Rehabilitation of the polders has to be executed from the considerations of the risks of climate change issues, land subsidence and river bank erosions.

Mr. Kabir Bin Anwar, secretary, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech as special guest said that this study "Long Term Monitoring, Research and Analysis of Bangladesh Coastal Zone (Sustainable Polders Adapted to Coastal Dynamics)" is being carried out with the assistance from the World Bank. The long five thousand kilometers coastline of this country has no good research-based study and information. We used to take projects randomly for the immediate solutions to the burning issues. Honorable prime minister of Bangladesh, Sheikh Hasina, daughter of father of the nation Bangabandhu Sheikh Mujibur Rahman has given a new hope to Bangladesh. With the aim to ensure permanent solutions for the future generations of Bangladesh, she has taken a 100-year delta plan for the coastal development. Therefore, this workshop and the ongoing research study are being carried out complying with the delta plan. Some renowned organizations from Denmark, the Netherlands, USA and Bangladesh (IWM) are involved in this research work.

Mr. AKM Enamul Hoque Shameem MP, Honorable Deputy Minister, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech as Guest of Honour mentioned that 500 to 550 areas in Bangladesh at present are affected by the river bank erosion. Out of them 50 to 55 areas are at high risk. Which is why Honorable state minister, he himself, Secretary, other officials of the Ministry of Water Resources and DG of BWDB are visiting to different river bank erosion affected areas. During the visits instant instructions are being made according to necessity. Water Resources ministry is the ministry of humanity and its main duty is to stand beside the people affected by river bank erosion and water logging. Under the leadership of the Honorable Prime Minister, Sheikh Hasina, Ministry of Water Resources and BWDB are on the side of disaster affected people.

Chief Guest Mr. Zaheed Farooque, MP, Honorable Minister of State, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech informed that Bangladesh is holding 5th position among the countries who are at risks of challenging natural disaster created due to climate change. The specific challenges of the coastal areas are sustainable development of the coastal polders, prevent siltation on the river bed, protect areas from drainage congestion, cyclone, storm surge, long-term hydro morphological changes, changes in land use, pollution of environment, etc. These problems are increasing day by day and to get a solution to the problems this project has been taken up. From the experiences of CIDR in 2007 and Aila in 2009, it has been realized that development of the existing coastal polders is needed. Aiming to that objective,

this study has been admitted. Protection of river bank erosion in the coastal cannot be possible in the similar way as it is being practiced in other areas of Bangladesh. Therefore, a research study is needed, and it will help solving the problems of the coastal area.

Mr. Engr. Mahfuzur Rahman, Director General, BWDB, in his speech as Chairman said Water Board has come to a Paradigm shift from its former position. In the light of the present delta plan and with the spirit to become a developed country by 2041 as the honorable Prime Minister aspires, we have to do development and it is to be done with no regret concept. Keeping that concept in head, the height and design sections of the existing coastal embankment and also the types of the regulators wherever they exist are to be reformed/ rehabilitated according to necessity. Simultaneously water management of the polders are to be designed based on the influence of climate change issues. Due to climate change, rainfall can be increased to 15%. Considering the impact, regulators and canal systems are to be designed and embankment protections are to be provided. Following this kind of integrated approach, we did not do any project in the past. After integrating all the prevailing issues and considering the necessary parameters, this study will provide a design guideline.

Summary of Technical and Subjective Stakeholder's Consultation Team Meeting

The problems of the polders, their solutions including management issues as identified and described by the stakeholders of the southwest region in the workshop at Khulna are summarized below:

Polder problems

- Land within polders are lower than the river bed;
- Sluice gates are not functional;
- Absence of manpower and system for Operation and Maintenance of polder infrastructures;
- No opportunity exists for the affected people to provide their opinion;
- Drainage congestion and salinity are now prevailing in the polders;
- Heights of polder dykes are not sufficient;
- Most the canals are silted up and illegally occupied;
- Sluice gates are not operated systematically;
- Damage of biodiversity;
- Subsidence;
- Sluice gates are small;
- River bank erosion and silted up rivers;
- Leasing out of the canals;
- Entry of saline water for fish cultivation.

The views of the participants in the workshop regarding solutions to the above problems are summarized below:

Polder Management

- Land within polder are being deprived of siltation for the last 60 years. Therefore, settling of silt inside the polder are to be allowed exploiting tidal flow;
- To allow free movement of tidal flow, sluice gates are to be widened sufficiently comparing with the width of canal or river;

- According to C.S map, canals inside the polder are to be freed from illegal occupants and to be excavated;
- Local administration together with public representatives need to be involved in the management and maintenance of regulators/ sluices and in appointing staffs for their operations;
- Make water retention ponds within *khas* lands of the polders;
- Polder dykes are to be strengthened and raised to sufficient heights;
- Ensure regular maintenance of the polder infrastructures;
- Prevent leasing out of the river and canals;
- Establish connectivity of the river system and canals;
- Introduce sluice gates capable of two-way movement of water;
- Afforestation;
- There is need of movement of fish and boat through sluice gates;
- Climate change disaster issues together with land structure and tidal conditions are to be kept in mind in the polder design. In this regard ecosystem is also to be counted;
- making small catchments within the polder and their management.

Land erosion and Sediment management

- Water flow in the river system during high and low tide need to be increased;
- Planned construction of sustainable and climate resilient dykes;
- The dyke (toe) of the polder should be at least 100 feet away from the river bank;
- TRM needs to be introduced in reducing sedimentation in the rivers and downstream canals of the gates;
- Dredging of the rivers;
- Regular maintenance of polder dykes and make afforestation outside dyke periphery

Investment Plan

- Introduction of a new regional authority for the overall management of the southwest coastal region;
- Investment to recover ecosystem of the southwest coastal region;
- Rehabilitation of the people suffering from climate change issue;
- Investment aimed at TRM in the polders of southwest region for silt management;
- Investment for repairing and raising dyke heights including regular maintenance of them;
- Investment to establish green belt with mangrove plantation;
- Investment for climate resilient agriculture, fishery and livestock

1. Introduction

Bangladesh is located at the confluence of the three great trans-Himalayan rivers – the Ganges, the Brahmaputra and the Meghna (GBM). While over 90 percent of the catchment of the GBM system lies outside of Bangladesh, more than 200 rivers and tributaries and distributaries of the GBM system drain through the country via a constantly changing network of channels, tidal inlets and creeks, before emptying out into the Bay of Bengal. Thus, the coastal zone of Bangladesh, a landmass just above the mean sea level, is continually influenced by these Himalayan drainage systems that form one of the largest and most active deltas in the world.

The coastal zone of Bangladesh spans over 710 km of coastline and is prone to multiple threats. Sixty two percent of the coastal land has an elevation less than 3 meters and eighty-three percent is within 5 meters above mean sea level. The flow of the rivers entering the GBM delta is the third largest in the world and river floods occur regularly, often leading to flooding of one thirds of the country. In 1998, the flooded area covered as much as two thirds of the country. With a sediment supply of 1 billion tons per year, this is the delta with the largest sediment supply in the world. This leads to accretion of the land area in the coastal zone (5-10 km^2/year, mainly in the Meghna Estuary), and to highly unstable river branches and estuaries.

In fact, the entire coastal belt is subject to regular erosion and deposition process. The large amount of sediments deposited form loose land mass and obviously subsides under natural conditions of overburden pressure. It is also known that their formations of peat soil the coastal deposits. It has been noticed that the subsidence rate may be higher in places due to anthropogenic factors like drainage and ground water extraction. On top of that there are tectonic movements in the deep subsoil, caused by the horizontal plate movements.

The coastal zone of Bangladesh contributes 32 percent of the land area and hosts nearly 28 percent of the population (i.e. nearly 42 million). The coastal population is projected to grow to 61 million by 2050. A high pace of population growth characterizes coastal districts. This trend continues to push millions of people to live in the low-lying coastal areas, which are highly vulnerable to natural hazards. However, in recent years it has been noticed that population growth is much lower than rest of the country, especially in the western part of the coastal belt, possibly resulting from out migration due to several factors including increase in storm surges and cyclonic events.

The coastal lands, being subject to regular flooding by saline water during high tides, could not be used for normal agricultural production. In 1960s polder technology was initiated to build coastal polders surrounded by embankments preventing the spilling of saline water onto the lands at high tides and thus the coastal area became suitable for cultivation. The Coastal Embankment Project made possible the reclamation of large tracts of land for agriculture from 160 onwards. Polder building proceeded continuously until today. We now have 1.2 million hectares reclaimed in 139 active polders in the coastal zone of Bangladesh where most of the people in this area live.

In over half century of its existence, a number of challenges have surfaced that threaten the long-term safety and even the very existence of the polder system. With the aim to possible solution of the problems, the project “Long Term Monitoring, Research and Analysis of Bangladesh Coastal Zone (Sustainable Polders Adapted to Coastal Dynamics)” arranged a Stakeholder’s Consultation

Workshop at the City Inn Hotel in Khulna on 27/04/2019. The people living in the polders of the southwest region of the country participated in the workshop. Mr. Zaheed Farooque, MP, Honorable Minister of State, Ministry of Water Resources, attended the Workshop as Chief Guest. Mr. AKM Enamul Hoque Shameem MP, Honorable Deputy Minister, Ministry of Water Resources was present as Guest of Honour. As Special Guests, Mr. Kabir Bin Anwar, Secretary, Ministry of Water Resources, Mr. Nishchinta Kumar Podder, Additional Divisional Commissioner, Khulna and Mr. Md. Helal Hossain, Deputy Commissioner, Khulna attended the workshop. The chairman of the workshop was Mr. Engr. Mahfuzur Rahman, Director General, BWDB. Approximately 130 participants attended the workshop who were Govt. officers, Professionals and the individuals from the polders of Jessore, Khulna, Satkhira an Bagerhat.

2. Background of the Workshop

Two consecutive floods occurred in 1954 and 1955, sufferings of the mass caused by the floods, loss and damage of crops due to floods, loss and damage of crops due to inundations created by high tides, intrusion of saline water into agricultural land, creation of prospects for agricultural activities, creating safe environment for the people living along entire Bangladesh coast – all are attributed to the creation of *East Pakistan Water And Power Development Board* by the erstwhile government. In order to achieve all these objectives this organization started construction of coastal embankments in early sixties that continued through subsequent decades. Since then BWDB has constructed 139 polders. These polders play a significant role in production of agricultural produce and providing safety to the people. However, these polders over the course of time created enormous negative impacts to the nature, such as silted-up or getting squeezed or dying of rivers and khals of varying sizes inside the polders, decrease in biodiversity, extinction of species etc.

The rivers cannot, as could before, spread their water flow and sediment onto the flood plains or on distant landmass due to the embankments appearing as obstacles between land and rivers. As a result, many adverse effects are gradually getting significant - like rise of river bed, getting squeezed of rivers in width, decrease in speed of water current etc. This is to say that extensive impacts have cast over the natural environment both outside and inside the embankment across the entire coastal area.

In the initial planning of construction of embankments, the main attention was given towards protection of agricultural land. The matters of protecting water resources in rivers and canals, maintaining harmony between environments inside and outside the polders, protecting overall environment etc. could not effectively make rooms for considerations in the initial planning. A shortfall is apparent in preparing designs of embankments due to the lack of information and data involving tackling of storm surges caused by high-rated cyclones. In addition, the extent of this shortfall has increased as a result of already changed and changing climate. The need of constructing timely, improved, and effective polders, is now therefore felt, for the sake of increase in agricultural produce, considering the issues of increase in storm surge height due to severe cyclones, adverse effects caused by climate change such as sea level rise, severe wind actions, creating environment of free movements for fish, maintaining biodiversity. In order to achieve these objectives Bangladesh government has undertaken a project titled *Coastal Embankment Improvement Project, Phase 1*.

The salient objectives of this long term study:

- To create a framework for polder design, based on understanding of the long term and large scale dynamics of the Bengal delta and on sustainable polder concepts.
- To present an overview of values of relevant parameters at locations in the polder area, now and in the future, as boundary conditions for polder design and management.
- To develop a long term investment plan for implementation of the proposed design and management improvements leading to integrated water resources management, targeting sustainable development goals.
- To build the analytical foundation and technical capacity of BWDB and other stakeholders including local communities, as appropriate, to engage in science driven decisions on floods, storm surges and drought hazards in the coastal region of Bangladesh.

In order to construct sustainable and effective polder taking into considerations of the aspects of past planning regarding embankment, lessons learned regarding preparation of designs, and meeting requirements of now and the future, there is a research component under this project (CEIP-1) titled *Long Term Monitoring, Research and Analysis of Bangladesh Coastal Zone.*

In order to extend support to this research work it is very much necessary to gather opinions, information, data from different government and non-government organizations, people of different classes in the coastal area. Towards this aim it is one of the useful means to arranging a workshop involving concerned stakeholders. There will be more than one workshop so that entire coastal area comes under such information gathering endeavor. As part of this endeavor a workshop was held in Khulna city at the City Inn Hotel Auditorium on 27 April 2019 by the participation of stakeholders from the southwest coastal region. In this workshop Mr. Zahid Faruk, MP, State Minister of the Ministry of Water Resources of the People's Republic of Bangladesh was present as the chief guest.

3. Inaugural Session

3.1 Summary of speeches, Inaugural Session

Mr. Habibur Rahman. Chief Engineer and Project Director, CEIP-1 (Coastal Embankment Improvement Project), BWDB, in his welcoming speech mentioned that there exists 139 BWDB constructed polders in the coastal region of Bangladesh. The peripheral embankments of the existing polders were designed based on the natural high tide level. These embankments were not capable of facing impacts of the cyclone, storm surge and seal level rise. The trend of Natural disaster and cyclone in these days have increased due to the changes in climate. Of them CIDR in 2007, Aila in 2009 and later on Mahasen in 2013 are notable. Other than that population including economic activities in the coastal region have been increased. Therefore, to protect the polders from the influence of these natural and manmade problems, sustainable and long-term development of the coastal areas in Bangladesh has become extremely essential. Rehabilitation of the polders has to be executed from the considerations of the risks of climate change issues, land subsidence and river bank erosions. Consultants in their study will investigate the matters and will provide opinions based on findings.

Mr. Kabir Bin Anwar, secretary, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech as special guest said that this study "Long Term Monitoring, Research and Analysis of Bangladesh Coastal Zone (Sustainable Polders Adapted to Coastal Dynamics)" is being carried out with the assistance from the World Bank. The long five thousand kilometers coastline of this country has no good research-based study and information. We used to take projects randomly for the immediate solutions to the burning issues. Honorable prime minister of Bangladesh, Sheikh Hasina, daughter of father of the nation Bangabandhu Sheikh Mujibur Rahman has given a new hope to Bangladesh. With the aim to ensure permanent solutions for the future generations of Bangladesh, she has taken a 100-year delta plan for the coastal development. Therefore, this workshop and the ongoing research study are being carried out complying with the delta plan. Some renowned organizations from Denmark, the Netherlands, USA and Bangladesh (IWM) are involved in this research work. We have to protect few hundred thousand kilometers of navigable route, riversides and river banks. Honorable Prime Minister urged the need for dredging of the rivers canals and beels to increase the water holding capacity. The dredged earth can be utilized in the reclamation of land which is very necessary. This workshop has been arranged to know the opinion of the stakeholders regarding the problems and their solutions of the coastal polders. Based on the opinions as obtained from the workshop, research work will be progressed and thus find out a way of long-term solutions to the problems of the polders.

Mr. AKM Enamul Hoque Shameem MP, Honorable Deputy Minister, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech as Guest of Honour mentioned that 500 to 550 areas in Bangladesh at present are affected by the river bank erosion. Out of them 50 to 55 areas are at high risk. Which is why Honorable state minister, he himself, Secretary, other officials of the Ministry of Water Resources and DG of BWDB are visiting to different river bank erosion affected areas. During the visits instant instructions are being made according to necessity. Additional officials and employees have been employed in these affected areas to accomplish abundant works. During the need they will work on Fridays and Saturday and even during government holydays. Water Resources ministry is the ministry of humanity and its main duty is to stand beside the people affected by river bank erosion and water logging. Under the leadership of the Honorable Prime Minister, Sheikh Hasina, Ministry of Water Resources and BWDB are on the side of disaster affected people.

Chief Guest Mr. Zaheed Farooque, MP, Honorable Minister of State, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech informed that Bangladesh is holding 5th position among the countries who are at risks of challenging natural disaster created due to climate change. The specific challenges of the coastal areas are sustainable development of the coastal polders, prevent siltation on the river bed, protect areas from drainage congestion, cyclone, storm surge, long-term hydro morphological changes, changes in land use, pollution of environment, etc. These problems are increasing day by day and to get a solution to the problems this project has been taken up. From the experiences of CIDR in 2007 and Aila in 2009, it has been realized that development of the existing coastal polders is needed. Aiming to that objective, this study has been admitted. Protection of river bank erosion in the coastal cannot be possible in the similar way as it is being practiced in other areas of Bangladesh. Therefore, a research study is needed, and it will help solving the problems of the coastal area. This is not the problem of the Ministry rather it is a national problem. We have to work together to fight the challenges. If you can help us with your living experiences and knowledges; than it will be easier for the Ministry of Water resources to solve problems of the coastal area polders.

Mr. Engr. Mahfuzur Rahman, Director General, BWDB, in his speech as Chairman said Water Board has come to a Paradigm shift from its former position. In the light of the present delta plan and with the spirit to become a developed country by 2041 as the honorable Prime Minister aspires, we have to do development and it is to be done with no regret concept. Keeping that concept in head, the height and design sections of the existing coastal embankment and also the types of the regulators wherever they exist are to be reformed/ rehabilitated according to necessity. Simultaneously water management of the polders are to be designed based on the influence of climate change issues. Due to climate change, rainfall can be increased to 15%. Considering the impact, regulators and canal systems are to be designed and embankment protections are to be provided. Following this kind of integrated approach, we did not do any project in the past. After integrating all the prevailing issues and considering the necessary parameters, this study will provide a design guideline. If we can formulate this design guideline and follow it strictly, we can assure that Bangabandhu's dream of Sonar Bangla as the honorable Prime Minister aspires to take shape will be possible to be implemented. Achieving that goal, Ministry of Water resources and BWDB are moving forward.

3.2 Welcoming Address

Engineer Habibur Rahman, Chief Engineer & Project Director, CEIP-1 (Coastal Embankment Improvement Project-1), BWDB (Bangladesh Water Development Board).

Mr. Habibur Rahman. Chief Engineer and Project Director, CEIP-1 (Coastal Embankment Improvement Project), BWDB, in his welcoming speech mentioned that there exists 139 BWDB constructed polders in the coastal region of Bangladesh. The peripheral embankments of the existing polders were designed based on the natural high tide level. These embankments were not capable of facing impacts of the cyclone, storm surge and seal level rise. The trend of Natural disaster and cyclone in these days have increased due to the changes in climate. Of them CIDR in 2007, Aila in 2009 and later on Mahasen in 2013 are notable. Other than that population including economic activities in the coastal region have been increased. Therefore, to protect the polders from the influence of these natural and manmade problems, sustainable and long-term development of the coastal areas in Bangladesh has become extremely essential. Rehabilitation of the polders has to be executed from the considerations of the risks of climate change issues, land subsidence and river bank erosions. Consultants in their study will investigate the matters and will provide opinions based on findings.

3.3 Address of the Special Guest

Mr. Kabir Bin Anwar, Secretary, Ministry of Water Resources, People's Republic of Bangladesh.

Mr. Kabir Bin Anwar, secretary, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech as special guest said that this study "Long Term Monitoring, Research and Analysis of Bangladesh Coastal Zone (Sustainable Polders Adapted to Coastal Dynamics)" is being carried out with the assistance from the World Bank. The coast line we possess is around five thousand kilometer that extends from the Indian boarder at Haria Bhanga river in the west to the Naff river in the east. This five-thousand-kilometer coastline of this country has no good research-based study and information. We used to take projects randomly for the immediate solutions to the burning issues. Honorable prime minister of Bangladesh, Sheikh Hasina, daughter of father of the nation Bangabandhu Sheikh Mujibur Rahman has given a new hope to the nation. With the aim to ensure permanent solutions for the future generations of Bangladesh, she has taken a 100-year delta plan for the coastal development. Therefore, this workshop and the ongoing research study are being carried out complying with the delta plan. Some renowned organizations from Denmark, the Netherlands, USA and Bangladesh (IWM) are involved in this research work. Deltares of the Netherlands owns vast working experience in Bangladesh and they have been working here for more than 50 years.

BWDB (Bangladesh Water Development Board) maintains 16800 kilometers of embankments throughout the country. In the haor basin i.e. in the seven districts of Sunamganj, Netrakona, Sylhet, Brahmanbaria, Moulvibazar, Habiganj and Kishoreganj around 1700 km bank protection works takes place where the overall bank protection works are executed in 17000 km. Wherever there is river bank erosion we rush on to the places, put some geo-bags, and then take a project. That is how we do work on an ad hoc basis. We have to protect few hundred thousand kilometers of navigable route, riversides and river banks. Honorable Prime Minister urged the need for dredging of the rivers canals and beels to increase the water holding capacity. From study we have realized that the dredging to increase water holding capacity has manifold advantages like:

- Navigability will increase
- Water vessels can move through canals
- Carrying cost will be reduced in the water navigation route
- Ground water recharge will increase
- Irrigation water will be available in the dry season
- Area for fisheries development will be increased
- Help protecting the balance in eco system

Now the question is where the dredged earth can be kept. This dredged earth can be utilized in the reclamation of land, where cultivation will take place, industries will be established, and employment opportunities will be generated. We are working on achieving that goal.

This workshop has been arranged to know the opinion of the stakeholders regarding the problems and their solutions of the coastal polders. Based on the opinions as obtained from the workshop, research work will be progressed and thus find out a way of long-term solutions to the problems of the polders. The work is little time consuming and therefore patience would be needed.

3.4 Address of the Guest of Honour

Mr. AKM Enamul Haque Shamim, MP, Honorable Deputy Minister, Ministry of Water Resources, People's Republic of Bangladesh.

Mr. AKM Enamul Hoque Shameem MP, Honorable Deputy Minister, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech as Guest of Honour said the most important work of the Water Resources Ministry and BWDB (Bangladesh Water Development board) is to take challenge of the recent rainfall and flood. He mentioned that 500 to 550 areas in Bangladesh at present are affected by the river bank erosion. Out of them 50 to 55 areas are at high risk. Our first duty would be to take preparation in advance for the rainfall, flood and water logging. Which is why Honorable state minister, he himself, Secretary, other officials of the Ministry of Water Resources and DG of BWDB are visiting to different river bank erosion affected areas. During the visits instant instructions are being made according to necessity. For the last three months I have visited 18-19 places of river bank erosions. We, including the honorable state minister and secretary are working together to challenge the upcoming flood. The works of BWDB at Khulna should be controlled from Khulna office. I have discussed this issue with the secretary and honorable state minister. Though Khulna is a divisional town, some of its works are controlled from Satkhira due to the adverse road communication. Now, the road network is improved and therefore, we would establish the work control from Khulna.

We have come here to the workshop to listen to your important thoughts on the problem of polders as well as their solutions. You will be happy to know that additional officials and employees have been employed in the adversely affected areas so that additional and plenty of works can be accomplished. If necessary, they will work on Fridays and Saturday and even during government holydays. Water Resources ministry is the ministry of humanity and its main duty is to stand beside the people affected by river bank erosion and water logging. Under the leadership of the Honorable Prime Minister, Sheikh Hasina, Ministry of Water Resources and BWDB are on the side of disaster affected people. We are here to help the people who are affected by waterlogging and, we would do services whatever needed for the disaster affected people.

3.5 Address of the Chief Guest

Mr. Zahid Faruk, MP, Honorable State Minister, Ministry of Water Resources, People's Republic of Bangladesh.

Chief Guest Mr. Zaheed Farooque, MP, Honorable Minister of State, Ministry of Water Resources, Peoples Republic of Bangladesh, in his speech expressed gratitude to the organizer of BWDB who arranged the stakeholder's consultation workshop at Khulna for the study titled "Long Term Monitoring, Research and Analysis of Bangladesh Coastal zone (Sustainable Polders Adapted to Coastal Dynamics)". We hope that the participants would contribute their valuable thoughts in identifying problems of the polders and their solutions to get rid of the problems. We all know that Bangladesh is one of the biggest delta in the world which is formed by the three great trans-Himalyan rivers the Ganges, the Brahmaputra and the Meghna. Except the southeast and northeast hilly area of Bangladesh, the rest of the country's land is flat in Topography. The coastal zone in the country can be considered as the most resourceful area where a large portion of the people are living. From the worldwide experience and experiences from Bangladesh, it is proved that climate change poses threat to our nation as well as globally. Bangladesh is holding 5th position among the countries who are at risks of challenging natural disaster created due to climate change. If we cannot solve the ongoing problems through engaging consultants, the problems may keep on increasing with time. The specific challenges of the coastal areas are sustainable development of the coastal polders, prevent siltation on the river bed, protect areas from drainage congestion, cyclone, storm surge, long-term hydro morphological changes, changes in land use, pollution of environment, etc. These problems are increasing day by day and to get a solution to the problems this project has been taken up. From the experiences of CIDR in 2007 and Aila in 2009, it has been realized that development of the existing coastal polders is needed. Aiming to that objective, this study has been admitted. We welcome you at the workshop to provide your valuable ideas and discussions from personal experiences and thus help the study come out with quick effective outputs to take a useful project. We all would like to follow the plans and directions of the honorable prime minister Sheik Hasina in implementing the dream for Sonar Bangla of Bangabandhu Sheik Mujibur Rahman. Secretary of the Water Resources Ministry in his speech mentioned that the river bank erosion projects are taken on an ad-hoc basis and geobags and concrete blocks are used in the protection works. The direction of the honorable prime minister is to stop these kinds of temporary measures as they cannot solve the bank erosion problems. She says big rivers are to be taken up under big river training projects to address the river erosion problems. We are going ahead with the aim to execute her directions. After formation of the government, we the state minister, deputy minister, sectary and BWDB officials of the Water Resources Ministry are visiting days and nights throughout the country. You may

have heard that in 2017 there has been enormous damage and shortage of crop production in Sunamganj area due to flood. This time we have worked hard for the protection. You will be happy to know that we have been successful in saving the embankments of Sunamganj. Farmers will now be able to harvest their paddy safely to take home. Similarly, in other areas we can train the rivers and thus protect the rivers from bank erosions. We have taken those kinds of projects in hand. We are working with the honorable MPs and their people of the affected area on identifying the problems of river bank erosions and how these can be properly addressed. You know that we have our future plan to protect big rivers by dredging.

Protection of river bank erosion in the coastal cannot be possible in the similar way as it is being practiced in other areas of Bangladesh. Therefore, a research study is needed, and it will help solving the problems of the coastal area. This is not the problem of the Ministry rather it is a national problem. We have to work together to fight the challenges. If you can help us with your living experiences and knowledges; than it will be easier for the Ministry of Water resources to solve problems of the coastal area polders.

I firmly believe that we would be able to make success to the endeavors of the honorable prime minister Sheik Hasina in materializing the dream of Bangabandhu's Sonar Bangla.

3.6 Address of the Chairman

Mr. Md. Mahfuzur Rahman, Director General, Bangladesh Water Development Board.

Mr. Engr. Mahfuzur Rahman, Director General, BWDB, in his speech as Chairman said we have an ongoing project named Coastal Embankment Improvement Project. When we have taken that project in hand there was a component to conduct a feasibility study of the whole coastal area. It was discussed in the previous addresses, why that study would be undertaken. Honorable local MP has pointed out the severity of river erosion problems in Paikgacha, Koyra and Dacope. If we think deeply, then we can see the main problems of those areas are siltation, salinity, cyclone and river erosion. Simultaneously there is problem of flood. During the dry season, water of Gorai-Modhumoti-Rupsa river system drains through Khulna and Mongla where the navigability is low. Together with these problems 139 polders are added which extends from Haria Bhanga river to Teknaf river including a portion of the Bay of Bengal. In that case the circulation of sediment, the influence of cyclone and tide are to be kept in mind in doing water management design in the polders. All these influences will be considered in this study. As our honorable minister mentioned, we will take projects in hand based on the study.

Water Board has come to a Paradigm shift from its former position. In the light of the present delta plan and with the spirit to become a developed country by 2041 as the honorable Prime Minister aspires, we have to do development and it is to be done with no regret concept. Keeping that concept in head, the height and design sections of the existing coastal embankment and also the types of the regulators wherever they exist are to be reformed/ rehabilitated according to necessity. Simultaneously water management of the polders are to be designed based on the influence of climate change issues. Due to climate change, rainfall can be increased to 15%. Considering the impact, regulators and canal systems are to be designed and embankment protections are to be provided. Following this kind of integrated approach, we did not do any project in the past. After integrating all the prevailing issues and considering the necessary parameters, this study will provide a design guideline. If we can formulate this design guideline and follow it strictly, we can assure that Bangabandhu's dream of Sonar Bangla as the honorable Prime Minister aspires to take shape will be possible to be implemented. Achieving that goal, Ministry of Water resources and BWDB are moving forward.

4. Stakeholder's Consultation Meeting (Technical & Subjective)

4.1 Address of Deputy Team Leader

Presenter of the topic "Problem of the polders, their development planning and design" Mr. Zahirul Haque Khan, DTL and Director, Coast, Port and Estuary Division, Institute of Water Modelling (IWM).

After welcoming everybody of the workshop, he said that the polder infrastructures are to be designed based on the overall considerations of the issues like river water levels during monsoon, storm surge, cyclone, sea level rise due to climate change, subsidence, etc. Similarly considering the overall issues, planning and design for the fast and effective drainage system of polders are to be worked out. There should be provisions for unobstructed movement of fish and boat in the polder system. Modern technology for the superior and easy operational system of sluice gates are already been adopted in the developed world. Our sluice gates are very heavy. But the gates with modern technology are light and durable and cannot decay in saline water. Our sluice gates are to be built with these kinds of materials and there would be provisions for movement of boat and fish through the infrastructure. In USA, we have seen this kind of infrastructures where opportunities for unobstructed movement of fish are accommodated. We do not have this option at present, but in future we will have it.

Mr. Khan mentioned, we have to divide into five groups for this technical and subjective consultation meeting. Five sets of questionnaires are to be provided to five groups. Answers to the questions are to be written by each of the groups collectively from your own experiences. In the end the group leaders from every group will present their answers and thus the answers will be shared with everybody of the workshop. The followings are the overall questions that are prepared for you.

1. What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

2. Are the peripheral rivers around the polders experiencing bank erosions? What are the reasons behind the bank erosions? What are the bad impacts of the riverbank erosion? What kind of defense mechanism should be taken to attain sustainable bank protection? What offset distance of the poldered dyke should be kept away from the river bank?

3. What kind of investment project is necessary for the integrated development of the whole coastal area?
4. What are the new changes or modifications needed to be introduced in the design of Polder?
5. To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water into the polder through gates during dry season?
6. What are the O&M (Operation and Maintenance) problems of the Sluice Gates/ Regulators existing in the polders? What kind of measures or techniques should be taken to address the problems? Is there any necessity for the movement of fish and boat through Sluice gates?
7. Is there any problem of siltation in the peripheral river of the polders? If the rivers are silted up than what are the reasons behind it? What consequences had occurred due to the river siltation? Compared to the past, are the tide levels in these rivers increasing or decreasing? What are the necessary measures to be taken for managing river siltation and the rise in tide levels?
8. Identify the problems of irrigation management during the dry season. In solving irrigation problems and in the development of the polder, what are your suggestions?
9. What is the present salinity concentration level in the peripheral rivers of your polder? Compared to the past are the salinity increased? Is the salinity in peripheral rivers expected to be increased in future? If the salinity is increased, what kind of adverse impact will influence on paddy, fish and coastal area? To overcome the bad influences, what are the necessary measures do you think to be taken up?

Mr. Khan pointed out that our sediment management technique should be identified as this is our main problem.

At end of his presentation he advised the participants to be divided into five groups and select group leaders. Flip charts and questions are provided on your tables and you are to write your answers in the flipcharts. After finishing your answers, group leaders will come on the stage and present answers. All your voices, data and information are being recorded that we will store.

4.2 Group Discussions

The participants dividing into five groups had groupwise discussions on the provided questions and finalize answers collectively and wrote them in the flipcharts. After finishing writing, Team Leaders on behalf of the groups came up on the stage with their written views in flipcharts and presented before the participants in the workshop. The answers prepared for the groups together with their answers are provided in Appendix-3 of this report.

4.3 Address of Moderator

Professor Dr. M. Monowar Hossain, Executive Director, Institute of Water Modelling (IWM).

After Greeting the Participants of the Workshop, Dr. Hossain said you are challenging with the local problems for long and you know what probable measures to be taken to solve the problems. IWM in the past had consultation with you on these local problems and provided solutions. Your judicious discussions and replies to the questions in the workshop have reflected the similar problems. We have a team here, who have discussed with all the different groups on the local problems and they have sincerely realized all your views and thinking for the solution. You have spoken to the problem of siltation, river erosion, salinity intrusion, drainage congestion and water logging, etc. and simultaneously opined and discussed on several ways of getting rid of the problems. You also pointed out not to think on the traditional ways of solutions, rather to consider for the innovative solution. You have correctly made us understood that only solution is the subject matter of this research. We have several partners working together in this study. Considering the discussions of the workshop, we will conduct a good study to find out an effective solution and prepare a report to submit to the government. You have discussed about the TRM, which is your concept and we are trying to establish a scientific base on it. We have taken note of the workshop proceedings, and for your valuable opinions, I on behalf of IWM expressing thanks and gratitude to you all and assuring you that we are with you in resolving solutions to the problems.

4.4 Address of Chairman, Technical & Subjective Session

Mr. Md. Habibur Rahman, Chief Engineer and Project Director, Coastal Embankment Improvement Project (CEIP-1), Bangladesh Water Development Board.

Mr. Md. Habibur Rahman, expressed his heartiest thanks and gratitude to all the participants and guests whose presence and hard work have made the workshop successful. He expressed special thanks to the organizing consulting firms and the officials of the government and non-government offices, who have participated in the workshop and provided valuable opinion. In his address he said in the nineties we worked here, and we know about the water logging and TRM. Whatever you have discussed about TRM would be included in the study. Through this study the height of the embankment of the whole coastal polders extending from the Sundarbans to the Teknaf area would be determined based on the subjects like climate change, storm surge, sea level rise, subsidence, etc. In this respect your valuable opinion will play important role. In addition to IWM, the other consultant teams working in the study are from DHI, Deltares and from the USA universities of Columbia and Colorado where Novel Prize winner professors are associated. In addition to the problems of these polders they have enough experiences on subsidence. We hope that we would get a good report from them where your opinion would be considered with importance. We know you are directly connected with the problems of the polders for the last 40 to 50 years. Therefore, you have much more practical experiences than the foreign experts. Last month we conducted a workshop on Barisal division at Barisal and today we did it at Khulna. Our next workshop would be held at Chittagong. Including Chittagong division, opinions of stakeholders from the three coastal divisions would help a lot to the study.

In the end he seeks apologize from the participants for taking their valuable long time of presence from 9 AM to 3 PM. He pursues blessing from all and said that the parameters that we would obtain from the report including the design data and information from the consultants, the polders would be designed on that basis. Our consultants have worked day and night for the workshop. Especially he expressed his gratitude to Zahirul Haque Khan and Dr. Salam Sikdar. He also expressed his gratitude to all BWDB officials and employees.

5. Summary of Technical and Subjective Stakeholder's Consultation Team Meeting

Summary (Khulna)

The problems of the polders, their solutions including management issues as identified and described by the stakeholders of the southwest region in the workshop at Khulna are summarized below:

Polder problems

- Land within polders are lower than the river bed;
- Sluice gates are not functional;
- Absence of manpower and system for Operation and Maintenance of polder infrastructures;
- No opportunity exists for the affected people to provide their opinion;
- Drainage congestion and salinity are now prevailing in the polders;
- Heights of polder dykes are not sufficient;
- Most the canals are silted up and illegally occupied;
- Sluice gates are not operated systematically;
- Damage of biodiversity;
- Subsidence;
- Sluice gates are small;
- River bank erosion and silted up rivers;
- Leasing out of the canals;
- Entry of saline water for fish cultivation.

The views of the participants in the workshop regarding solutions to the above problems are summarized below:

Polder Management

- Land within polder are being deprived of siltation for the last 60 years. Therefore, settling of silt inside the polder are to be allowed exploiting tidal flow;
- To allow free movement of tidal flow, sluice gates are to be widened sufficiently comparing with the width of canal or river;
- According to C.S map, canals inside the polder are to be freed from illegal occupants and to be excavated;
- Local administration together with public representatives need to be involved in the management and maintenance of regulators/ sluices and in appointing staffs for their operations;
- Make water retention ponds within *khas* lands of the polders;
- Polder dykes are to be strengthened and raised to sufficient heights;
- Ensure regular maintenance of the polder infrastructures;
- Prevent leasing out of the river and canals;
- Establish connectivity of the river system and canals;
- Introduce sluice gates capable of two-way movement of water;
- Afforestation;

- There is need of movement of fish and boat through sluice gates;
- Climate change disaster issues together with land structure and tidal conditions are to be kept in mind in the polder design. In this regard ecosystem is also to be counted;
- making small catchments within the polder and their management.

Land erosion and Sediment management

- Water flow in the river system during high and low tide need to be increased;
- Planned construction of sustainable and climate resilient dykes;
- The dyke (toe) of the polder should be at least 100 feet away from the river bank;
- TRM needs to be introduced in reducing sedimentation in the rivers and downstream canals of the gates;
- Dredging of the rivers;
- Regular maintenance of polder dykes and make afforestation outside dyke periphery

Investment Plan

- Introduction of a new regional authority for the overall management of the southwest coastal region;
- Investment to recover ecosystem of the southwest coastal region;
- Rehabilitation of the people suffering from climate change issue;
- Investment aimed at TRM in the polders of southwest region for silt management;
- Investment for repairing and raising dyke heights including regular maintenance of them;
- Investment to establish green belt with mangrove plantation;
- Investment for climate resilient agriculture, fishery and livestock

Appendix-1

Photographs of Stakeholder's Consultation Workshop, Khulna

Photographs

Engineer Md. Mahfuzur Rahman, Director General, BWDB, delivering speech as Chairman of the Workshop

Mr. Kabir Bin Anwar, Honorable Secretary of the Ministry of Water Resources, delivering Speech as Special Guest of the Workshop

Mr. AKM Enamul Haque Shamim, MP, Honorable Deputy Minister of the Ministry of Water Resources, delivering speech as Guest of Honour

Mr. Zahid Faruk, MP, Honorable State Minister, Ministry of Water Resources, delivering speech as Chief Guest of the Workshop

Photographs

Portion of the invited Participants at the Workshop

Portion of the invited Participants at the Workshop

Portion of the invited Participants at the Workshop

Engineer Md. Mahfuzur Rahman, DG, BWDB, delivering speech as Chairman; Chief guest, Special guest and other honorable guests are seating on the Stage.

Photographs

Portion of the invited Participants at the Workshop

Seating on the stage from left Professor Dr. M. Monowar Hossain, Executive Director, IWM; Mr. Kamruzzaman, Local Water Resources Specialist; Mr. Md. Habibur Rahman, PD and Chief Engineer, CEIP-1, BWDB; Shafiqul Islam, Principal, Bhabodaho College

Subjective Group Discussion

Subjective Group Discussion

Photographs

Subjective Group Discussion

Subjective Group Discussion

Subjective Group Discussion

Subjective Group Discussion

Photographs

Subjective Group Discussion

Subjective Group Discussion

Subjective Group Discussion

Team leader of Group -2 & President IWMF, Mr. Mohir Uddin Bishwash, presenting the outcomes of their group discussions

Photographs

৩ নং গ্রুপের দলগত আলোচনার ফলাফল উপস্থাপন করছেন জনাব জাহিন সামস স্বাক্ষর, প্রতিনিধি, সুশীলন, তালা, সাতক্ষীরা

Mr. Sarwar Alam of Group-5, District forest Officer, Jessore, Presenting outcomes of his group discussions

Mr. Gazi Abdul Hamid of Group-1, Bhabodaho Pani Niskason Songram Committee, presenting the outcomes of his group discussions

Mr. Ikramul Islam of Group-4, Presenting outcomes of his group discussions

Appendix-2

Questions of Different Groups

Group-1

Question-1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Question-2: Are the peripheral rivers around the polders experiencing bank erosions? What are the reasons behind the bank erosions? What are the bad impacts of the riverbank erosion? What kind of defense mechanism should be taken to attain sustainable bank protection? What offset distance of the poldered dyke should be kept away from the river bank?

Question-3: What kind of investment project is necessary for the integrated development of the whole coastal area?

Question-4: What are the new changes or modifications needed to be introduced in the design of Polder?

Question-5: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water into the polder through gates during dry season?

Group-2

Question-1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Question-2: Do you have the problems prevailing in your polder like waterlogging, filling up and grabbing of the drainage canals, conflicts between growing rice and fishery and dykes with low height? What are the ways to get rid of the problems and what kind of participatory water management practice needs to be planned to attain sustainable solution?

Question-3: What are the O&M (Operation and Maintenance) problems of the Sluice Gates/ Regulators existing in the polders? What kind of measures or techniques should be taken to address the problems? Is there any necessity for the movement of fish and boat through Sluice gates?

Question-4: What are the new changes or modifications needed to be introduced in the design of Polder?

Question-5: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water through gates into the polder during dry season?

Question-6: What kind of investment project is necessary for the integrated development of the whole coastal area?

Group-3

Question-1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Question-2: Is there any problem of siltation in the peripheral river of the polders? If the rivers are silted up than what are the reasons behind it? What consequences had occurred due to the river siltation? Compared to the past, are the tide levels in these rivers increasing or decreasing? What are the necessary measures to be taken for managing river siltation and the rise in tide levels?

Question-3: Identify the problems of irrigation management during the dry season. In solving irrigation problems and in the development of the polder, what are your suggestions?

Question-4: What kind of investment project is necessary for the integrated development of the whole coastal area?

Question-5: What are the new changes or modifications needed to be introduced in the design of Polder?

Question-6: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water through gates into the polder during dry season?

Group-4

Question-1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Question-2: What is the present salinity concentration level in the peripheral rivers of your polder? Compared to the past are the salinity increased? Is the salinity in peripheral rivers expected to be increased in future? If the salinity is increased, what kind of adverse impact will influence on paddy, fish and coastal area? To overcome the bad influences, what are the necessary measures do you think to be taken up?

Question-3: What kind of investment project is necessary for the integrated development of the whole coastal area?

Question-4: What are the new changes or modifications needed to be introduced in the design of Polder?

Question-5: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water through gates into the polder during dry season?

Group-5

Question-1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Question-2: What kind of problems in the coastal area and within the polders are likely to occur in future due to climate change, storm surge, declining upstream water flow in dry season, urbanization, and changing in land use? In this changing environment, what innovative idea/technology needs to be devised in Planning the development of polders, so that implementation of a sustainable, secured, acceptable to the local public and environment friendly polder development project can be possible?

Question-3: What kind of investment project is necessary for the integrated development of the whole coastal area?

Question-4: What are the new changes or modifications needed to be introduced in the design of Polder?

Question-5: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water through gates into the polder during dry season?

Appendix-3

Views of the Stakeholders

Group:1

Name of group leader: Gazi Abdul Hamid (freedom fighter), Bhabodaho Pani Nishkason Songram committee, Jessore

Question 1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Problems:

Past Problems	Present Problems
• Sluice gate width was not adequate	• Land level inside the polder is lower than the river side
• River water cannot enter the polder	• Canals inside the polder are silted up
• Bed height of sluice gate had no harmonization with the bill depth	• Sluice gates are not working
• Dyke height was less	• Manpower and system are not available to carryout O&M activities
• O&M activities were not carried out in coordination with the people	• No opportunity available for giving opinion by the affected people
	• Polder at present is waterlogged and salty

Solution:

- Land within polder are being deprived of siltation for the last 60 years. Therefore, settling of silt inside the polder are to be allowed exploiting tidal flow;
- To allow free movement of tidal flow, sluice gates are to be widened sufficiently comparing with the width of canal or river;
- According to C.S map, canals inside the polder are to be freed from illegal occupants and to be excavated;
- Giving responsibilities to the Local government, manpower employment for the O&M activities of sluice gates are to be made;
- Water retention ponds within polder *khas* lands are to be made.

Question 2: Are the peripheral rivers around the polders experiencing bank erosions? What are the reasons behind the bank erosions? What are the bad impacts of the riverbank erosion? What kind of defense mechanism should be taken to attain sustainable bank protection? What offset distance of the poldered dyke should be kept away from the river bank?

Reason:

Reduction in depth of the river causes bank erosion.

Bad impacts:

- Dyke erosion
- Loss of homesteads and installations
- Loss of crop
- Increase in salinity
- Damage to plants and biodiversity

To prevent bank erosion, tidal flow in the river is to be increased. Planned and sustainable dykes are to be built to face the risk of climate change impacts.
Dykes (toe) are to be built 100 feet away from the river banks. Afforestation are to be made in the char and in 100 feet space between the dyke and river bank.

Question 3: What kind of investment project is necessary for the integrated development of the whole coastal area?

Reply:

- Introduction of a new regional authority for the overall management of the southwest coastal region;
- Investment to recover ecosystem;
- Rehabilitation of the land less people owing to climate change issue;

Question 4: What are the new changes or modifications needed to be introduced in the design of Polder?

Climate change disaster issues together with land structure and tidal conditions are to be kept in mind in the polder design. In this regard ecosystem is also to be thought.

Question 5: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water into the polder through gates during dry season?

Reply:

Yes, by applying TRM.
Special Remark: Ganga-Ichamoti-Jamuna-Raymongol flow is to be taken into consideration in the overall planning of polder management.

Participants:

1. Ashek e Elahi, Adi Jamuna, Nadi Bachao Andolon Committee
2. Seikh Abdur Rajjak, Panel chairman, Tala sadar UP
3. Bobotosh Mondol, Chairman, Burigoalini UP Shamnogor
4. S. M. Ataur Rahman, Chairman, Padmapukur UP
5. Gazi Abdul Hamid (freedom fighter), Bhobodaho Pani Nishkason Songram committee, Jessore
6. Dr. Towhid, Environment expert, BWDB
7. Upal Mahmud, IWM
8. Tarek Bin Hossain, IWM

Group:2

Name of group leader: Mohiruddin Biswash

Question 1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Polder problems:

- Insufficient dyke height
- Various problems in sluice gates
- Most of the canals are silted up and illegal occupation
- In appropriate gate operations
- Silted up canal at gate downstream

Solution:

- Strengthening and heightening of dyke
- Introduce sluice gates capable of two-way movement of water and make it operable
- Removal of illegal occupants from the silted-up canals and excavate following land record
- Regular maintenance of dyke, gate and canal

Question 2: Do you have the problems prevailing in your polder like waterlogging, filling up and grabbing of the drainage canals, conflicts between growing rice and fishery and dykes with low height? What are the ways to get rid of the problems and what kind of participatory water management practice needs to be planned to attain sustainable solution?

- Waterlogging, filling up of canals by illegal occupants, conflicts between rice grower and fishery, and dykes of low height exists.
- Continue TRM, prevent leasing out internal canals, remove all kind of illegal occupants, and strengthen water management organizations. Heightening of dykes. Establish coordination of work between beneficiaries, civil society, local council, and restricted government organizations.

Question 3: What are the O&M (Operation and Maintenance) problems of the Sluice Gates/ Regulators existing in the polders? What kind of measures or techniques should be taken to address the problems? Is there any necessity for the movement of fish and boat through Sluice gates?

Problems:

- Spare parts of the gates are not available on time
- Gates are being operated by some selfish influential people
- Negligence of the Authority

Solution:

- Authority should ensure timely supply of spare parts
- Gate operations to be executed by the Water management association
- There is need of movement of fish and boat through sluice gates

Question 4: What are the new changes or modifications needed to be introduced in the design of Polder?

- Polders need to be small in sizes
- compartments are to be made within the polders based on (high/ low) land elevations.

Question 5: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water through gates into the polder during dry season?

- No need

Question 6: What kind of investment project is necessary for the integrated development of the whole coastal area?

- TRM to be introduced in all coastal polders
- A regional authority to be established for the southwest coastal region.

Participants:

1. Mohiruddin Biswash (TL)
2. M. A. Hannan
3. A. Motleb Goldar
4. Md. Hashem Ali Fakir
5. Shirina Akhter
6. Kamal Hossain
7. Enamul Haque
8. Nur Ahmed Mukul
9. Shishir Kumar
10. Ajharul Islam
11. Md. Sakhayat Hossain
12. Seikh Moinuddin
13. Tapas Kumar

Group:3

Name of group leader: Not mentioned

Question 1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Problem:

- Salinity
- Reduction in depth of the rivers due to siltation – Rivers are dead and are dying
- Water logging
- Loss/ Damage of Biodiversity
- Land subsidence

Solution:

- Silt management – (TRM) – Manage silt laden water during high tide
- Take measures such that the silt deposition does not occur in the river bed rather it takes place in the nearby bill area. Application of TRM will help regaining river depth, solve the problem of water logging and save biodiversity.
- Polder dykes to be built strong and sustainable.

Question 2: Is there any problem of siltation in the peripheral river of the polders? If the rivers are silted up than what are the reasons behind it? What consequences had occurred due to the river siltation? Compared to the past, are the tide levels in these rivers increasing or decreasing? What are the necessary measures to be taken for managing river siltation and the rise in tide levels?

- Certainly, there exist problems of siltation in the peripheral rivers

Reasons:

The main reason for siltation was the technology that was applied in this region was not suitable; the polder technology of the 60's was not appropriate for this region. Rivers in this region are tidal and sediments are carried by the high tide. Due to the polder technology and coastal embankments, sediments are deposited within the river bed rather than flood plain (low lying beel area) specially in the areas where the water flow velocity is less. Therefore, many rivers and their branches are gradually silted up.

Consequences:

Water logging: Rain water cannot get out of the polder. The drainage capacities of the rivers are lost as they are no more alive.

- loss of crop/ Fishery farms are flooded
- Migration of poor affected people
- Damage of bio-diversity
- Damage of educational institutions
- Lack of job opportunity in the locality
- Shortage of potable water
- Spread of water borne diseases

Tides in the rivers are almost diminished; Name of such rivers are- Hari, Sibsa, Betna, West palta, Sholmari, Morichap, Labannyabati, Bhadra, Hamkura, Shapmara, Kholpetua, Haria, Shalikha.

Solutions:
The only solution to the problem is TRM (Tidal River Management), which can do silt management by using tides in the rivers and help regaining river depths and solve water logging situations. Examples are: Kabadak river and Pakhimara TRM.

Question 3: Identify the problems of irrigation management during the dry season. In solving irrigation problems and in the development of the polder, what are your suggestions?

Reply:
Scarcity of water and inadequate depths in the rivers and canals due to siltation.
Solution:

- Irrigation would be easy if the rivers and canals have adequate depth
- Water reservoirs for rainwater retention during monsoon
- Zoning of the polder for agriculture and shrimp culture
- Make canals active as before
- Improved irrigation technique and adaptation of crop that are saline resistant and require less water.

Question 4: What kind of investment project is necessary for the integrated development of the whole coastal area?

- Dyke repairing, heightening and planned maintenance
- TRM in every river for better silt management
- Green belt (Mangrove)
- Climate resilient improved technology for agriculture and fishery
- Investment for housing so that there will be no migration of people
- Better disaster management by NGO
- Afforestation

Question 5: What are the new changes or modifications needed to be introduced in the design of Polder?

- Two-way sluice gate
- Modern technology/ system
- Zoning within polder
- Interconnections of the river system and canals
- Provisions for the opportunity to allow sediment laden water into the polder

Question 6: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water through gates into the polder during dry season?

- There is need to allow free entry of water, but the gates are small
- Ensure uniform deposition of sediment through excavating canals within the polder
- Provide crop compensation

Participants:
Not provided during consultation

Group:4

Name of group leader: Md. Ekramul Islam

Question 1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Problem:

- Ring dyke height is low
- Within the dyke canals and branch canals are silted up
- Sluice gates are small
- Illegal occupations in the canals and dykes
- River bank erosion and river siltation

Solution:

- Heightening of dykes
- Re-excavation of canals
- Bigger gate size and increase in numbers
- Erosion protection
- Removal of illegal occupants

Question 2: What is the present salinity concentration level in the peripheral rivers of your polder? Compared to the past are the salinity increased? Is the salinity in peripheral rivers expected to be increased in future? If the salinity is increased, what kind of adverse impact will influence on paddy, fish and coastal area? To overcome the bad influences, what are the necessary measures do you think to be taken up?

- Salinity level is high and is increasing further; Salinity level in future is expected to be increased.
- Affect agriculture to a great degree;
- There should be options to hold sweet water inside the polder and prevent entry of saline water;
- Saline resistant crop needs to be cultivated;

Question 3: What kind of investment project is necessary for the integrated development of the whole coastal area?

- Government should take initiative to implement long term project (in the field of Agricultural product, fishery, water management, environmental, and social sectors).

Question 4: What are the new changes or modifications needed to be introduced in the design of Polder?

- Heightening of dykes,
- Installation of modern gates and numbers to be increased,
- re-excavation of canals and new canal excavation,
- making and management of small catchments.

Question 5: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water through gates into the polder during dry season?

- In dry season there is no need to allow free movement of saline water through the gates.

Participants:

1. Chittaranjan Halder, president WMA, Polder 22 Paikgacha, Khulna
2. Sushen Kumar Mondol, President WMA, Polder 30, Botiaghata, Khulna
3. Ananta Kumar Roy, General Secretary WMA, Polder 28/2 Botiaghata, Khulna
4. Nityananda Sarkar, President WMA, Polder 31P Botiaghata, Khulna
5. Ekramun Islam, President WMA, Polder 29 Dumuria, Khulna
6. Md. Jahangir Alam, General Secretary WMA, Polder 29 Dumuria, Khulna
7. S. M. A. Alim, General Secretary WMA, (31 part Polder 29) Botiaghata, Khulna
8. Moloy Sarkar, Regional Coordinator, ME.N.R.M, Khulna
9. Sujan Kumar Bildar, XO, BWDB, Khulna
10. Seikh Abdul Wadud, Polder Project, Khulna

Group:5

Name of group leader:

Question 1: What are the various problems occurred within the polder in the past and being faced presently? What kinds of planning are necessary to be taken up to address these problems for the development of polders?

Problems:

Past problem	Present Problem
• Absence of enough sluice gates	• Canals and rivers are silted up
• Sluice gates were not operational	• Canals are leased out
• Quality of Dykes were not good	• Salt water is allowed into the polder for fishery
• Dyke height was less	• Water logging
• There was no arrangement for afforestation	• Illegal occupation of dyke slope
	• Erection of houses on silted up rivers
	• Illegal cutting of trees on dyke
	• Deteriorated sluice gates
	• Sluicegate operations are not managed properly

Solutions:

- Construction of adequate modern sluice gates
- Heightening of ring dyke
- Dredging
- Prevention of leasing out of canals and rivers
- Sluice gate operations to be managed by WMA (Leased out canal)/combined initiatives
- Salt resistant plantation (social forestry)

Question 2: What kind of problems in the coastal area and within the polders are likely to occur in future due to climate change, storm surge, declining upstream water flow in dry season, urbanization, and changing in land use? In this changing environment, what innovative idea/technology needs to be devised in Planning the development of polders, so that implementation of a sustainable, secured, acceptable to the local public and environment friendly polder development project can be possible?

Problems:

- Narrowing of river/ illegal occupation
- Upstream river sedimentation
- Breaking of dykes due to cyclone
- Decrease in agricultural crop production

Solutions:

- Removal of illegal occupants of river
- Dredging
- Regular maintenance of dyke
- Afforestation
- Government initiative of settlement (for the landless)

Question 3: What kind of investment project is necessary for the integrated development of the whole coastal area?

- Government + Nongovernment initiative

Question 4: What are the new changes or modifications needed to be introduced in the design of Polder?

- Heightening of dyke
- More than one sluice gates are to be built in a canal
- Provisions for uninterrupted movement of fish and aquatic animal

Question 5: To reduce sedimentation in river and at downstream canal of the (regulator) gate, is there any need to allow free entry of high tide water through gates into the polder during dry season?

- No

Participants:

11. Md. Saidul Islam, Divisional forest officer, Social forestry department, Bagerhat
12. Nirmal Kumar Pal, Divisional forest officer, Management planning division, Khulna
13. Seikh Nahiduzzaman, IWM
14. Kazi Mokammel Kabir, Forest Ranger, Sundarban West, Forest Dept., Khulna
15. Seikh Asadur Rahman, Forest Ranger, Management division, Forest Dept, Khulna.
16. Abdul Mottaleb Golder, President, Hori Vodra association, secretary WMF
17. S. M. Shamshuddoha, Asstt Conservator of Forest, Social forestry Circle, Khulna
18. Almahmud Alam Khan, 34/2 polder, President, WMA
19. Md. Kamrul Islm, 34/2 Polder, General Secretary, WMA

Appendix-4

Registered Guests

Attendance Sheet

Regional Stakeholders Consultation Workshop

Long Term Monitoring, Research and Analysis of Bangladesh Coastal Zone (Sustainable Polders Adapted to Coastal Dynamics)

Date: 27 April 2019 **Venue: Conference Room of Hotel City Inn, Khulna**

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Chinmoy Roy	Deputy Director DAE, Khulna	01712261156 chinmoyroy1962@gmail.com	
	[illegible]	[illegible]	01718624707	
	A.T.M. MASUDUR RABBY	SDE KHULNA O&M DIV.-2, BWDB	01712006938	
	Krishna Pada Das	SDE Khulna O&M Division-2, BWDB, Khulna	01714240268	
	[illegible]	[illegible]	01724849492	
	[illegible]	[illegible]	01718742129	
	BHABOTOSH KUMAR MONDAL	CHAIRMAN 9NO. BURI. UP SHYAMNAGAR	0171950529 2	
	Ananta Kumar Roy	Jnl. Secretary Kaiya WMA Khulna	01715352305	
	মোঃ বায়েজিদ [illegible]	সভাপতি SSM- WMA [illegible]	[illegible]	Bayjid

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Advocate Al Haj Kamruzzaman	President, Peni-Committee Monirampur	017-13921102	
	Abu Mohsin	Progoti-Samaj Kallyan Sangstha.	01725666 0-60	
	Md Sayedul Islam DFO, Social Fo	Forest	01999804911	
	Arifuzzaman Khan	Executive Engr. BWDB, Satkhira-2	01711178781	
	Md. Nahidul Islam	Sub-divisional Engr. BWDB, Satkhira-2	01788-189861	
	Mohammad Shahidulla	Civil Engineer Blue Gold Prog. BWDB, Satkhira	01715478031	
	Md. Zaki Hasan	SAE, CEIP-1 BWDB, Khulna	01716014915	
	Md. Anowar Hossain	AE, CEIP-1 BWDB, Khulna	01711308008	
	MD-Ekhlasur Rahman	WIMA	01949-632640	
	ASM Noor Ahmed	President BIL Dakatia WMA	01814952552	

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Dr. Md. Towhidul Islam	Environmental Specialist CEIP-1, PMU BWDB	01911493918 towhidenvs@gmail.com	[signature]
	Abdul Matleb Golder	Secretary WMF	01710-037175	[signature]
	Mohiruddin Biswas	WMF Resident	01727029647	[signature]
	Shiekh Kartik Halder	WMA	01715-263256	[signature]
	S.M.A Alim	WMA Nandonkhi Ysolice	01710-751910	A Alim
	Shaikh A. Adud	VP.O Polder project Khulna	01718 692727	[signature]
	Md. Mofizur Rahman Chowdhury	Ichthyologist Wildlife Management & Nature Conservation Div. Khulna	01721088844 mofizur.rahman8@gmail.com	[signature]
	Nirmal Kumar Paul	Divisional Forest Officer, Mgt. Plan Division, Khulna	01712744223 paulnirmalbgd@hotmail.com	[signature] 27/4/19
	Md. Sarwar Alam	Divisional Forest Officer, Jashore.	01723912217	[signature] 27/4/19.
	Pankaj Kanti Majumder	DD, DAE, Khulna	01716-953341	[signature] 27/4/19

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Dilip Kr. Sana	Uttaran, Tala	01712-860594	[signature]
	Md. Fahim Hasan	Assistant Eng. SWZ, BWDB Khulna	01318235665	[signature]
	Amal Kanti Roy	DFO, DOF	01913890545	[signature]
	Md. Shahidul Islam	DFO, Satkhira DOF	01711135381	[signature]
	Jahin Shams Sakkhar	Uttaran Program Dev Specialist	01794603351	[signature]
	MALAY K. SARKER	Regional Coordi CNRS. Khulna	01713488292	[signature]
	Gouranga Nandy	Sr. Reporter Kaler Kantho	01716639461	[signature]
	MD. ISRAFIL HOWLADER	CHAIRMAN METAKHALI	01721-514298	[signature]
	[illegible]	[illegible]	01711-171272	[signature]
	Saroj Kumar Mistry	DPD. SCMFP DOF, Khulna	01714444262	[signature]

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Kazi Hayat Masud	SAE/BWDB	01724-229133	[signature]
	Ashek-E-Elahi	Adi Jamuna Bacou ~~Ad~~ ~~Ad~~ Anddon. Satkhira	01718 4050 66	[signature]
	Polash Kumar Banerjee	Executive Engr. Khulna O&M Division-2	01671364974	[signature]
	Atikur Rahman	Regional Information Office, Khulna	01938 626820	[signature]
	Md. Abdus Salam Khan	XEN/BWDB Dredger	01732-398919	[signature]
	Sk Imtiaz Hossain	ME/BWDB (BGP)	01937877512	[signature]
	R.G. Uzzal	Journalist Shomoyer Khobor	01912 941594 shomoyerkhobor @gmail.com	[signature]
	H.D. Halal	Journalist Pathoker potrika	01910314495 Helal khulna0@ gmail.com	[signature]
	Habibur Rahman	Journalist Desh Shongog	01922310132	[signature]
	Mamun Reza	Daily Probaha	01712613336	[signature]

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	শেখ মোনায়েম	সাঃ সম্পাদক মহেশ্বরপাশা WMA	০১৭১১ ৪৫৬০৪৫	[signature]
	মোহাঃ সালাহউদ্দিন	উপ-বিভাগীয় প্রকৌঃ (পঃ) পাউবো, খুলনা বিভাগ-2	01711240258	[signature]
	মোঃ আসাদুজ্জামান [illegible]	সম্প্রসারণ-উপকর্মকর্তা [illegible]	০১৭১৮-৪৫০৮৫০	[signature]
	প্রভাঃ এস.এম. আবদুর রহমান	চেয়ারম্যান ১১ নং [illegible] ইউ.পি, [illegible], সাতক্ষীরা	01711-479298	[signature]
	চিত্তরঞ্জন হালদার	সভাপতি ডিহিকুন্ডা খাল WMA পোল্ডার-22.	01714597094	[signature]
	মোঃ হাবিবুর রহমান	উপ-প্রধান মৎস্য সম্প্রসারণ কর্মকর্তা যশোর	01918-043742	[signature]
	মোঃ [illegible] ইসলাম	সভাপতি, [illegible]	০১৭৪০ [illegible]	[signature]
	Bishnu Pada Datta	Chairman, Paira UP Abhoynagar Jessore	01713923075	[signature]
	মোঃ রুহুল আমিন	[illegible]	01724341562	[signature]
	মোঃ [illegible]	XEN, CEIP-1 BWDB	01732-435998	[signature]

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Kazi Mohammad Kalia Forest Ranger	Forest Ranger office Sundarban West Division	01712-662302	
	S.M. Shamsuddoha ACF	Social Forest Division Bagerhat	01728-805222	
	Sujan Kumar Haldar	XO, BWDB	01912986551	
	Sherina Akther	Deputy team leader Shushilan	01714-808048 sherin@shushilan.org	
	Md. Mizanur Rahman	Sub-Divisional Engineer BWDB	01711439888	
	মো: শাহাজাদা গাজী	W.M.A B	01716-875921	
	সুজেন কুমার মন্ডল	সভাপতি WMA পোল্ডার ৬০	0182[illegible]606	
	Md. Mahidur Rahman Lala	Deputy Team Leader M&E, CEIP-1	01711-173629	
	Hashem Ali Fakir	Member Pani Committee	01716462843	
	KAMAL NAJMUS SALEHIN	Sr. Communication Officer	01716408919	

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Nithyanonda	WMA	01720965027	[signature]
	MD Rezaul	Bangladesh Betar, Kh.[illegible]	01712-230072	[signature]
	S.M. Mijan Mahmud	UAO, Koyra DAE	01717344845	[signature]
	Sm [illegible]	[illegible]	01733961 8621	[signature]
	KAMRUZZAMAN	CTSB	01925587186	[signature]
	M. A. Hannan	polder-25 secretary W.M.A	01711-668239	[signature]
	ANAMUL	Polder 27/1-27/2	01799966551	[signature]
	Azroul	"	01714822184	[signature]
	ABM. Shafiqul Ha.	President Central Panni Committee	01711351940	[signature]
	M.D. ALL Mahemud	President WMA 34/2 Part	01726034407	[signature]

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	M.D. Kamrul Alam	Sec. WMA 34/2	01767980607	Kamrul
	H.M. Badruzzaman	A.D. Department of Fisheries. Khulna Division	01712002563	[illegible]
	MD. HASAN WARISUL KABIR	ADD (প্রশি) DAE, Khulna	01711950668	[illegible]
	SK moinuddin	X.P. BWDB	01916401377	[illegible]
	MD. ABU SAYED	ATM	01971509151	[illegible]
	Md. Zahid	Photo Journalist Desh Shongjok	01676207080	[illegible]
	G.M. [illegible] Rahman	Chairman South Bedkashi Koyra	01716-679920	[illegible]
	Md. Habibul Haque Khan	Director DOE, Khulna	01716-916327	[illegible]
	Md. Shahnewaz Talukder	Executive Engineer Narail O&M Divn. BWDB Narail	01918858145	[illegible] 29/08/18
	Waked Ali Chokladen.	Sub-Divisional Engineer	01711-823427	[illegible] 29/08/18

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	প্রশান্ত কুমার দে	উপ-বিভাগীয় প্রকৌশলী দাকোপ	01748783555	[signature]
	মো: কামাল হোসেন বাওয়ালী	সভাপতি [illegible]	০১৭১১-৬৬৬৯০৬	[signature]
	সুমন সিকদার	সহকারী প্রকৌশলী কার্যালয়, নড়াইল	01758-102225	[signature]
	A.K.M. Sayeedullah	DRE/CEIP-1 Pacckage-1 BWDB, Khulna.	019191432163	[signature]
	Md. Mokhlesur Rahman	CSE/CEIP-1 package-1,	01924711704	[signature]
	Md. Delwar Hossain	QCS Package-1	01712614024	[signature]
	Krishna Sarkar	Agriculture Extension officer, Dacope. Khulna	01983-026959	[signature]
	মো: [illegible] রহমান	সম্পাদক, [illegible]	01719838534	[signature]

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Md. A. Sattar	Photographer PID	01712744970	[signature]
	S.M. Salahuddin	Asst. Manager	01911 182860	[signature]
	Anwarul Islam Kajol.	Reporter	01711323232	Kajol
	Mirzillur Rahman	Secretary Tala Pani Committee	0721197329	[signature]
	Polashi Akter	Member, Kopotakkha Bachao Andolon	01775184306	[signature]
	Sumon			

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
1)	Biplob saha	cameraman BTV Khulna	01843861896	[signature]
2)	MD. Sumon	Cameraman Mohona T.V	01724-953354	[signature]
3)	MD. Basharr	Somoy T.V	01964444537	[signature]
4)	MD. AZIZUL ISLAM	NTV	01712263563	[signature]
5)	SHOLL	CHALONTI 71	01760000005	[signature]
6)	Shafiq	channel-i cameraman	01712-333887	[signature]
62	Md. Habibur Rahman	Deputy Team Leader / DDCS & PMS consultant	01755627386	[signature]
63.	Md. Sohel Rana	Khulnanchal	01913-557915	[signature]
64.	kajal	পূর্বাঞ্চল	01711329234	[signature]
65	Bahar	Dakkhinanchal prohdin	01972023520	[signature]

SL	Name of Participant	Designation and Organization	Mobile number and E-mail Address	Signature
	Malak	Askeebatta	01711248318	
	Jahid	Samakal	01712903938	
	Sumay	Khulnatim es	01731216550	
	[illegible]	VJ channel24	01718692682	
	Khairul Alam	Channel 24	01612864068	
	[illegible]	[illegible]	[illegible]	