

ANNUAL REPORT 2023



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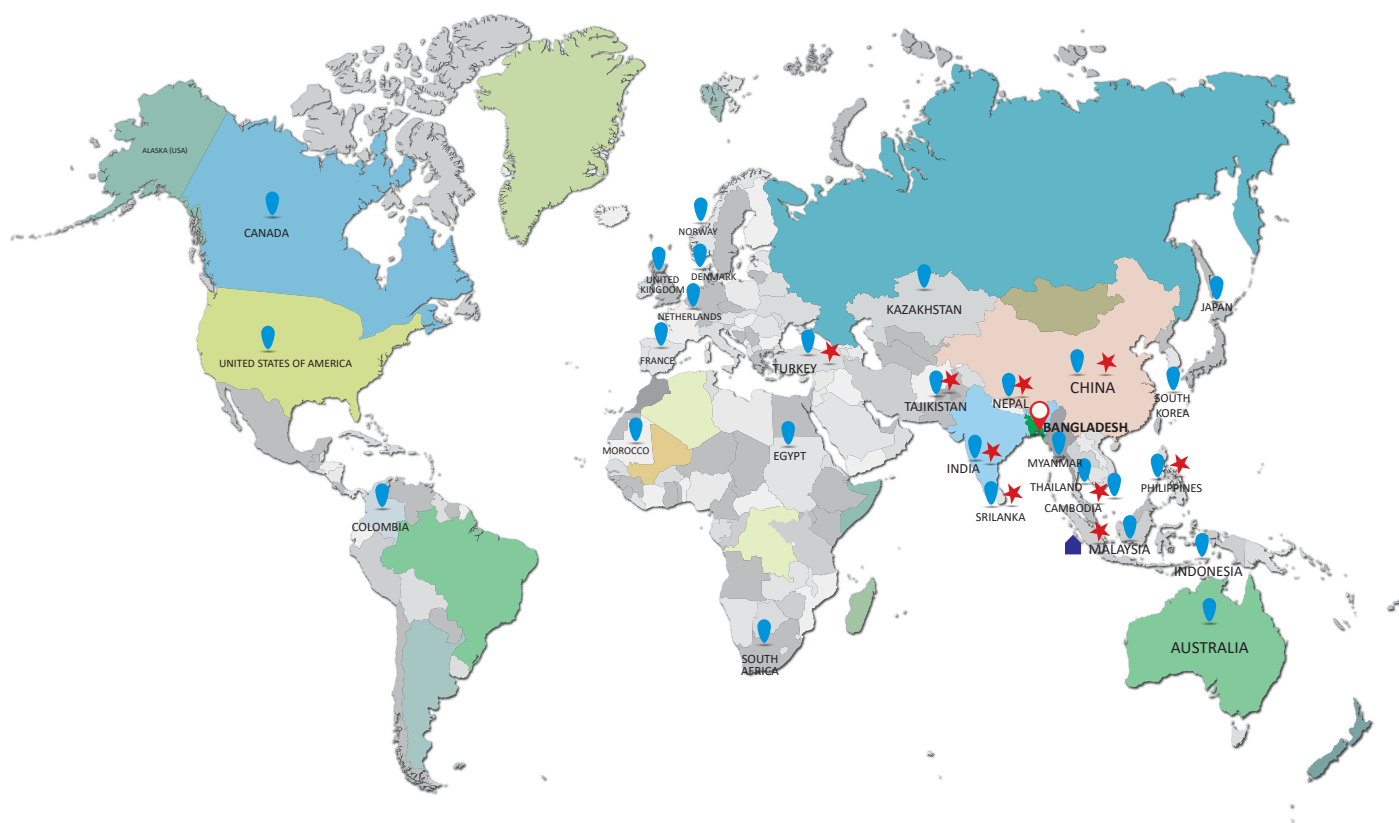
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- Mathematical Modelling and Allied Science
- Green and Climate Resilient Development
- Climate Change Adaptation and Mitigation in Water Resources
- Integrated Water Resource Management
- Wetland and Lakes Management
- Irrigation Management
- Groundwater Management
- Water Supply, Sanitation and Urban Water Management (WSU)
- Water Supply Master Planning
- Water Quality & Ecology
- Fluvial Hydraulics and River Morphology
- River Engineering
- Bridge Hydraulics and Structural Analysis
- Flood Risk Management
- Integrated Coastal Zone Management
- Coastal Hydraulics and Morphology
- Tidal River Management (TRM)
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- Software Management and IT Solutions
- Geographic Information Systems and Remote Sensing (GIS&RS)
- Topographic, Hydrographic, and Hydrometric Data Collection
- Digital Land Survey for Digitizing Mouza Map for accurate land Records
- Environmental and Social Impact Assessment (ESIA/EIA)
- Water Resources Optimization and Decision Support Systems
- Flood Forecasting and Early Warning Systems
- Water Governance and Policy Development
- Sustainable Development Goals (SDGs) in Water Management
- Hydrological and Meteorological Modelling
- Water Distribution Network Design and Management
- Wastewater Treatment and Reuse Technologies
- Ecological Restoration and Conservation Green and Water Bodies
- Aquatic Habitat and Biodiversity Management



About IWM

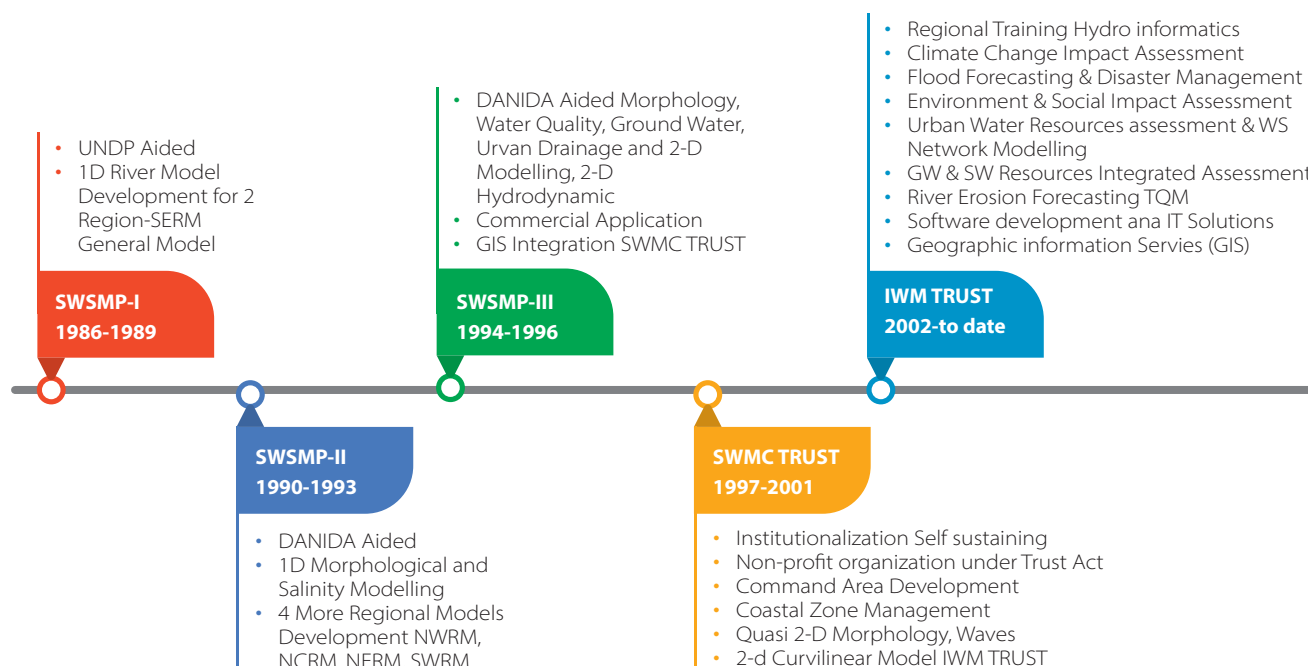
IWM was established in December 1996 as Trust through a Cabinet decision, Government of the People's of Bangladesh.

IWM is a self-sustained and independent Trust established in 1996. IWM service includes but not limited to Policy Support, Capacity Building, Research and Innovation, Development Advisory and Consultancy Services. IWM is a unique organization in Bangladesh that provides World class services in the fields of Water Resources Management, Water Supply, Sanitation and Urban Drainage Management, Coast, Port & Estuary Management, Flood Management, Irrigation Management, Survey and Data, ICT- GIS and River Engineering for improved and sustainable Water Resources Management leading to Green and Climate Resilient Development. IWM also provides technical support related to Climate Finance, Carbon Credit and Disaster Risk Financing. IWM operates under the guidance of the Board of Trustees (BoT). The Secretary of the Ministry of Water Resources is the Chairperson of the BOT. IWM is an ISO certified institute. IWM has been awarded and successfully completed thousands of projects in Bangladesh. Besides the institute has expanded its services to Malaysia, India, Nepal, Sri Lanka, Tajikistan, Turkiye, the Philippines and USA.

IWM offers a wide range of specialist services in the field of water resources planning and management as well as hydrometric measurements, hydrographic bathymetric & topographic surveys and monitoring. Environmental Impact Assessment (EIA) & Social Impact Assessment (SIA) and Detail Design.

IWM functions as a non-profit organization on a cost recovery basis.

Historical Development of IWM



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IWM Organogram

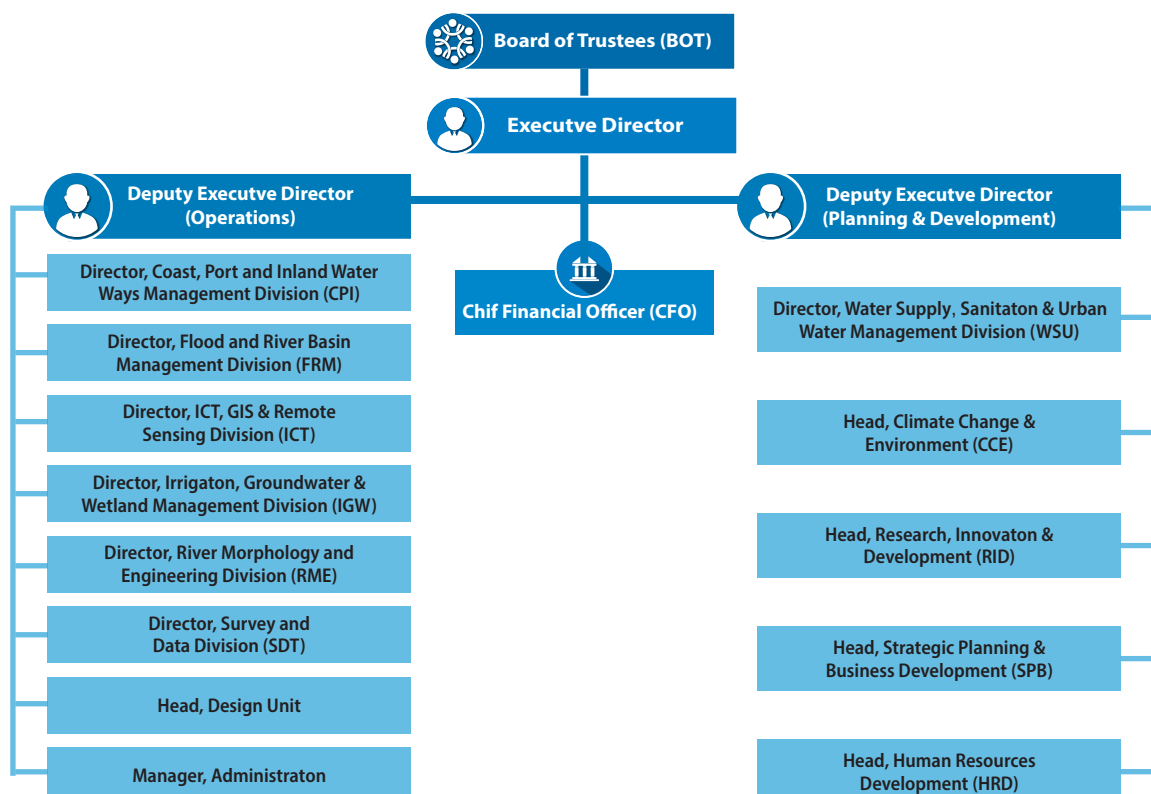


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Message from

CHAIRPERSON



Mr. Nazmul Ahsan

Secretary

Ministry of Water Resources
Government of the People's
Republic of Bangladesh

It is with great pleasure that I extend my heartfelt congratulations to the Institute of Water Modelling (IWM) on the publication of its Annual Report 2023. As the Chairperson of the Board of Trustees, I have had the privilege of closely observing the remarkable progress and achievements of this esteemed organization since assuming my role. Over the years, IWM has firmly established itself as a Center of Excellence in Asia, excelling in the fields of mathematical modeling, computational hydraulics, climate studies, environmental management, and allied sciences, while making significant contributions to integrated water resources management.

Established in December 1996 through a Cabinet decision of Government of the People's Republic of Bangladesh, IWM has played a pivotal role in supporting Bangladesh's journey toward becoming a prosperous nation. By delivering world-class solutions in water, environment, and climate-related sectors, the Institute has consistently demonstrated its expertise in the efficient planning, design, and implementation of infrastructure projects for various ministries. IWM's proficiency in mathematical modeling has earned it recognition both domestically and internationally. Equipped with state-of-the-art survey instruments and a team of highly skilled professionals, the Institute is well-positioned to undertake even the most complex survey projects with precision and excellence.

IWM's impact extends far beyond Bangladesh, as it has successfully addressed numerous water-related challenges in other countries as well. It is particularly encouraging to note that IWM's collaborations with educational and research institutions, both within the country and abroad, have grown exponentially. These partnerships have opened new avenues for cooperation across South and East Asia, North America, and Europe, further solidifying IWM's global reputation.

As Chairperson of the Trust, I would like to express my sincere gratitude to the members of the Board of Trustees for their invaluable contributions and unwavering support over the years. I also extend my deepest appreciation to the dedicated professionals at IWM for their relentless efforts in elevating the institution's stature and enhancing the nation's image on the global stage. I am confident that IWM will continue to thrive and achieve even greater milestones in the years to come. Wishing the Institute a future filled with success and prosperity.

Mr. Nazmul Ahsan

Secretary

Ministry of Water Resources
Government of the People's Republic of Bangladesh
& Chairperson, IWM Board of Trustees (BoT)

Message from

Executive Director



S M Mahbubur Rahman

Executive Director
Institute of Water Modelling (IWM)

It is my pleasure to present the Annual Report 2023 of the Institute of Water Modelling (IWM) to our valued clients, partners, and well-wishers. This report offers a comprehensive overview of our services and accomplishments over the past year.

The year 2023 marked a period of continued recovery from the pandemic's challenges. Despite ongoing global economic disruptions stemming from the Russia-Ukraine conflict, IWM showed strong resilience. We met numerous challenges successfully, even as new ones emerged. I sincerely thank all IWM staff for their dedication and hard work. I am also grateful to the Chairperson and Board of Trustees for their ongoing support and guidance.

In 2023, IWM advanced significantly at both national and international levels. We collaborated with around 40 clients on nearly 90 projects. The Coast, Port & Inland Waterways Management (CPI) Division undertook key projects such as determining standard high and low water levels and reclassifying inland waterways for BIWTA, along with a hydrological and morphological study for the Naf River Estuary.

The Flood & River Basin Management (FRM) Division initiated critical efforts to expand flood forecasting models and enhance inundation mapping for high-risk coastal zones for BWDB. It also completed hydrological studies and field surveys under the Haor Flood Management and Livelihood Improvement Project (HFMLIP), supported by BWDB.

The ICT-GIS & Remote Sensing Division (ICT) played an instrumental role in developing the Wind Map of Bangladesh. This project included designing a GIS-based platform, generating the wind map, and building a dynamic data input system for SREDA.

The Irrigation, Groundwater & Wetland Management (IGW) Division successfully executed several key projects, including a mathematical modelling study for the rehabilitation of the Barisal Irrigation Project (BIP) for BWDB, and a hydrological assessment of surface and groundwater resources in the High Barind region for WARPO.

The River Morphology & Engineering (RME) Division contributed to vital hydro-morphological studies. Prominent among them were bridge studies over the Jamuna at Chilamari-Rowmari, the lower Meghna at Barisal-Bhola, and the Meghna branch, all commissioned by RHD. The division also monitored the Jamuna River to protect the River Training Works (RTWs) of the Jamuna Bridge on behalf of BBA.

The Survey and Data Division (SDT) enhanced IWM's data acquisition capabilities using advanced equipment such as Multibeam Echo Sounders, 3D Laser Scanners, UAVs, ADCPs, RTK GPS, and survey vessels. Notable assignments included a multibeam bathymetric survey at Jajira and Naria for the Bangladesh Army, as well as hydrological surveys for CWASA's Southern Chattogram Region Water Supply Project.

The Water Supply, Sanitation and Urban Water Management (WSU) Division completed several essential infrastructure projects. These included the Master Plan for Pollution Control and Navigability of the Meghna River for DWASA, the design and supervision of the Tetulzhora-Bhakurta Well Field Project, and the sewerage master plan and detailed design for Sylhet City Corporation (SCC).

The Climate Change and Environment (CCE) Unit worked on climate projections and scenario-based studies in partnership with BUET, DOE, the World Bank, and other stakeholders.

The Research, Innovation & Development (RID) Unit conducted impactful research including traffic-induced vulnerability assessments in Dhaka, assessments of potable water sources in Dumuria (Khulna) and Patharghata (Barguna), and evaluations of drought indices to identify patterns across Bangladesh during 2023.

IWM remains dedicated to continuous transformation and innovation. Looking ahead, our priorities will focus on innovation, value addition, diversification, and nature-based solutions. These strategies will foster knowledge sharing, enhance climate resilience, and promote environmental sustainability, supporting both national goals and global efforts for a resilient future.

A handwritten signature in black ink, appearing to read 'S M Mahbubur Rahman'.

S M Mahbubur Rahman

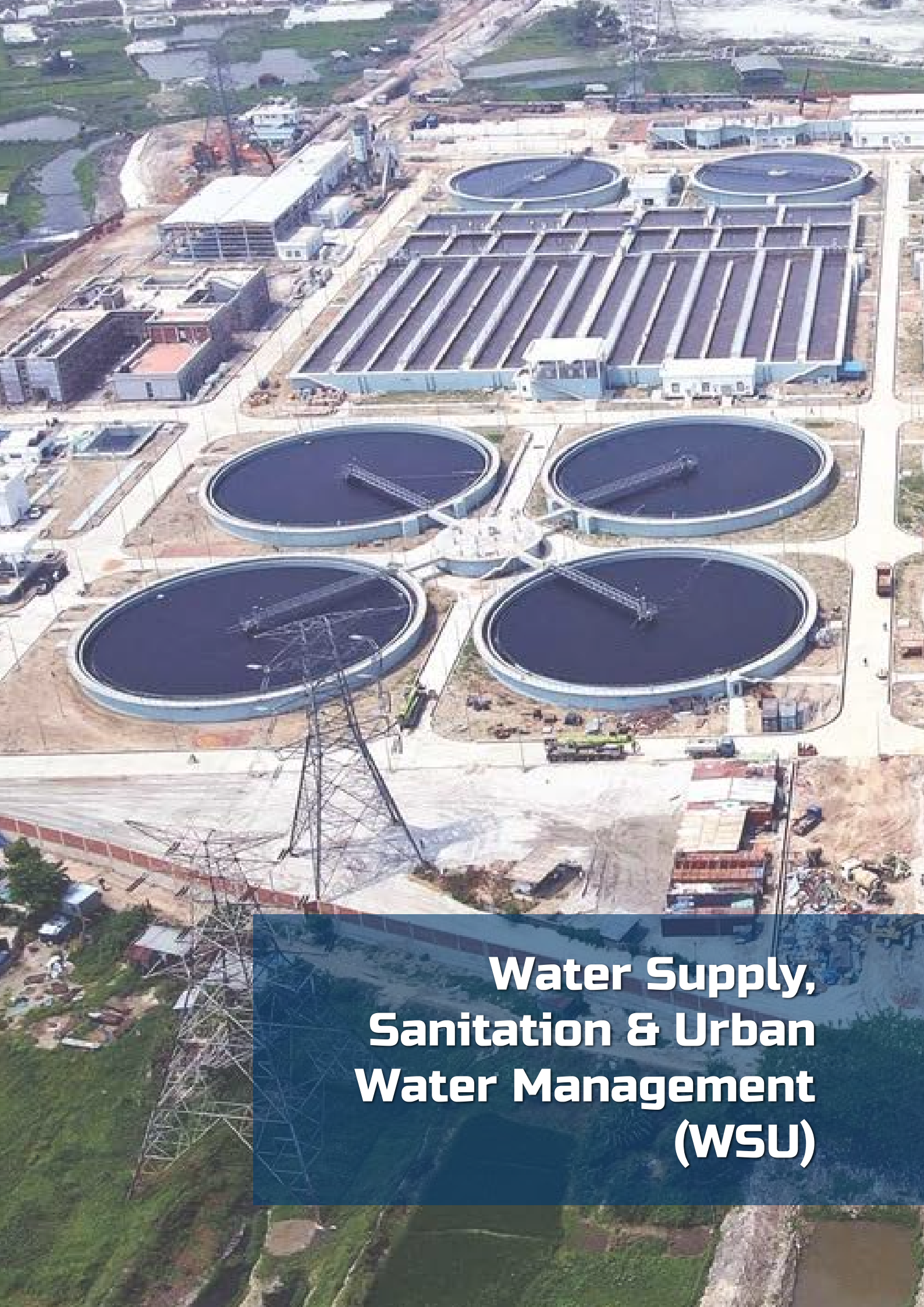
Executive Director
Institute of Water Modelling (IWM)

IWM Success 2023: at glance

We are steadily growing to provide sustainable solutions to the water sector of not only in Bangladesh but also in neighboring countries. Since its inception in 1986, IWM has been continuing to thrive in an extraordinary manner and is growing day by day. In 2023 IWM has took several challenging projects of great national interest and experienced a steady growth. We have provided our services on **90** projects and to **40** clients. Maintaining or strong pursuit in modelling. We are exploring some relevant sectors to meet the pressing demand of our valuable clients. Services of IWM are requested from different integration agencies from various countries and thus IWM is getting recognition at a global scale.

Completed Major Projects in 2023

- Hydro-morphological Model Study and Strategic Planning for Char Development in the Meghna Estuary under CDSP Project phase IV-B(AF), **BWDB**
- Mathematical Model Study for Integrated Development and Sustainable Management Plan of Shahbazpur Channel of Lower Meghna River, **BWDB**
- Hydro-morphological Study of Jamuna River at Manikganj, **BWDB**
- Capacity Development for Enhanced Flood Forecasting and Warning Services of Bangladesh (Phase-I), **BWDB**
- Detailed Feasibility Study for Identifying Erosion Vulnerability and Protection of Proposed Economic Zone Construction at Bhuapur Upazilla in Tangail District, **BWDB**
- Development of a GIS Based participatory project Management Information system (PPMIS), **BWDB**
- Bathymetric Survey and Monitoring for Supporting Implementation of Gorai River Dredging and Bank Protection Project, **BWDB**
- Comprehensive Feasibility Study for Sustainable Restoration and Protection of Wetlands (Haor, baor, beel, and connected rivers etc.) in different Hydrological Regions of Bangladesh, **DBHWD**
- Hydrological Investigation & Modelling of the State of Surface and Groundwater Resources in the High Barind Region, **WARPO**
- Re-location of Existing Private Dockyards from the Bank of Buriganaga and Development of a Plan for Standard Dockyards Zone, **BIWTA**
- Feasibility Study for Developing Eco-Friendly Reservoirs for Conservation and Utilization of Excess Rainwater of Hilly Streams of Sitakund, **BWDB**
- Feasibility Study for Sylhet Division Agricultural production enhancement through Surface water Management and Utilization, **BADC**
- SDOP Phase-II, Sustaining Groundwater Irrigation for Food Security in the Northwest Region of Bangladesh Commonwealth Scientific and Industrial Research (**CSIRO**)
- Groundwater Rejuvenation as Climate Change Resilience for Marginalized and Sensitive Ganges (**GRACERS**)
- Feasibility Study and Detail Design for Construction of Large Bridges on upazilla, Union & Village Road Project (FSB)-LBSP-2, **LGED**
- Master Plan on Meghna River Pollution Control, Navigability Increase and Ensuring Riverbank Stability, **DWASA**
- Detailed Design & Construction Supervision of Water Supply Network under Tetulzhora-Bhakurta Well Field Project Area, **DWASA**
- ESIA and ESMP Compliance and Effect Monitoring of the Sustainable Coastal and Marine Fisheries Project (SCMFP), **DoE**
- Sewerage master plan and detail design of priority works in Sylhet, Sylhet City Corporation (**SCC**)
- Updating of the Morphological Study of the Sugandha River for BPW to Protect the Dowarika Bridge at Babugonj Upazila in Barisal, **RHD**
- Hydro-Morphological Study of proposed 2nd Monu Bridge at road N-207, Moulvibazar, **RHD**
- Hydro-Morphological Study of Proposed Bridge over the Kushiya River at (Z-2017) Road, Moulvibazar, **RHD**
- Monitoring of the Jamuna River for the Safety of River Training Works (RTWs) of Jamuna Bridge, **BBA**
- Hydro Morphological Surveys and Investigation of the Padma.Ganges River in connection with Land Reclamation in Padma river adjacent to Rajshahi City Corporation Ara (**RCC**)
- Dredging/Re-Excavation of Bangali-Karotoa-Fuljor-Hurasagor River System with Bank Protection Project, **BWDB**



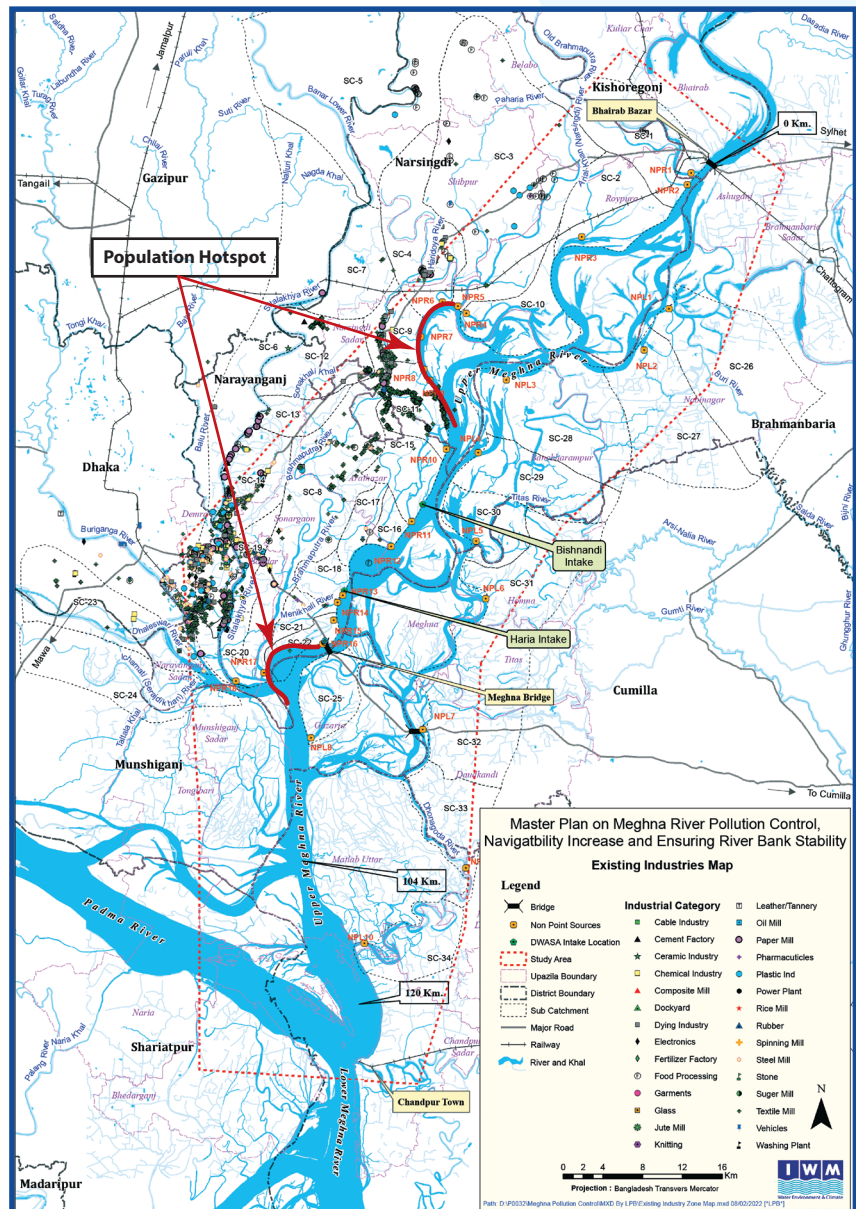
**Water Supply,
Sanitation & Urban
Water Management
(WSU)**

Master Plan on Meghna River Pollution Control

The Meghna River is one of the three major rivers in Bangladesh. It carries large catchment rainfall-runoff from the North-East (NE) and partly North-Central (NC), South-East (SE) hydrological region of Bangladesh. It has a large catchment (Meghalaya, Barak & Tripura basin) in the Indian Territory and ultimately discharge into the Bay of Bengal. The rising trend of the economic development of Bangladesh triggers many industrial growth and industrial zones along the banks of the Upper Meghna River and its adjoining area. The industrial effluent is being a threat for the Meghna River water pollution when it discharges into the river directly or through khals/canals without proper treatment. Moreover, there are 15 Pourashava beside both the banks of the Upper Meghna River, which also generates municipal waste. More townships will grow in the near future due to the present trend of urbanization. If township / industries are developed without proper planning that will also aggravate the Meghna River water pollution.

Institute of Water Modelling (IWM) prepared the Master Plan on Upper Meghna River from Bhairab Bazar to Chandpur town to protect the river water from pollution and ensure environmental compliance under an agreement with Local Government Division of LGRD Ministry with the supervision of DWASA.

Under this study IWM monitored year-round water quality of 22 parameters from 21 locations along the Meghna River. Database of water polluting industries was collected from the Department of Environment (DoE) district offices and further industrial survey was conducted to gather more information. There are about 1,200 nos. water polluting industries in this vicinity which includes Textile, Cement, Chemical, Composite Mill, Dyeing, Washing, Printing, Food, Garments, Glass, Knitting, Machinery, Metal, Paper Mill, Pharmaceuticals, Plastic, Spinning Mill, Steel Mill, Sugar Mill, etc. Moreover, due to absence of proper sanitation chain in the surrounding Paurashava and semi-urban area, domestic wastes



Location of existing industries pollution hotspots

discharges into the river flowing through tributaries of Meghna River and other canals.

The Meghna Master Plan strategically provides 38 action plans/project for implementation to combat / arrest water pollution of the Meghna River as well as water pollution in the tributaries/ distributaries of the Meghna River and environment at the surroundings Pourashavas. Out of 38 plans, 14 are structural measures and 24 are non- structural measures.

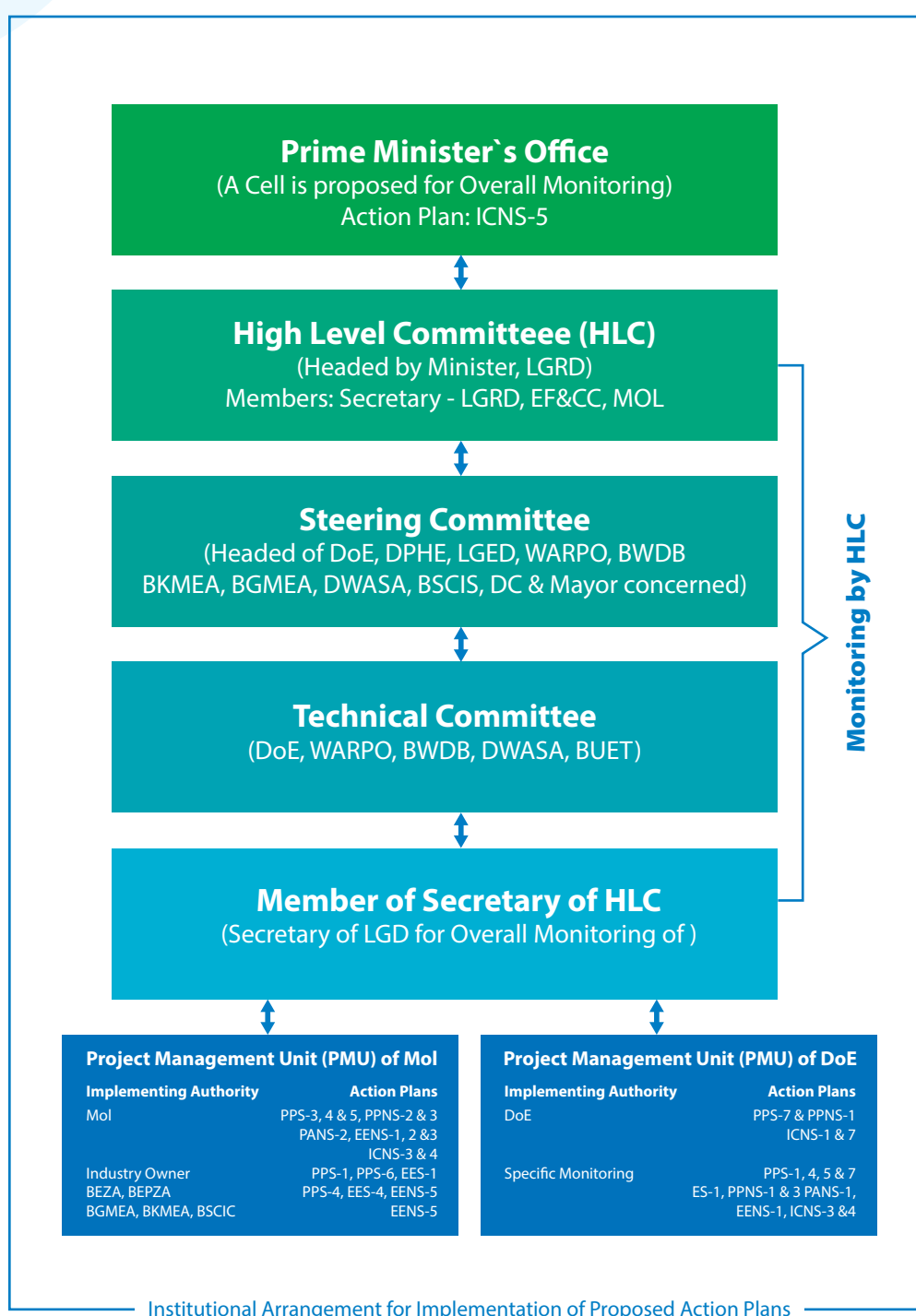
The suggested plans are ranked in three categories: very high priority, high priority and medium priority. It is recommended for immediate implementation of the very high priority projects to arrest the present water pollution.

There is a risk of water pollution into the Meghna River due to hugely polluted water coming through Dhaleswari, Shitalakhya and Brahmaputra (local) River at the confluence with Meghna River. To overcome this issue, it is recommended that a detail master plan is required for peripheral river of Dhaka city including Joydevpur area where industrial growth is going on abundantly.

This Master Plan is recommended industrial growth will be

continued with adequate treatment of effluent or establishing ZLD industry or create green industry, treatment of municipal waste or reuse/recycle of municipal waste and effective control of agricultural fertilizer and pesticides uses.

A water quality model was developed and validated for Upper Meghna River to identify the projected pollution situation of the river upto 2041 without and with project interventions as well as the benefits of the action plans. It may cost about BDT 39,117 million in short-term, BDT 232,213 in medium-term and BDT 139,865 million in long-term for implementation of the water supply system throughout the coming years.



Water Network Review in 33 Rohingya Camps, Cox's Bazar

The Rohingya refugee crisis in Cox's Bazar has led to the establishment of 33 camps, accommodating nearly a million displaced individuals who depend on an intricate water network for their survival. Ensuring the reliability and sustainability of this network is crucial for safeguarding public health and well-being. In response to this pressing need, UNICEF commissioned a comprehensive water network assessment to evaluate its functionality and identify areas for improvement. After a rigorous selection process, IWM was entrusted with this critical task, leveraging its extensive expertise in water supply management and assessment. The objective of this evaluation is to enhance the efficiency, resilience, and long-term sustainability of water access for the refugee communities.

The project focuses on assessing 298 water networks across the 33 Rohingya camps in Ukhiya and Teknaf, evaluating their functionality, water quality, and operational challenges. A highly skilled team of five professionals led the study, working both in the field and the head office. Field data collection was coordinated by a dedicated field coordinator, supported by four research assistants and six enumerators. Training and piloting activities were conducted at the field office with participation from UNICEF, WASH Sector representatives, and the Refugee Relief and Repatriation Commissioner (RRRC). Hands-on training for data collection was provided directly in the camps. Close coordination with UN agencies such as UNICEF, UNHCR, and IOM, along with NGOs, INGOs, and 33 camp focal personnel, played a critical role in ensuring the success of the assessment. The evaluation was carried out with significant dedication, particularly during the challenging rainy season, under the guidance of a proficient team leader.

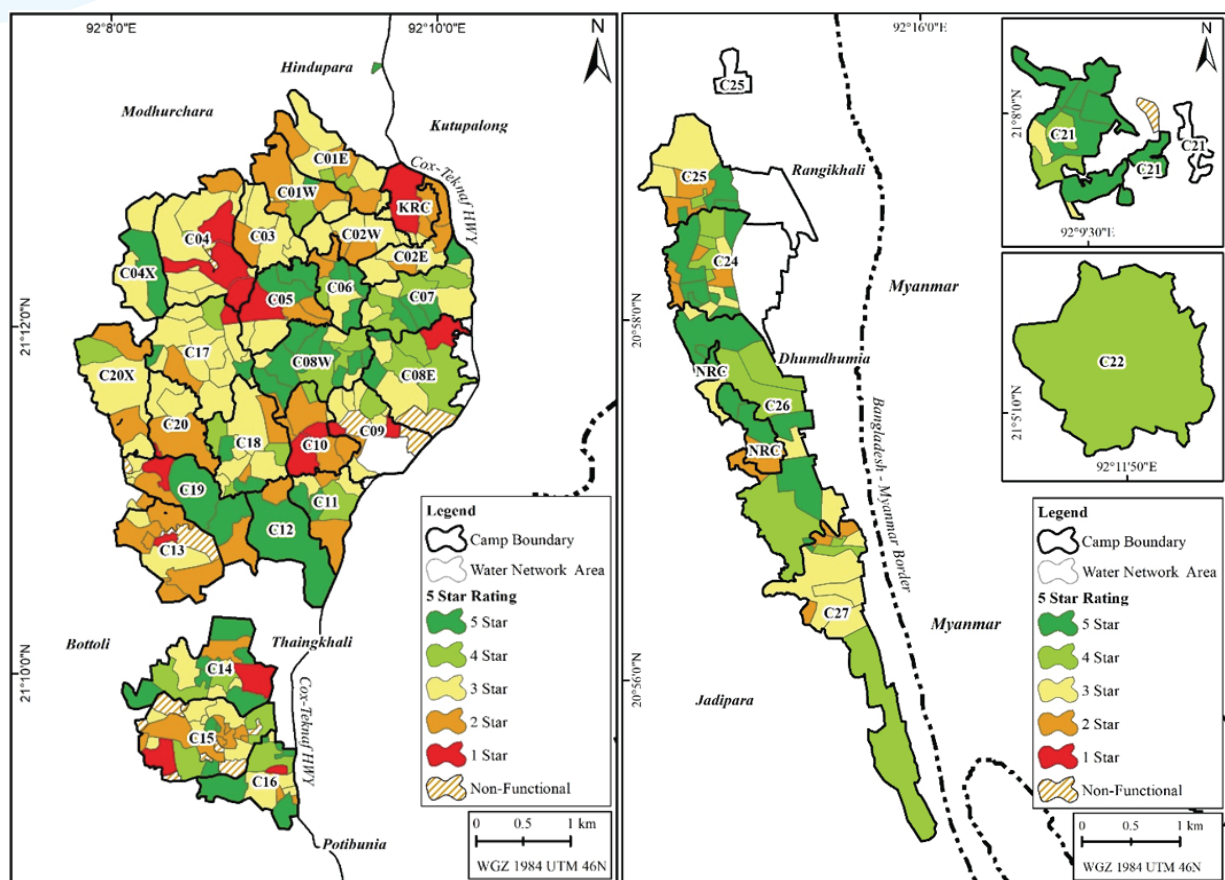
The assessment methodology was designed to provide a comprehensive understanding of the water network conditions. A structured questionnaire was developed to



collect all relevant water network information, which was verified by representatives from three UN agencies, the WASH Sector, and RRRC. Data collection was conducted using modern technology, with the Kobo Toolbox facilitating digital survey inputs. The questionnaires were completed in consultation with WASH focal points, engineers, and network operators from the respective camps. Field visits were carried out between August and October 2023, during which all water sources, storage tanks, and a representative sample of tap stands were surveyed. Residual chlorine levels were measured at tap stands using DR300 Pocket Colorimeter and pool testers. Out of approximately 6,400 tap stands across 33 camps, around 2,100 tap stands were surveyed.

Key project tasks included reviewing existing water supply scheme documents, preparing data collection tools, and training enumerators. The assessment covered various parameters such as pump volume, energy supply, tank capacity, and water quality indicators like chlorine levels. The collected data was analyzed and presented through fact sheets, graphs, tables, and maps. The findings of the assessment were compiled into camp-wise reports and maps, detailing all aspects of the water network. A validation workshop was conducted to review the results, leading to the preparation of a final report with actionable recommendations.

The evaluation focused on critical aspects such as water quantity, quality, infrastructure condition, and maintenance practices, incorporating user satisfaction levels. Assessment results were presented using five key indicators: per capita water supply, percentage of tap stands in service, percentage of operational taps, presence of free residual chlorine (FRC), and beneficiaries with at least a high level of satisfaction. These insights provide valuable guidance for future improvements, ensuring that the water network effectively meets the needs of the refugee population. Ultimately, the findings will inform future priorities and actions, contributing to the sustainability and efficiency of the water supply system throughout the coming years.



Camp Wise Performance of Water Networks in Ukhiya & Teknaf

**Irrigation,
Groundwater
& Wetland
Management
Division (IGW)**

Feasibility Study for the Rehabilitation of Barisal Irrigation Project (BIP)

The Barisal Irrigation Project (BIP) was designed to provide irrigation and improved drainage in Barisal Sadar, Babuganj and Bakerganj Upazila of Barisal District; Jhalokati Sadar, Nalchity and Rajapur Upazila of Jhalokati District and Kawkhali Upazila in Pirojpur District. The project's first phase was implemented in 1980, followed by the completion of the second phase in 1985.

BIP was designed to provide surface water irrigation, utilizing non-saline tidal water from nearby perennial rivers and channels. The available fresh water in peripheral rivers and khals was withdrawn by 81 diesel operated primary pump (25 cusec) and supplied to main khal/canal. This abstracted water was controlled by an offtake structure, combined or separated from primary pump houses, and check structure placed at the end of main canal and supplied to branch canal from where irrigation was made by 2 cusec LLP pumps. Later 30 pump houses were remodeled for single lifting gravity and partial gravity gation

method and operated with electricity. Among these 5 pump houses were engulfed by river erosion.

Over the years, challenges such as operational costs, changes in land-use pattern, natural water supply and socio-economic factors led to a gradual decline in the project's efficiency. Many key infrastructures, including pump houses, offtake structures, and check structures, have been damaged, while the discharge and pumping chambers, as well as the intake canal, are heavily silted up. Additionally, the motor and electric panel board are in poor condition, and the gate seals are completely damaged, further impacting the project's functionality. A detailed study is required to redesign the project considering the present situation and demand. Bangladesh Water Development Board (BWDB) engaged Institute of Water Modeling (IWM) to provide a comprehensive rehabilitation plan for BIP with a view of restoring the project's full potential.



Silted Up Intake Canal



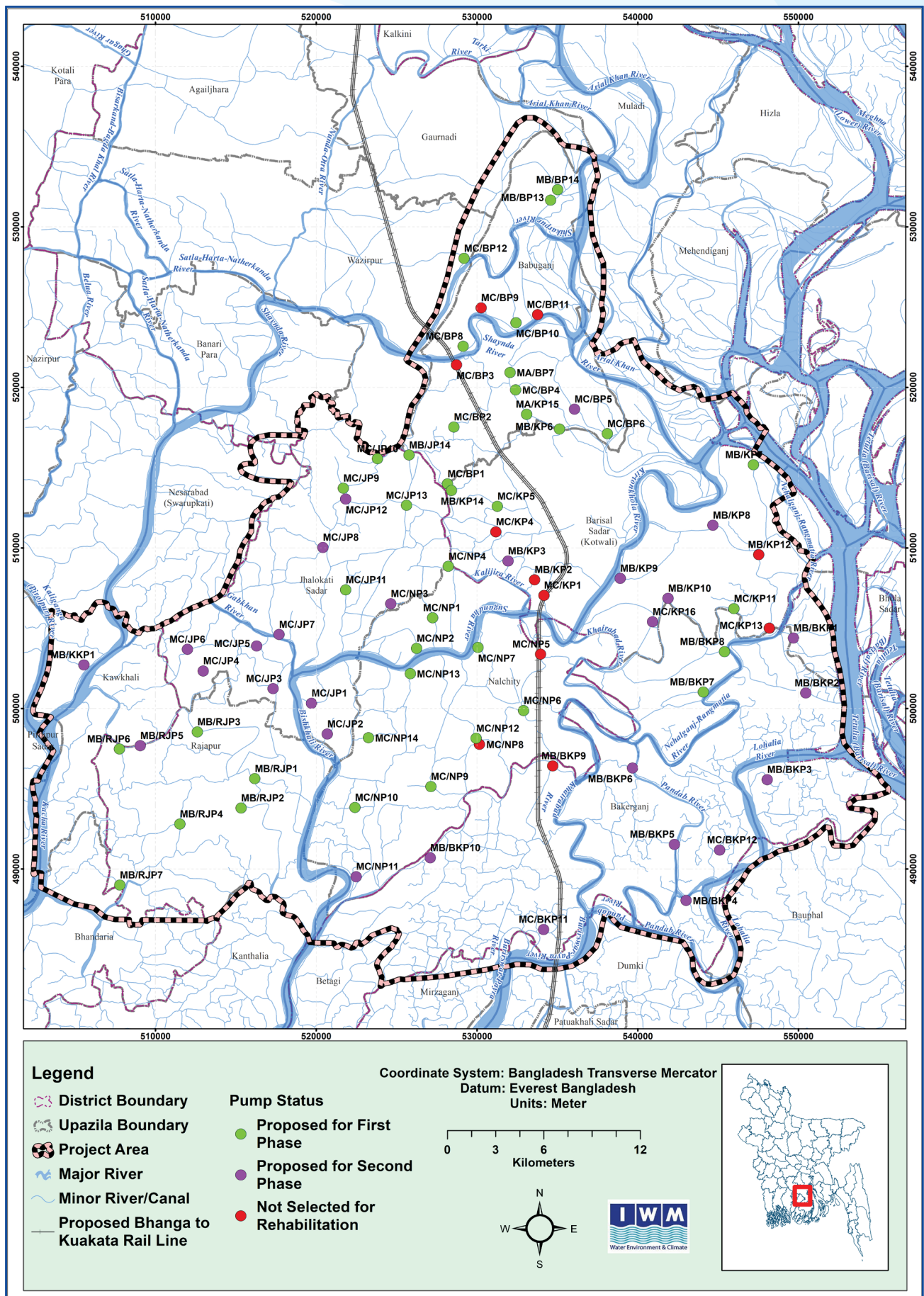
Damaged Offtake Structure



Silted Up Discharge Chamber



Damaged Electric Panel Board



Cross-section surveys of canals and rivers, water level and discharge measurements, sediment and bed material sampling and analysis, in-situ surface water quality measurements, and structure inventory were conducted under this study. Mathematical modelling was conducted to assess the water availability, to visualize the impact on water level due to irrigation and to envisage whether the proposed full supply level can be achieved for gravity irrigation.

The delineation of the command area for each individual pump house was conducted by considering the distribution of branch canals, the topographical features of the region, and through consultations with relevant stakeholders. The total command area and the net cultivated area for the BIP area are estimated to be 41,346 hectares and 26,892 hectares, respectively.

Water availability at each pump house location was assessed based on 80% dependable flow of long-term model simulation data. It was observed that the water availability will meet the proposed abstraction at all pump station locations. Model simulation also reveals that there are no significant changes in the water level for future abstractions. The flood inundation map assessed from model scenarios reveals that the study area is almost flood free.

A total of 21 pump houses have been recommended for rehabilitation in the first phase, while 46 pump houses have been recommended for rehabilitation in the second phase. A comprehensive stakeholder consultation and several meetings with BWDB professionals have been conducted for this purpose. The remaining eleven pump houses have not been recommended for rehabilitation. In the context of selection of pump houses for rehabilitation, the current land-use pattern, cultivation practices, natural water resources, socio-economic conditions, and urbanization have all been considered.

The proposed interventions for the rehabilitation of BIP include repair or reconstruction of primary pump houses, operator sheds, and remodeling of offtake hydraulic structures adjacent to primary pump houses. The rehabilitation plan also includes the repair or remodeling of hydraulic check structures or sluices for water retention along with the reconstruction of check structures. To improve water flow, intake canals, loop cuts and branch canals are proposed for re-excavation. The rehabilitation plan also involves manufacturing, supplying, and installing gates for offtake and hydraulic check structures, including trash racks and steel nets. Similarly, gate hoisting systems are proposed for installation for smooth operation. The plan also includes supplying and installing submersible pumps of 25 cusecs capacity along with electric panel boards. Finally, a connection of 440V 3-phase electricity lines has been proposed to ensure the effective operation of the rehabilitated pump system. An automatic pump operation system named SCADA (Supervisory Control and Data Acquisition) has been recommended for smooth operation of pump.

The economic analysis of the project demonstrated that the proposed interventions are financially viable. The rehabilitation is expected to increase cropping intensity from 169.07% to 212.75%, with an Internal Rate of Return (IRR) of 19.19% and a Benefit-Cost Ratio (BCR) of 1.61.

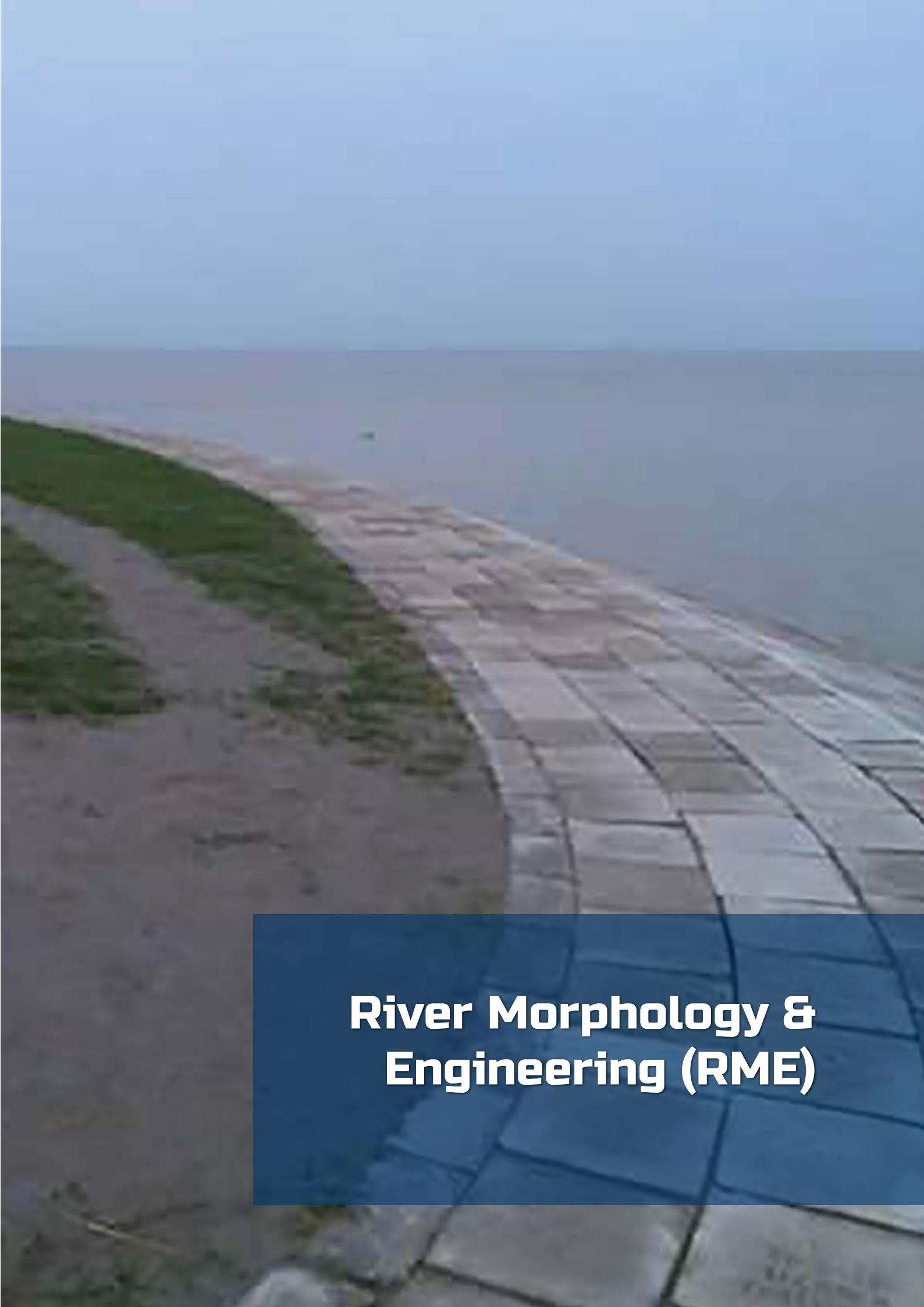
Additionally, the project aims to support sustainable agricultural practices by enhancing water use efficiency and reducing the environmental footprint of irrigation activities while ensuring minimal impact on the hydrological balance of local river systems. The rehabilitation of the Barisal Irrigation Project is a vital step towards restoring the region's agricultural productivity, securing a sustainable water supply for the Barisal region, benefiting thousands of farmers, and contributing to national food security.



Trash Rack



Sluice of the Pump House at Jhalakathi

A photograph of a riverbank. In the foreground, there is a curved stone revetment wall made of large, rectangular blocks. To the left of the wall is a grassy area. The river extends to the horizon under a clear blue sky. A semi-transparent blue rectangle is overlaid on the bottom right of the image, containing white text.

River Morphology & Engineering (RME)

Monitoring Of Hydraulic And Morphological Condition Of The Jamuna River For The Safety Of The Jamuna Bridge

Jamuna Bridge, one of the nationally important massive structures of Bangladesh that has been built over the giant river Jamuna. Jamuna is the lower stream of the Brahmaputra River, which originates in Tibet as Yarlung Tsangpo, before flowing into India and then southwest into Bangladesh. Spanning the mighty Jamuna River, it connects the eastern and western regions of the country, improving transportation, trade, and economic integration.

The Jamuna River is one of the world's great rivers, ranking in the top three in terms of both sediment and water discharge. Average width of the river is more than 12 km which has been constricted to 4.80km near the bridge location. On top of the constriction, variable flow and sediment as well as the upstream condition plays major role in governing the morphological processes, which can endanger the stability of the guide bunds and the bridge. BBA undertakes necessary paratory works and updates their monitoring plan with forecast of critical hydraulic and morphological condition in the vicinity of the bridge location provided by IWM under the framework of preparedness program.

extremely challenging. The river, being associated with rapid change of channel planform, thalweg shifting, char migration, sudden bed and bank erosion make the maintenance of the bridge more challenging. Early

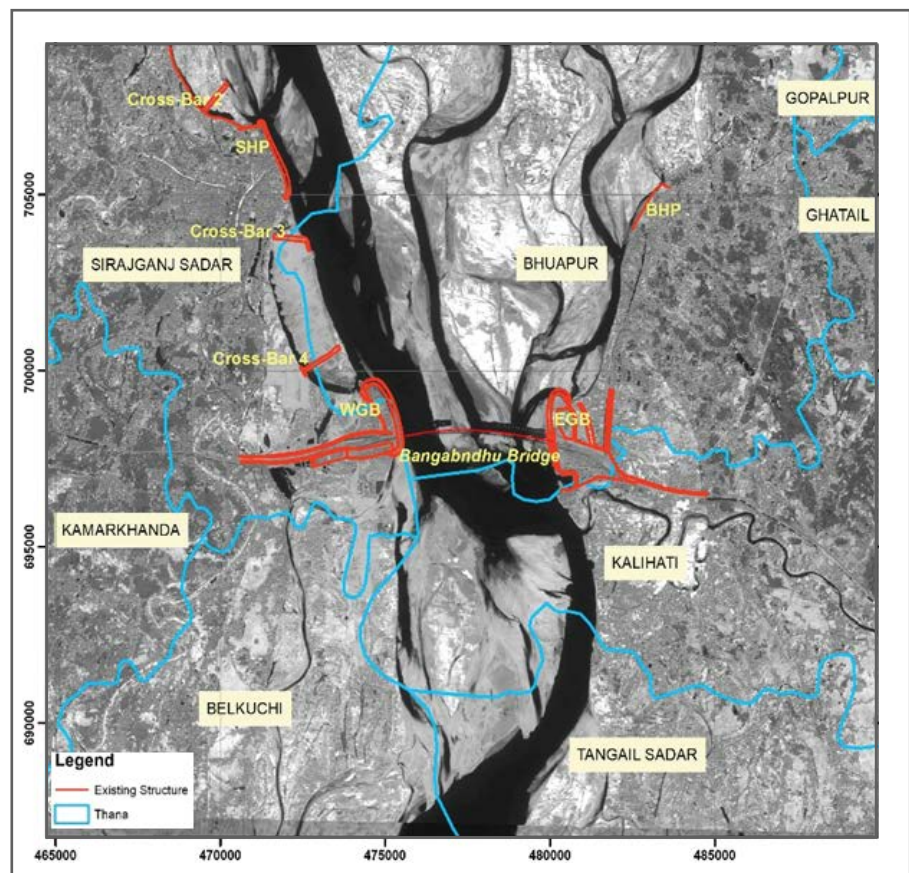


Figure 1: Study area within the Jamuna River encapsulating two bridges and their ancillary structures

Rationale/Necessity of Monitoring

It has been found that scour of foundations of bridges/river training work is the prime cause of bridge collapse in different areas of the world. Scour poses obvious problems to the stability of bridge structures. The scour hole generated has the effect of reducing the stiffness of foundation systems and can cause bridge piers to fail without warning. A more effective and economically viable method of combatting scour is to monitor its evolution over time and to implement remediation works.

The Jamuna River is one of the world's most unpredictable and dynamic rivers, prone to high sedimentation and strong currents, making construction and maintenance

assessment of the propagation of the hydro-morphological condition including bed scour allows the maintenance engineers to take countermeasures beforehand.

The flow of the Jamuna River, under the Bangabandhu Bridge is guided by two Guide Bunds; West Guide Bund (WGB) and East Guide Bund (EGB), situated at its right bank and left bank of the river, respectively. Moreover, this flow is carried toward these guide bunds in a controlled way by putting two hard points; Sirajganj Hard Point (SHP) and Bhupur Hard Point (BHP), about 10 km u/s of the Bridge. Besides these, BWDB has constructed a series of spurs, cross bars, hard points and revetments mainly along the right bank of the Jamuna River over a stretch of about 90km (from

Sariakandi to Chauhali) since 1998. During 2012 to 2014, BWDB implemented a pilot dredging work which resulted in rapid changes in planform and construction of four cross bars upstream and downstream of Sirajganj Hard Point. Some more structures exist along both banks of the river. These structures play vital role in a holistic approach in regulation, of bed and bank of the river at bridge location, at upstream and at downstream of the bridge and also in guiding the flow through the bridge.

Construction of a rail bridge at 300 m upstream of the existing road bridge started during 2021. The river in response to combined effect of two bridges may undergo changes and such adaptation of flow may also impart to the safety of the bridge. It was very much necessary to monitor the river morphology for implementation of the new bridge as well as safety of the existing bridge.

Involvement of IWM

Under the aforesaid backdrop, IWM with the aid of mathematical modeling of the Jamuna was sought, and under the contract between BBA, BR and IWM, technical support is being provided to the BBA and BR regularly for effective maintenance and monitoring plan regarding hydraulic issues of the Jamuna in the vicinity of the bridge. Numerical morphological model study of the Jamuna is used to forecast the critical hydraulic and morphological conditions during monsoon that identify the areas where monitoring, maintenance and emergency measures might be needed, and prepare a monitoring program for the safety of the river training works (RTWs) constructed for the Jamuna Bridge.

Since 1999, IWM provides technical support with supply of hydro-morphological data and interpreted results based on desk analysis of data. This service later extended and forecasting of the adverse situation that may pose threat to stability of the bridge are provided. With 1 year gap in 2006,

this service continued till now. More specifically the services include collection of hydro-morphological data corresponding to pre- and post-monsoon and monsoon period. Along with monitoring through data collection and forecasting, IWM also provides formal training at home and abroad. Prior to formal training, training on field data collection is also done.

Approach & Methodology

Basically, mathematical modelling approach followed by extensive data collection is adopted to monitor the hydro-morphological condition of the Jamuna river in the vicinity of the bridge. While the hydro-morphological behavior of the river system concerned is subjected to preliminary assessment based on available historical data, field inspections and appropriate analytical tools, comprehensive hydro-morphology requires mathematical models to resolve the governing physical processes to a sufficient degree of detail. In this respect extensive primary and secondary are collected and on the basis of the recent data, two-dimensional (2D) model is developed. Primary data collection includes bathymetry data covering 30 km reach of the Jamuna River encapsulating the bridge, water level, discharge and sediment data at several locations. The accuracy and applicability of the models is driven by the accuracy of hydrographic and topographic data. A well description of the river channel and its surrounding area is necessary and is used as the basic input of modelling. Various data are collected in order to have knowledge of the present condition of the river and most importantly to obtain an accurate model of high resolution. Based on the data, the 2D model of the Jamuna River is developed every year and calibrated against observed data. These data along with historical data guide to assess the trend and most importantly to check the authenticity of the model generated outputs. Sample plots of data and comparison of model generated outputs with observations are given in Figure 2 and 3.

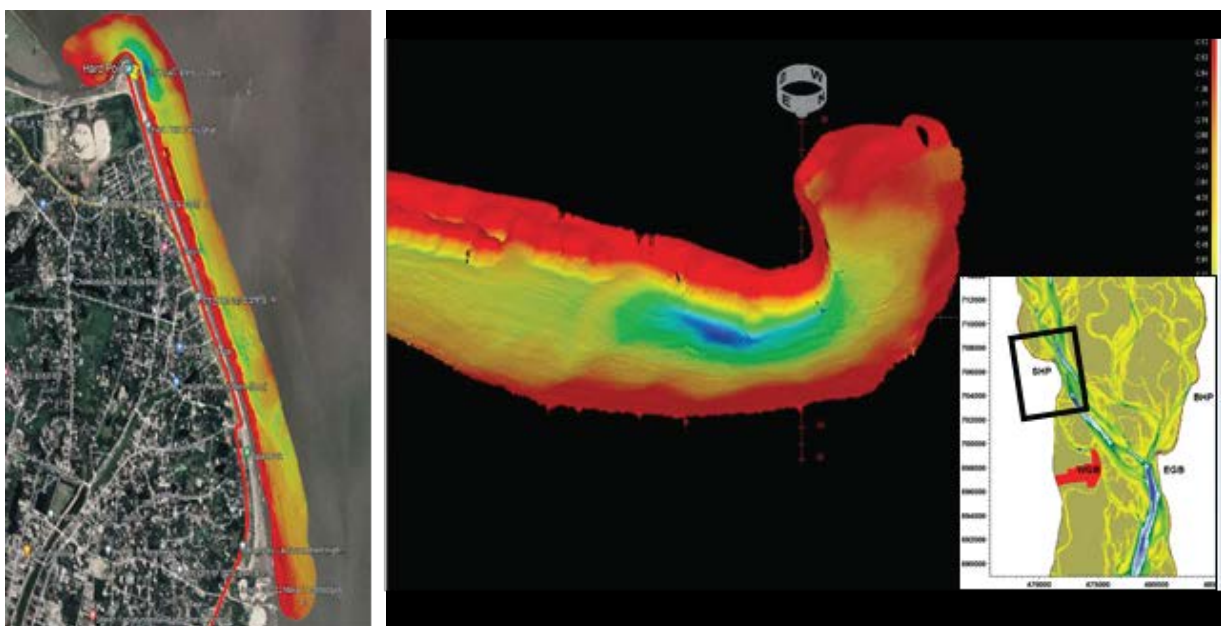
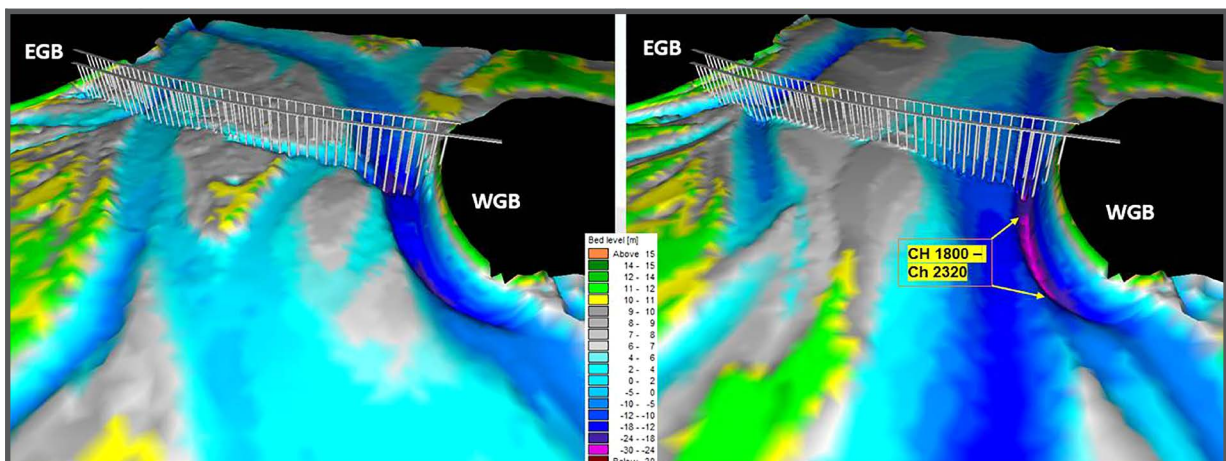
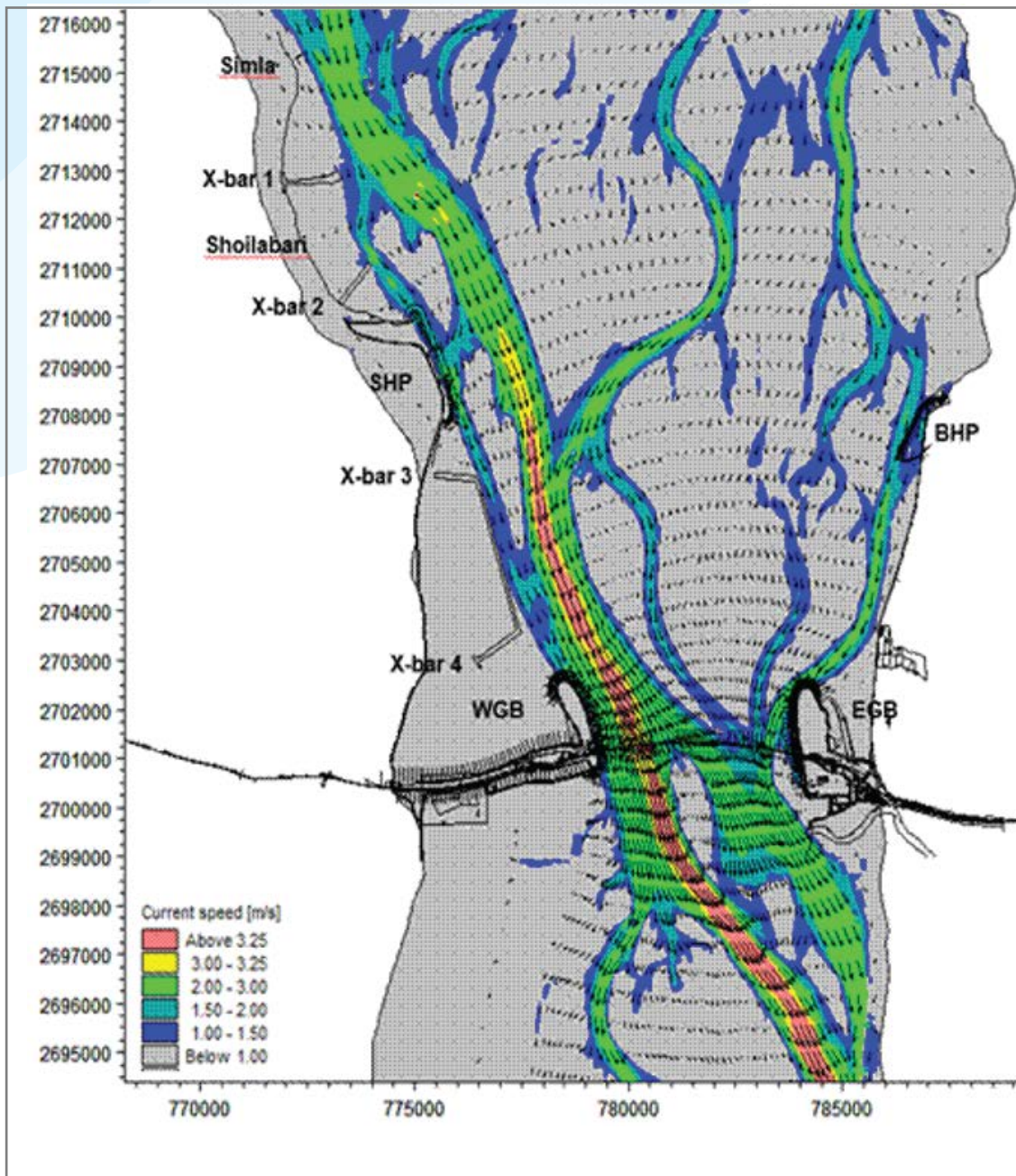


Figure 2 Collection of bed contour data obtained from Multi Beam Survey done at Sirajganj Hard Point (SHP)



Initial Bed Level

Simulated Bed Level After High Flood

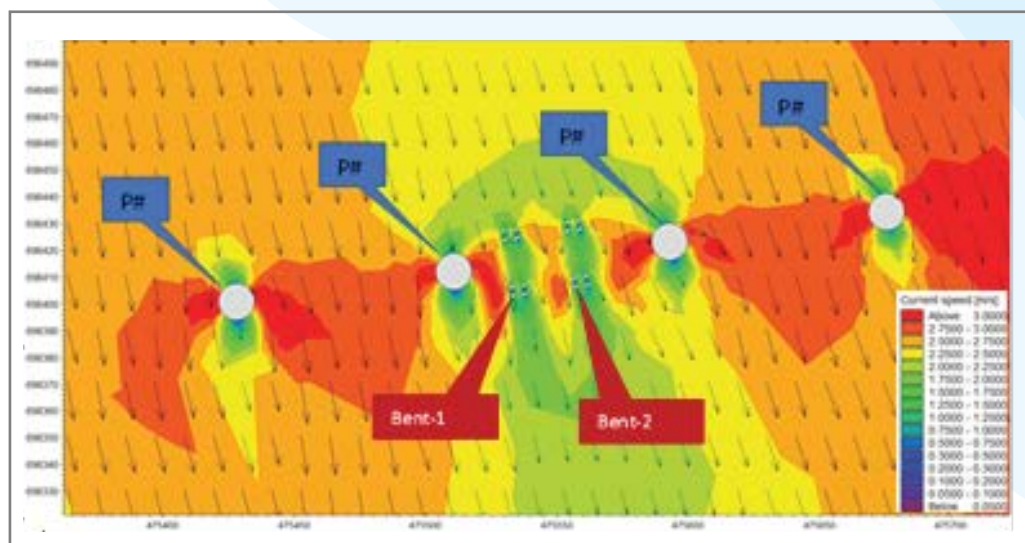


Figure: Model generated velocity vectors within the study area and zoomed view around the piers

In addition to providing support for the safety of the existing bridge to BBA, IWM also supports Bangladesh Railway with current hydro-morphological situation in the vicinity of the bridge area and also revisiting the hydraulic design variables. IWM was also engaged (2021) in the phase of selecting the hydraulic design variable of the rail bridge and also to evaluate the suitability of the site. Since then, IWM continues to support during on going construction phase.

Outputs/Forecasting

Having delineated the reach with different hazards and probable critical hydro-morphological conditions near the areas concerned with the help of 2D model outputs and field data analysis, monitoring program in the form of Monitoring Table is prepared. Monitoring program consists of collecting data at number of locations at specified time and intervals in order to acquire data/information, which is used for subsequent action. Table 1 shows a sample monitoring programme which is furnished before the onset of each monsoon. Similar directives are given for all structures within the bridge area.

Sample Monitoring Programme

Locations	Monitoring issues	Monitoring interval in time and space
At upstream tip of west guide bund (WGB)	Velocity at tip	Daily during rising and peak of the monsoon (from May to October)
	Bed development	Daily during peak and recession stage
	Water level	Daily during peak of the monsoon
	Bank erosion	Weekly during recession stage (August to October)
	State of underwater material	Weekly during rising stage but daily during peak and recession stage (from June to September)

IWM applied state of the art survey technique like Multibeam Echosounder and Acoustic Doppler Current Profiler for collecting morphological data during monsoon in the Jamuna River near Guide Banks and Piers which was highly challenging. The application of mathematical modeling presents various challenges, including computational complexities, representation of morpho-dynamics, data accuracy verification, and interpretation of model-generated

outputs. Developing a robust model requires a vast amount of data. Despite these challenges and inherent uncertainties, IWM successfully forecasts the morphological conditions of the Jamuna River before the onset of the monsoon and conducts data collection campaign in the river during monsoon contributing to both BBA and BR in maintenance of existing road bridge and implementation of new rail bridge.

An aerial photograph of a coastal landscape. In the foreground, a dark asphalt road with white lane markings runs diagonally from the bottom right towards the center. To the left of the road is a grassy area with several tall, dark evergreen trees. Further left is a wide, light-colored sandy beach. On the beach, there are several small, colorful objects that look like kayaks or small boats, one of which is red and yellow. The ocean is to the left of the beach, with white waves breaking against a rocky shoreline. The sky is a clear, bright blue. A semi-transparent dark blue rectangular box is overlaid on the bottom right portion of the image, containing white text.

**COAST, PORT &
INLAND WATERWAYS
MANAGEMENT
DIVISION (CPI)**

Study for Integrated Development and Management of Naf River Estuary and Land Development of Shahparir Dwip

Erosion of Shahparir Dwip sea beach has been a growing concern, threatening its natural beauty and stability. Despite various protective measures, long-term effectiveness remains a challenge. Teknaf to Saint Martin Island navigation route, a significant tourist attraction spanning approximately 35 km and taking around two to three hours to traverse by sea truck. This route is primarily active during the winter season when the wave climate is calm. However, navigability of the route is inadequate that restricts movement of large vessels. Bangladesh Water Development Board (BWDB) commissioned Institute of Water Modelling (IWM) to conduct a comprehensive study to assess the erosion dynamics and recommend sustainable mitigation strategies.

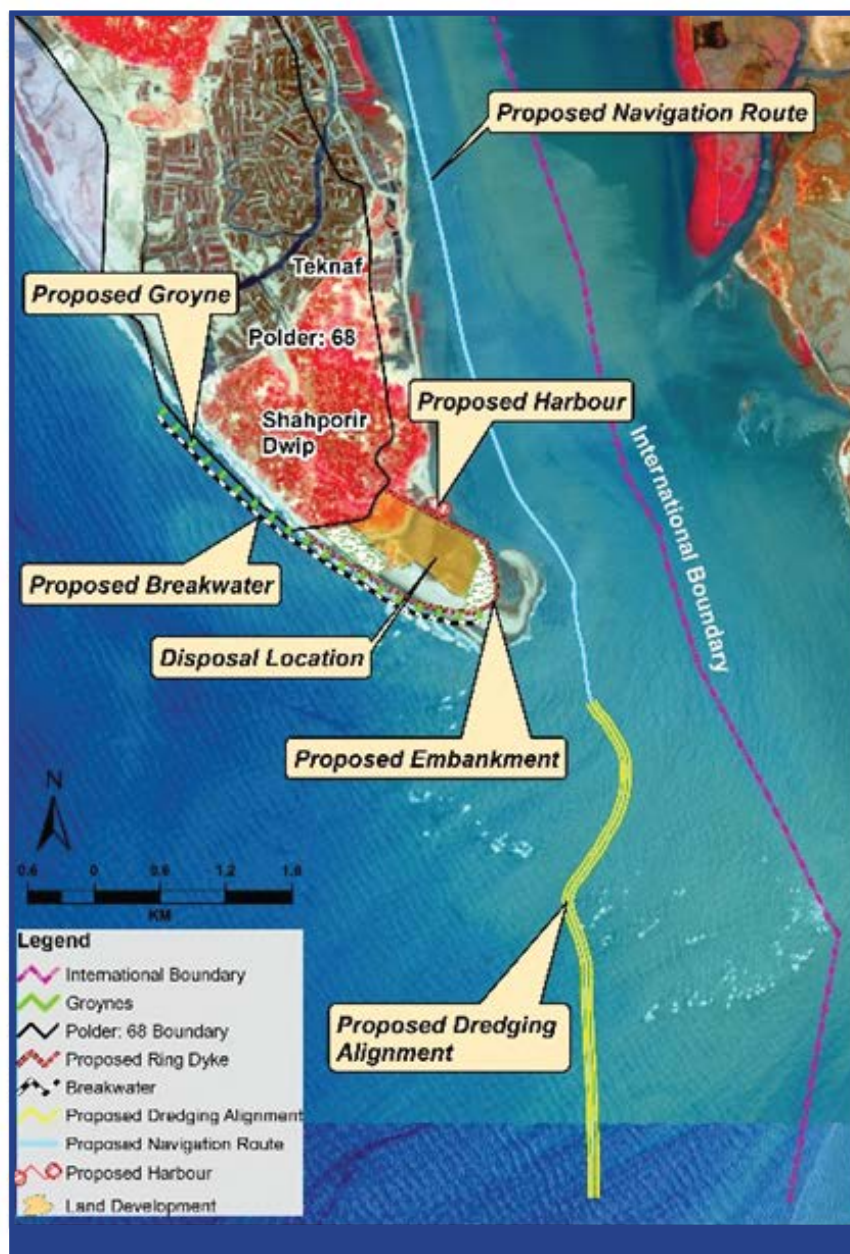
The overall objective of the study was to develop an integrated water resource management plan for the Naf River Estuary, addressing dynamic erosion and sedimentation processes while evaluating the feasibility of dredging and nature-based solutions.

The study identified wave action as the primary cause of erosion and conducted an in-depth analysis using field surveys, satellite imagery, stakeholder consultations, and numerical modeling. The assessment classified two highly vulnerable sub-reaches along the coastline:

- Sub-reach I (1.9 km) – Extending from the southernmost part of Shahparir Dwip to the southern end of Polder-68, this section has undergone protection measures but remains at risk.
- Sub-reach II (1.7 km) – Covering the western part of Golar Char, this area is directly exposed to wave action and remains highly vulnerable.

Both sub-reaches require urgent, long-term intervention to mitigate further coastal degradation. After rigorous analysis, Silt Accumulation Basins a combination of breakwaters and groynes were selected as the most suitable, long-term protective measure.

Other methods, such as revetments, beach nourishment, and standalone groynes, were also considered, but the integrated approach proved to be the most sustainable option. To improve navigability, a 4.4 km long and 80 m wide channel dredging has been proposed at the Naf River estuary. The total volume of capital dredging is estimated to be about 1.1 Mm³ along with 1.4 Mm³ for maintenance dredging for two years. 2.3 Mm³ dredged materials will be used to raise land level of entire Golar Char region up to 3mMSL.

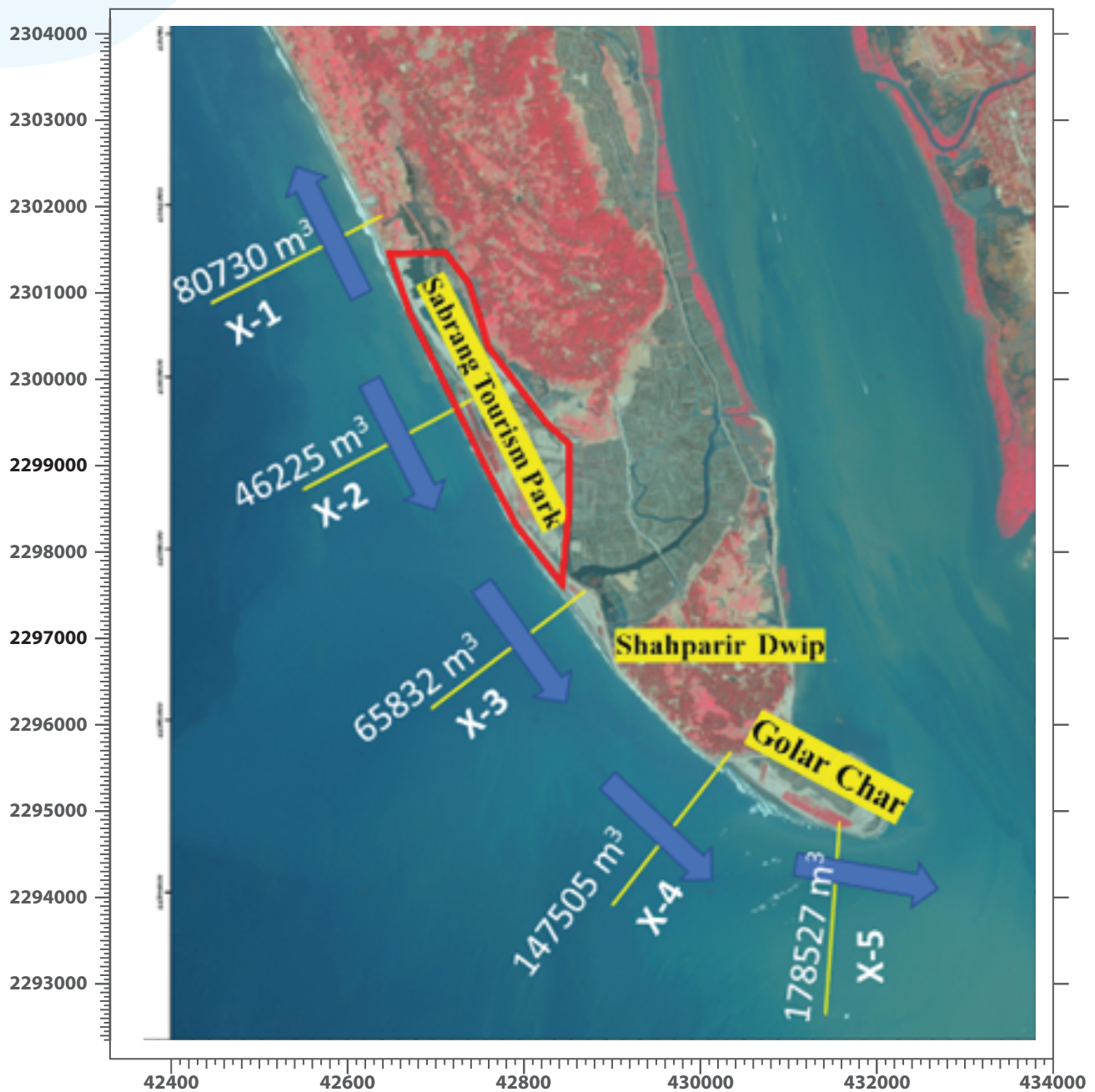


A temporary ring dyke using sand fill geo-tubes will be constructed around Golar Char to protect the disposal materials from normal tide intrusion during the dredging and land development activities. This dredging work is expected to improve navigation and create new land for development in the area.

In addition to land development, construction of a 3.45 km long embankment with slope protection has been proposed around Golar Char for safeguarding the land from erosion. Approximately 16 hectares of land will be under afforestation plan where planting of around 71,100 plants

will be done that would include Jhau trees. This afforestation effort will enhance the environment and create habitat for wildlife. Furthermore, a harbor facility will be developed for providing a secured anchorage for local boats during stormy weather conditions.

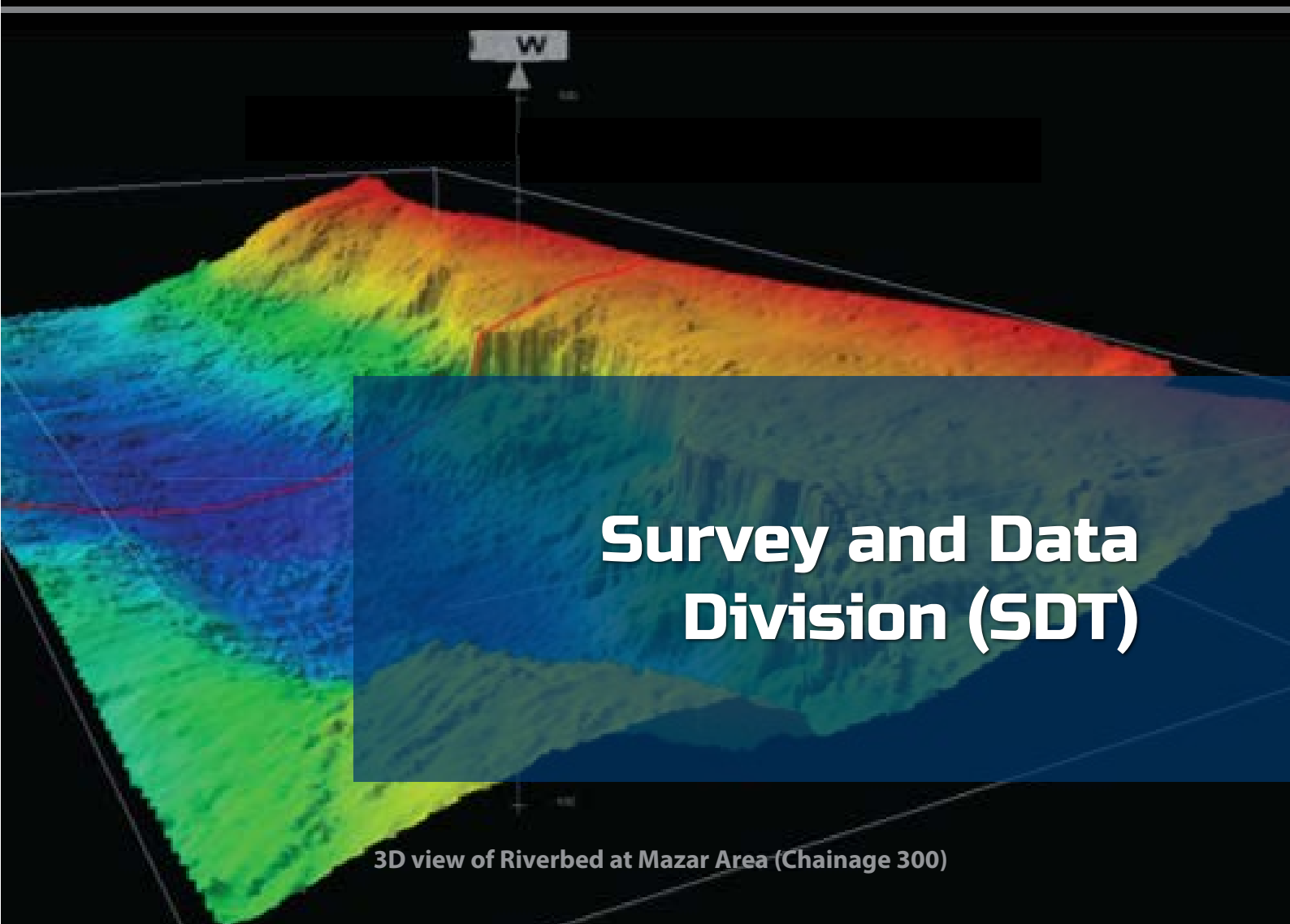
The outcomes of this study are vital for protecting local communities, enhancing navigability, and preserving the long-term tourism potential of the region. This project marks a significant step toward resilient coastal management, ensuring that Shahparir Dwip and its surroundings remain safeguarded for generations to come.



Annual net longshore sediment transport



Plan view at Sirajganj Hard Point under, Sirajganj District, using Drone/UAV LiDAR



Survey and Data Division (SDT)

3D view of Riverbed at Mazar Area (Chainage 300)

Preparatory Survey for Southern Chattogram Region Water Supply Project in People's Republic of Bangladesh

Institute of Water Modelling (IWM) carried out comprehensive survey works in the Matarbari Port Development Area located in Southern Chattogram Region as Subconsultant of Nippon Koei, Japan who was assigned by JICA for the "Preparatory Study". The purpose of this study was to develop a comprehensive plan and design for the water supply system in the Matarbari area. IWM was assigned to conduct river cross-section survey, interviewing local peoples to gather historical flood records, hydrological flood analysis and assessments of water quality. This initiative aimed to seek insights into the region's natural conditions as well as the meteorological, oceanographic and climate change factors affecting it.

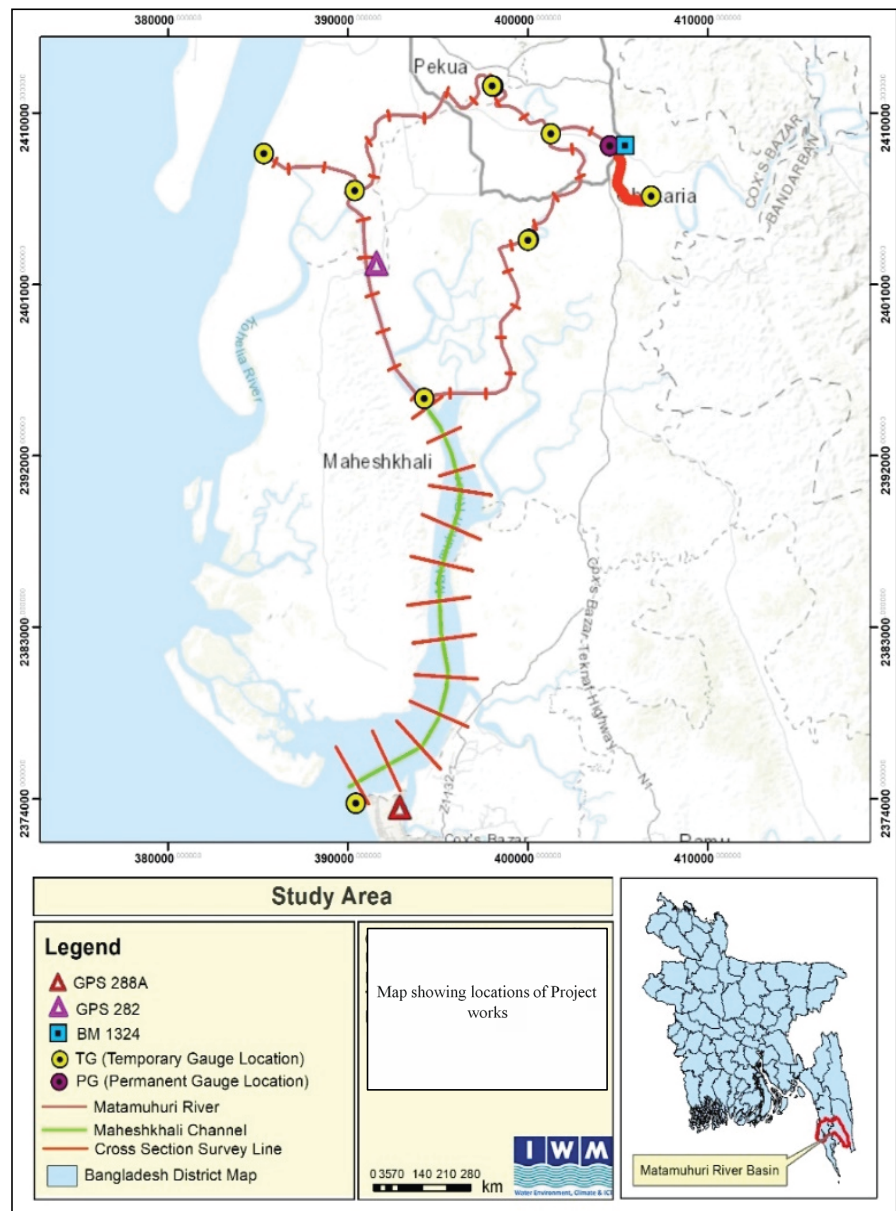
The study area is located at Chakaria, Pekua and Maheshkhali Upazilla in Cox's Bazar district. The data collection and survey efforts primarily focused on the regions downstream from Chakaria to the coastline within the Matamuhuri River basin. However, the basin confronts several challenges including different issues such as flood, sedimentation, bank erosion, pollution and impacts of climate change. These challenges contribute to alterations in flow pattern and raise concerns about potential saltwater intrusion due to basin's geological condition. Intensified floods and prolonged droughts are potential consequences of climate change in this region. The key activities of the project are outlined below.

Hydrological Data Collection

The information gathered through existing reports, data analysis and interviews with relevant institutions provides a comprehensive understanding of the current hydrological conditions in the Matamuhuri River basin. Hydrological data like Water Level (WL), Discharge (Q), Temperature, Relative Humidity, Sunshine Hour, Wind Speed, Rainfall, Salinity, Tidal Wave & Disaster Records had been gathered from various sources.

River Cross Section Survey at Matamuhuri & Maheshkhali Channel

River cross sections in the Matamuhuri River and Maheshkhali Channel had been surveyed to support the development of a flood simulation model. The survey methods for both the water and dry sections of the river were selected based on the flow conditions at the time of the survey. For the water-covered areas, a bathymetric survey was conducted by Echosounder/RTK-GPS while the land sections were surveyed using a leveling instrument and RTK technology.



Survey of Historical Flooding

An interview survey was undertaken to acquire in-depth understanding regarding water levels during recent floods and the highest recorded water levels from historical flood data at 25 different locations within the study area. The duration of the study was spanned a specific timeframe.

The interview results and information were documented using log sheets.

Hydrological Flood Analysis

A hydrological flood analysis was conducted for comparing the situation of flood with respect to different return period.

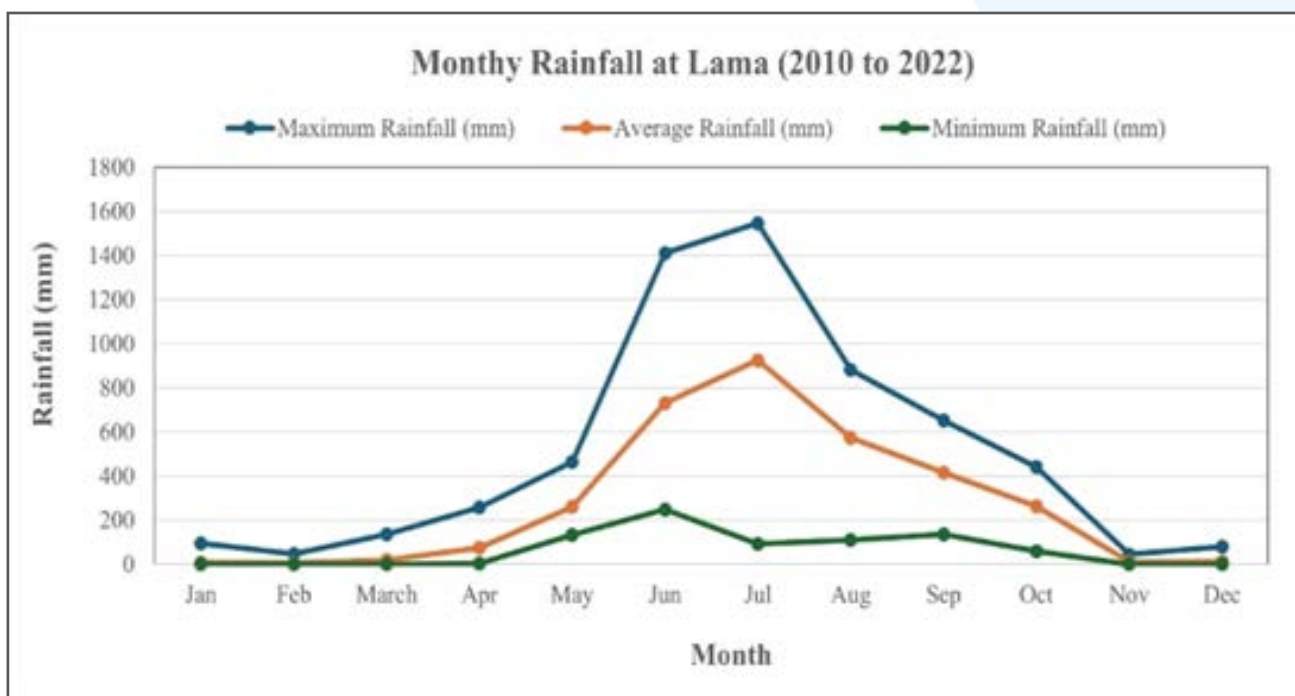


Figure: Rainfall Pattern Analysis of Lama Station

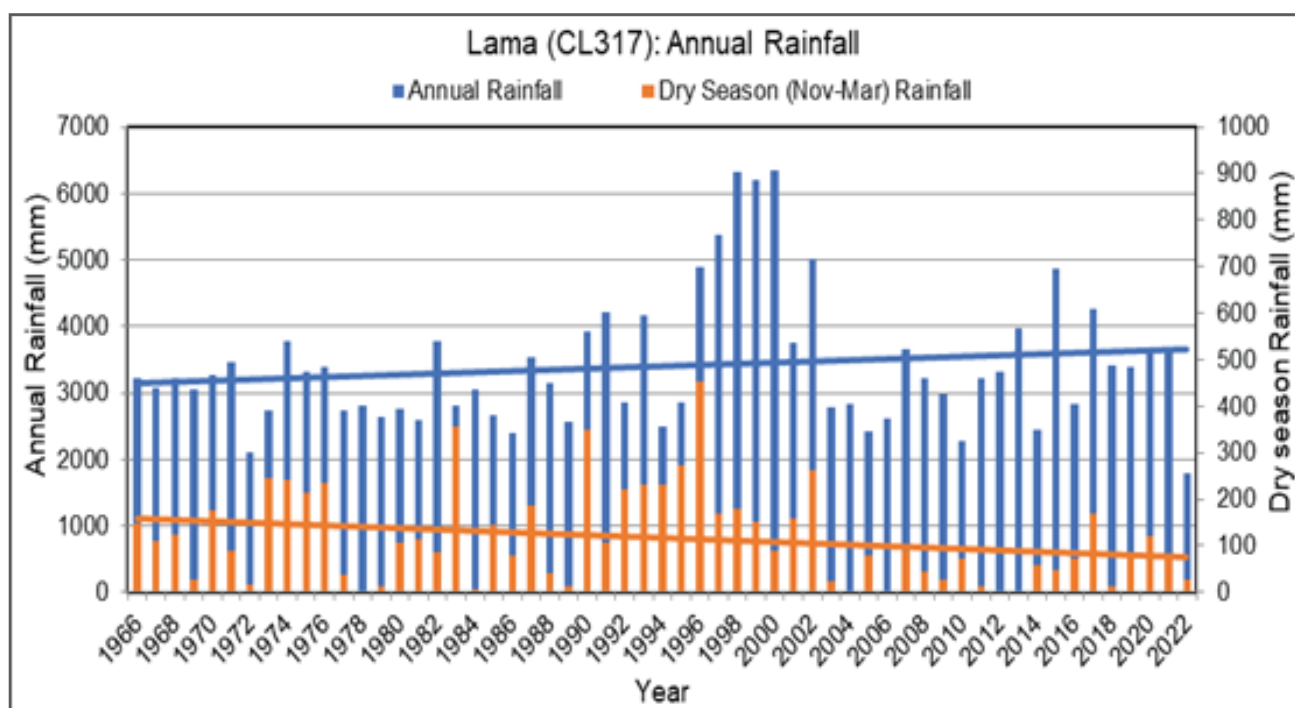


Figure: Annual & Dry Season Rainfall Trend of Lama Station

An inundation map was also prepared for better understanding. A flood inundation map was created that integrated geographic information system (GIS) technology, hydrological data and topographical information to visualize and analyze the extent of flooding in a specific area.

Water Quality Survey

Water quality samples were collected from the designated intake location of the Matamuhuri River. This sampling process spanned six months. Total 50 water quality parameters were examined by IWM. To guarantee the precision of water quality evaluations, standard procedures

was strictly maintained throughout the sampling, preservation and transportation phases. A submersible pump (specifically, the Gigant pump by Eijkelkamp) powered by a 12V DC Battery and tubing was used to collect the samples. After collection, these samples were promptly placed in cooling boxes containing ice packs and transported to the laboratory for testing.

The project commenced in mid-August 2023 and successfully completed in May 2024. All deliverables and reports were submitted to Nippon Koei in accordance with the established schedule.



Figure: Interview Survey at Selected Location and Marking of Flood Level by RTK



Figure: Water Quality Sampling of Mahamayuri River & In situ testing of water quality parameters

A photograph showing a flooded area. In the foreground, two young children are sitting on a large, dark log that is partially submerged in the water. The child on the left is shirtless and looking towards the camera, while the child on the right is wearing a pink long-sleeved shirt and blue shorts, also looking towards the camera. In the background, two cows are wading through the floodwater. One cow is brown and white, and the other is dark brown. The water is murky and brown. In the far background, there are some buildings and trees under a cloudy sky. A semi-transparent blue box with white text is overlaid on the upper right portion of the image.

Flood & River Basin Management (FRM)

Feasibility Study for Integrated Water Resources Management and Development of Surma-Kushiyara River Basin in Sylhet District

The Barak River bifurcates into two branches at Amalshid in the northeast border of Zakiganj upazila of Sylhet district.

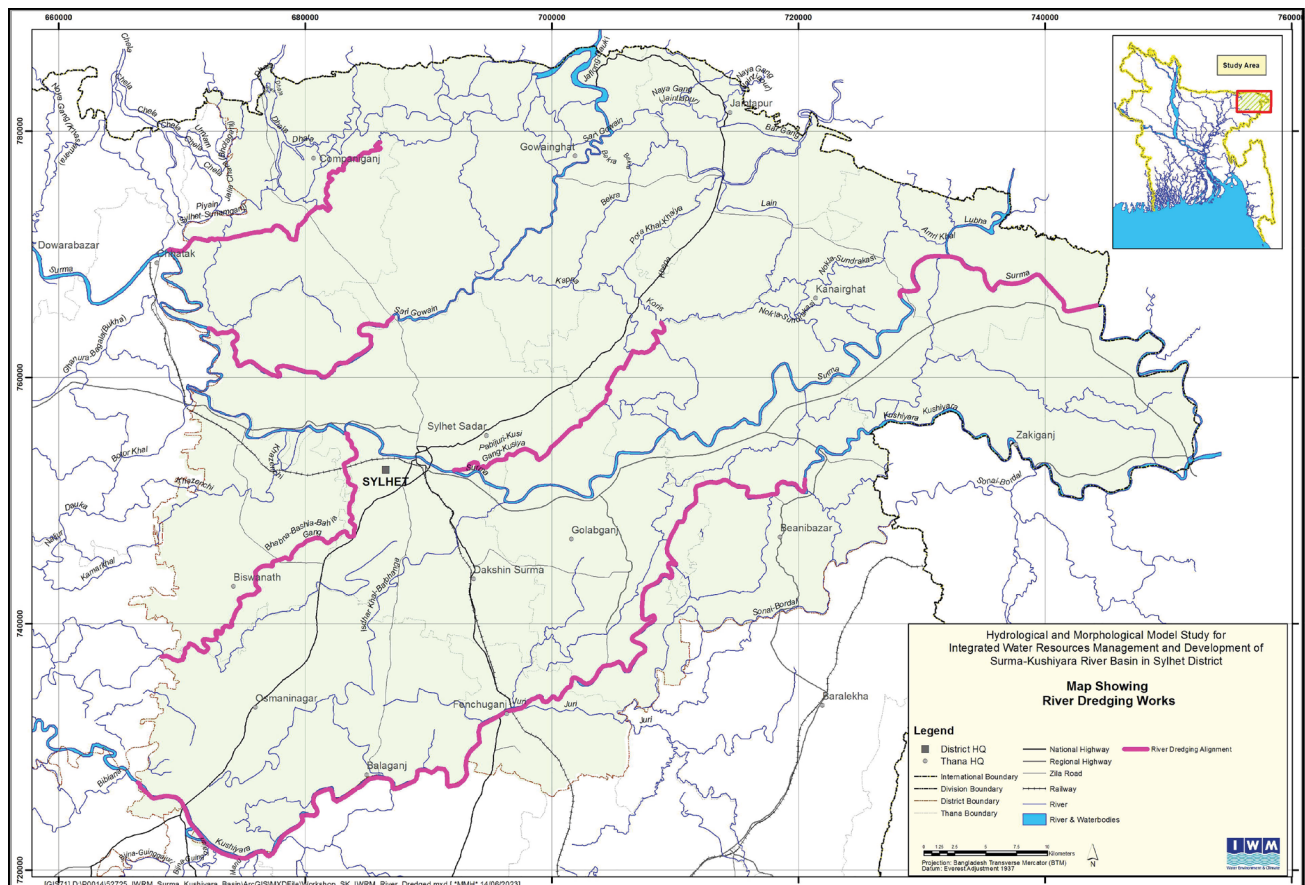
The northwestern arm is the Surma and the southwestern arm is the Kushiya. These two rivers undergo erosion and pre-monsoon floods, leading to loss of Boro crops, damage to submergible embankments in haor sub-projects, and other infrastructure. Sediment accumulation on river beds reduces their flood discharge capacity during the monsoon and causes drainage congestion. Most of the silt deposits in the Surma river. As a result, the Surma is drying every day and most of the water flows through Kushiya River causing horrific erosion on the river banks. To overcome these problems, BWDB decided to conduct a detailed feasibility study and IWM carried out Hydrological and Morphological Model study for the feasibility study.

The overall objective of the project is to carry out a comprehensive study for integrated water resources

management and development of Surma-Kushiya River basin investigating the flash flood mechanism, dynamic erosion and analyzing the need for embankment rehabilitation/reconstruction and other protective measures for sustainable solutions.

Major activities performed under the study are:

- Literature Review, Field visit, consultation with stakeholders
- Hydro morphological Survey, Topographic Survey and other investigation.
- Hydrological and hydrodynamic modelling.
- Morphological analysis.
- Assessment of key issues or parameters..
- Market /Demand analysis.
- Project planning and devise Alternative Development Option Plans.
- ESIA study.



Map showing location of proposed river dredging

- Conduct feasibility level design of proposed structures.
- Cost and benefit estimate of proposed interventions.
- Economic and financial analysis of proposed project.
- Dissemination of study findings and outcomes.

The list of interventions proposed is given as follows:

- Dredging of Surma River (52 km), Kushiya River (52 km), Piyan River (24 km), Bashia River (38.9 km), and Kushi Gang (32 km).
- Riverbank Protection Works at 46 locations of Surma

River (25530 meter), 32 locations of Kushiya River (23410 meter), 7 locations of Sari-Gowain River (3885 meter), 4 locations of Sonai River (1250 meter) and 1 location of Lubha River (160 meter).

- Construction of regulators at 4 locations
- Construction of 3500 meter floodwall in Balaganj Town.
- Upgradation of 2 km existing roads in Balaganj Town.
- Construction of 11 drainage outlets.
- Re-excavation 320 km of internal Khals.



Discussion with Sylhet City Corporation and BWDB Officials at Sylhet



Satellite Image analysis from 2016-2022 at Jalalpur at Kushiya River Right Bank shows erosion and deposition (Brown: Erosion, Green: Deposition)

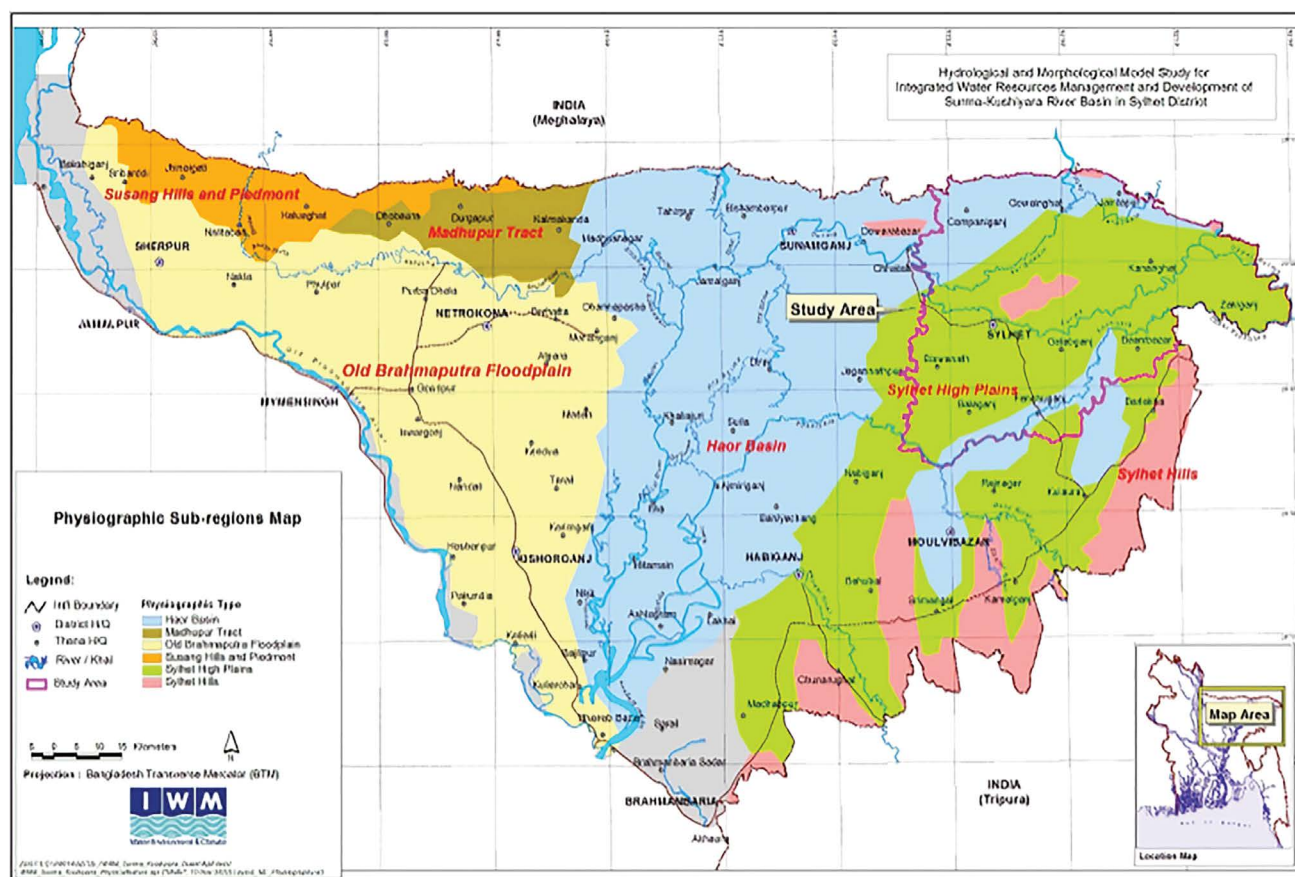


Figure: Physiography Sub-regions in the Northeast Region of Bangladesh



ICT, GIS & Remote Sensing Division (ICT)

Empowering the Farmers for efficient cropping in Bangladesh



Background

Bangladesh, being primarily an agricultural country, relies heavily on its agriculture sector for economic growth. Ensuring a profitable, sustainable, and eco-friendly agricultural system is vital for the nation's food security. With the aim of making Bangladesh self-sufficient in food production, the Government of Bangladesh has prioritized agriculture. However, the sector faces significant challenges, including rapid population growth, shrinking arable land, inefficient use of resources, and short cropping periods. Furthermore, the adverse effects of climate change droughts in the northwest, flash floods in the northeast, cyclones in coastal areas, and salinity in riverine regions—exacerbate these challenges.

To secure food supply for Bangladesh's growing population, it is essential to develop an efficient and sustainable agricultural production system. This requires proper planning and the adoption of modern technologies for land resource utilization. Identifying areas best suited for high agricultural output, considering soil quality and climate conditions, is a key step in this direction.

Bangladesh Agricultural Research Council (BARC), with funding from the Krishi Gobeshona Foundation (KGF),

launched the "Development of Upazila Land Suitability Assessment and Crop Zoning System of Bangladesh" project in 2017, set to complete in January 2025. The project's main goal is to assess land suitability for crop production by evaluating soil quality and climate scenarios, ultimately helping to create crop zoning maps for sustainable agricultural development. By following crop zoning guidelines, farmers can achieve higher yields at lower costs, ensuring profitability and food security.

As partner organization of this project IWM provided GIS and ICT based solutions making web applications (<https://cropzoning.gov.bd/>) and a Mobile App named "Khamari". This can be downloaded from Google Play Store: https://play.google.com/store/search?q=Khamari&c=apps&hl=en_US.

The developed systems promote sustainable agriculture, encourages commercial farming, boosts agricultural exports, enhances nutrition security, and helps farmers optimize their income. The system also provides soil health assessments, recommends appropriate fertilizers, and increases collaboration between farmers, scientists, and other stakeholders.

Crop Suitability Measure

The crop suitability assessment is based on two key factors: agro-edaphic and agro-climatic conditions.

- Agro-edaphic factors include soil characteristics such as permeability, depth, moisture availability, nutrient content, pH, salinity, consistency, and drainage, as well as flood hazards and landform (slope).
- Agro-climatic factors involve the length of the growing season, temperature, and other climatic conditions that influence crop growth and photosynthesis.

These factors are assessed individually for each crop using expert judgment from agricultural scientists and field experts, resulting in agro-edaphic and agro-climatic suitability maps. These maps are then combined to create an overall crop suitability map, following the soil-crop suitability model developed by Zijssvelt in 1979, later revised by Brammer in 1985 and Hussain in 2005.

Crop suitability is classified into four categories:

Very Suitable: > 80% of Maximum Attainable Yield (MAT)

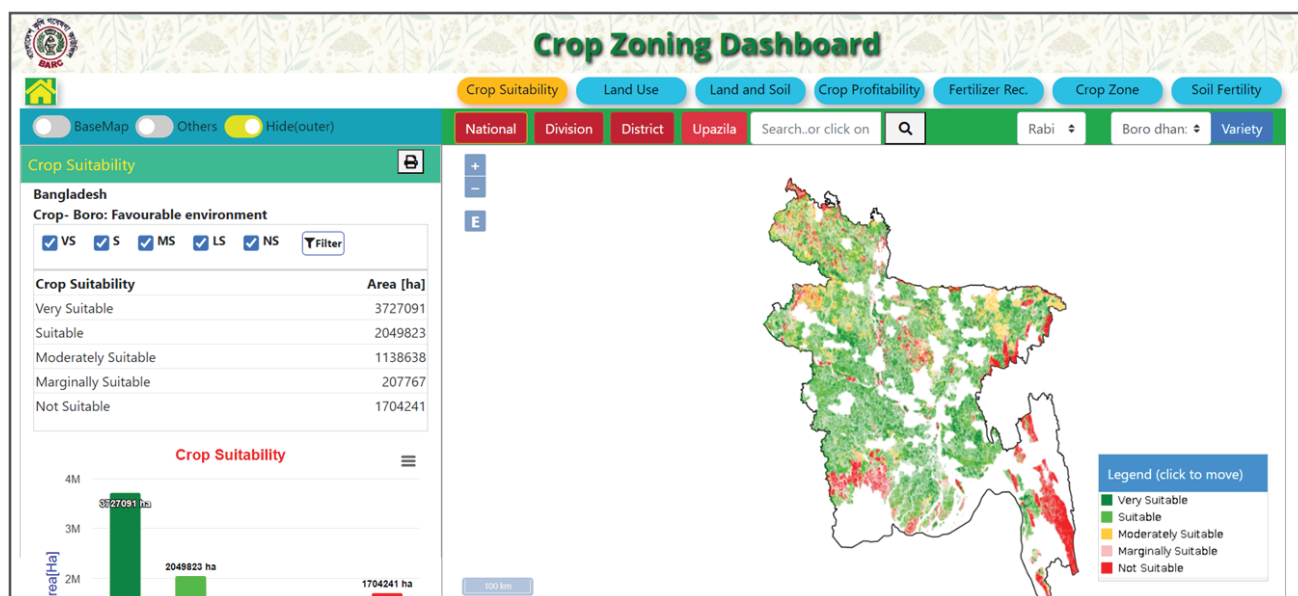
Suitable: 60-80% of MAT

Moderately Suitable: 40-60% of MAT

Marginally Suitable: 20-40% of MAT

Crop Zoning Web Application

A crop zoning web application (<http://cropzoning.gov.bd>) has been developed for agricultural scientists and government officials to map crop suitability, land use, crop profitability, Fertilizer estimation, crop zoning-based on fertility and productivity. It is a web GIS based interactive web application. The analyst and decision makers can utilize the application at Upazila, District, Division and National levels.



Web Interface of Crop Suitability Assessment

Khamari Mobile App

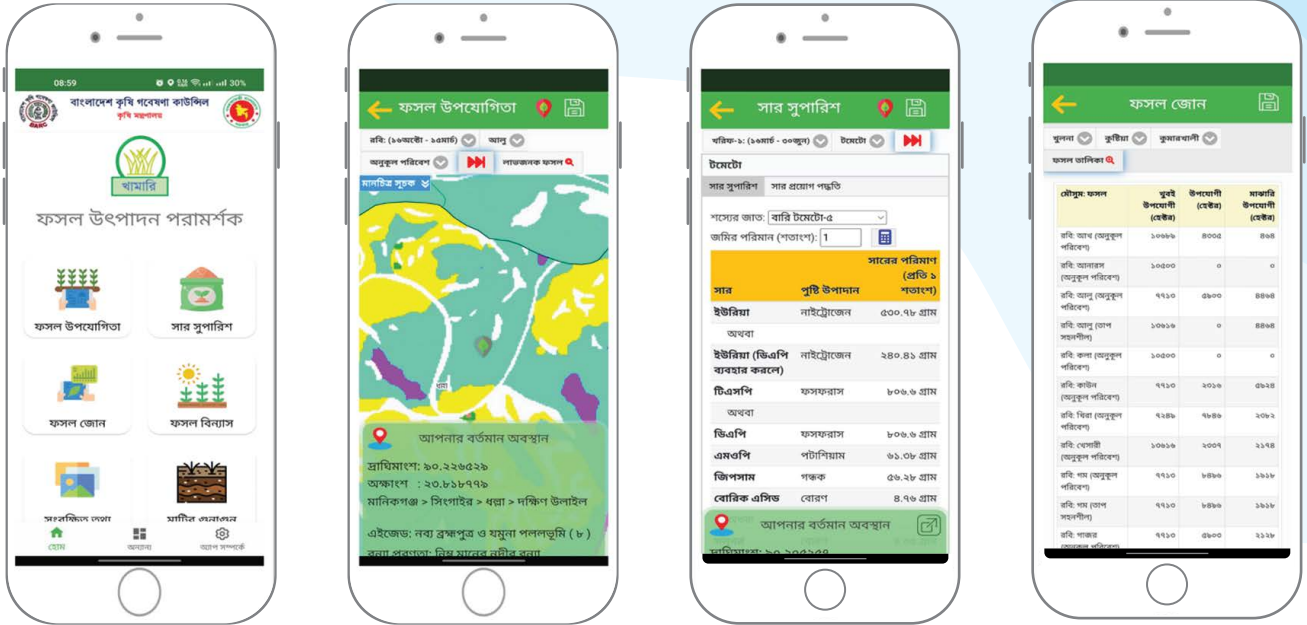
To make land suitability assessments accessible to farmers and stakeholders, BARC, in collaboration with the Soil Research Development Institute (SRDI) and the Institute of Water Modelling (IWM), developed the Khamari Mobile App. This app complements the Crop Zoning Information System (CZIS) and the Agricultural Advisory portal. It is available on both Android and iOS platforms and provides timely, relevant information to farmers based on their location and needs.

Farmers will get various agricultural related information, including season-wise crops, land fertility, fertilizer recommendation, and yield. The Khamari App works on following services:

- Crop Suitability for selected point location or Union
- Fertilizer Recommendation for selected point location or Union
- Upazila wise Cropping Zone

This service enables the farmer to know the crop suitability either on a location or a particular upazila.

Location based: The app provides the user with a list of suitable crops by preference for three crop seasons of the user's current location on the earth surface. The app uses the Geographical Positioning System (GPS) coordinates of the user's location and selected crop and send to the server for analysis and gets back the crop suitability with



potential production per decimal area.

Union based: The app provides a list of crops that are suitable in three crop seasons for a union (the lowest administrative entity in Bangladesh).

Fertilizer Recommendations

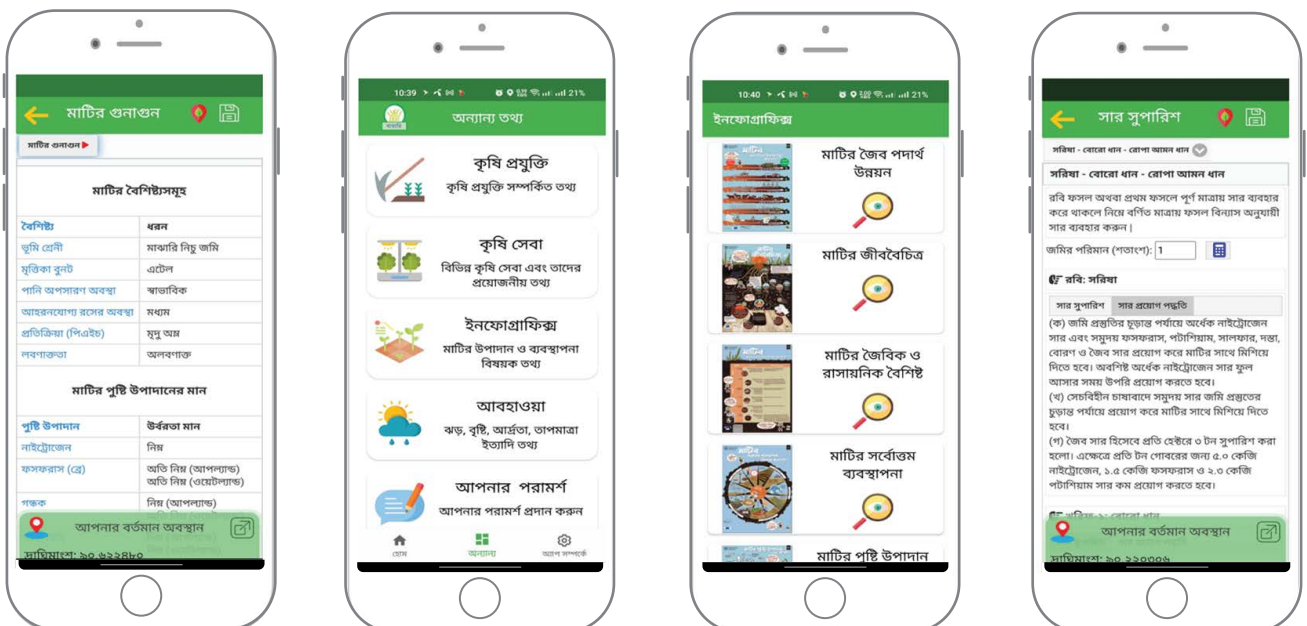
- Location based fertilizer: The Khamari provides crop wise and also cropping pattern wise fertilizer requirements with dose for the user's selected location.
- Union based fertilizer: The Khamari App provides crop and cropping pattern wise fertilizer doses for selected union areas.
- Fertilizer Calculator: A fertilizer dose calculator is also

made in Khamari App for selected crop or cropping pattern.

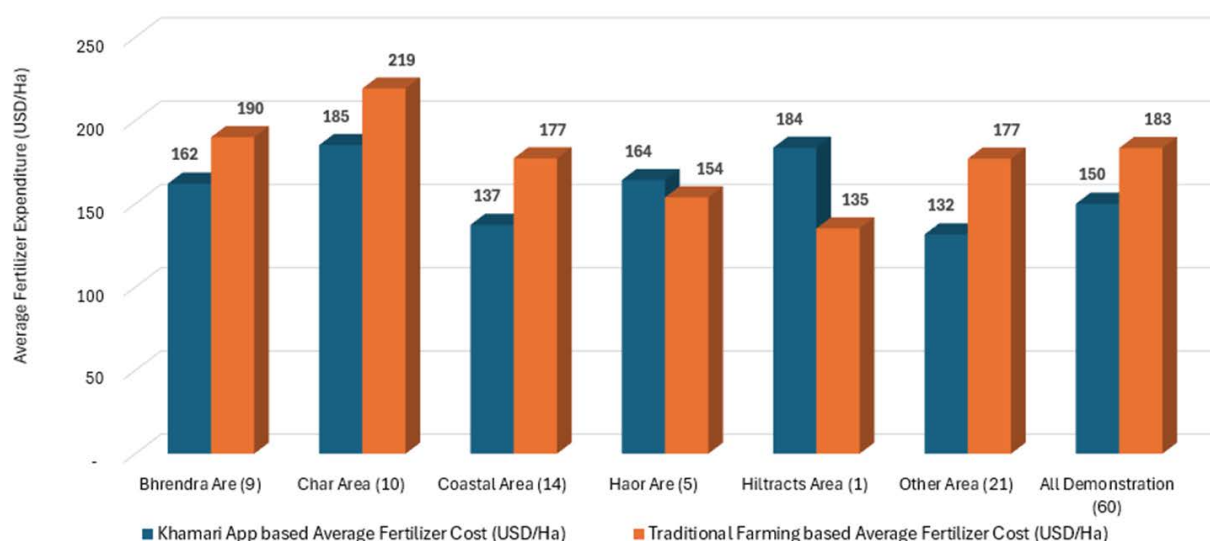
Impact Assessment of Khamari implementation

The BARC in cooperation with the DAE has conducted several demonstrations and trial program in different regions in Bangladesh for different types of crops using the Khamari App to find its potential impact. In 2023-24, 60 trials have been completed in 34 districts for Amon rice and 60 Upazila for Boro rice.

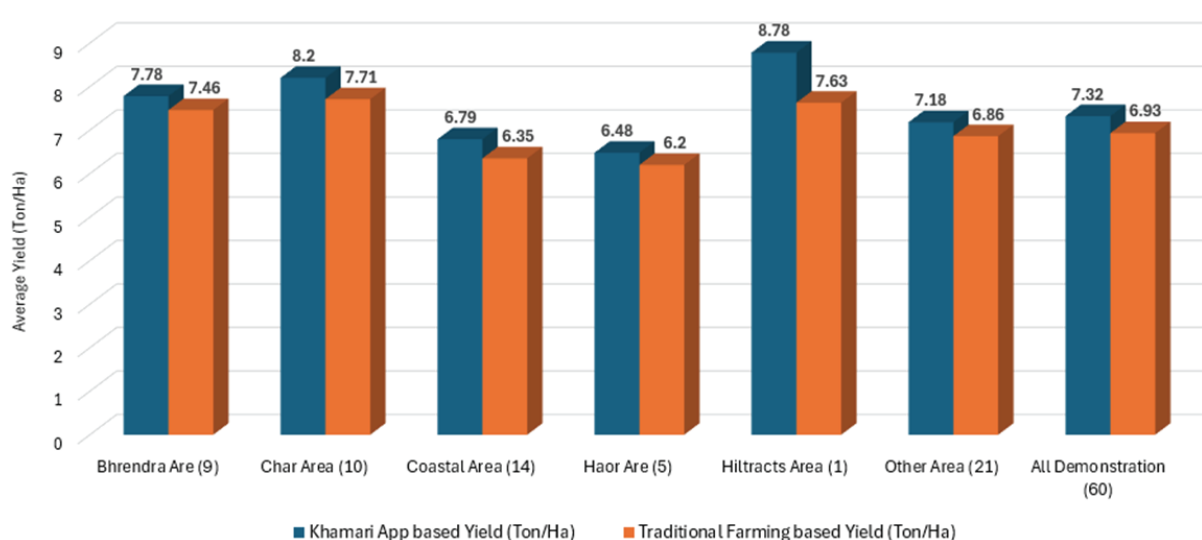
The results of these 60 trials found significant benefits of cost savings for fertilizer doses and increases in crop yields. The following figures present the comparisons of the average fertilizer cost (USD/ha) and crop yield (Ton/Ha).



Average Fertilizer Cost (USD/ha) of 60 Numbers of Broro Dhan Demonstration Trial (2023-2024)



Average Yield (in Ton/Ha) of 60 Numbers of Broro Dhan Demonstration Trial (2023-2024)



The overall benefit to farmers from using the Khamari Mobile App is estimated to be USD 179 per hectare, with a reduction in fertilizer costs of USD 68 per hectare and an increase in crop yield of 389 kg per hectare, valued at USD.

Trial data shows that for all seasonal crops, there has been a notable increase in production and a decrease in fertilizer costs. The seasonal impacts are summarized as follows:

Impact Items	Rabi Season (Nov-Mar)	Kharif-1 Season (Mar-Jul)	Kharif-2 Season (Jul-Nov)
Fertilizer Use	-13.22%	-27.34%	-34.56%
Production Change	+10.43%	+10.04%	+6.77%

Further analysis reveals that by applying the Khamari Mobile App for Aman rice cultivation across Bangladesh, the potential savings in fertilizer costs could reach BDT 27.64 billion (USD 232.0 million), while the increased crop production could generate an additional BDT 62.02 billion (USD 520.0 million). The total economic gain from Aman rice alone could amount to BDT 89.66 billion (USD 752.0 million).

Similarly, for Boro rice, implementing the Khamari App could result in an additional gain of BDT 82.05 billion (USD 688.0 million), demonstrating the significant economic potential of the app in transforming agricultural practices in Bangladesh.

Conclusion

As a research partner of BARC under the project "Development of Upazila Land Suitability Assessment and Crop Zoning System of Bangladesh," IWM has developed the Khamari Mobile App with the goal of empowering farmers and advancing sustainable agricultural practices. IWM takes pride in being a key development partner, working to enhance farming productivity and foster economic growth across Bangladesh. By using the Khamari Mobile App, farmers can make informed decisions, increasing crop production, which will

significantly contribute to food security. Additionally, optimized fertilizer usage will not only reduce import costs but also improve soil health and the overall environmental sustainability of agricultural practices.

The Khamari Mobile App model can also be adapted and deployed in other countries, taking into account their unique land, soil, and climatic characteristics, to promote agricultural excellence on a global scale.




খামারি মোবাইল অ্যাপ

Developed by IWM for BARC



এখন আমি জানি
আমার জমিতে কোন ফসল
সবচাইতে ভালো!



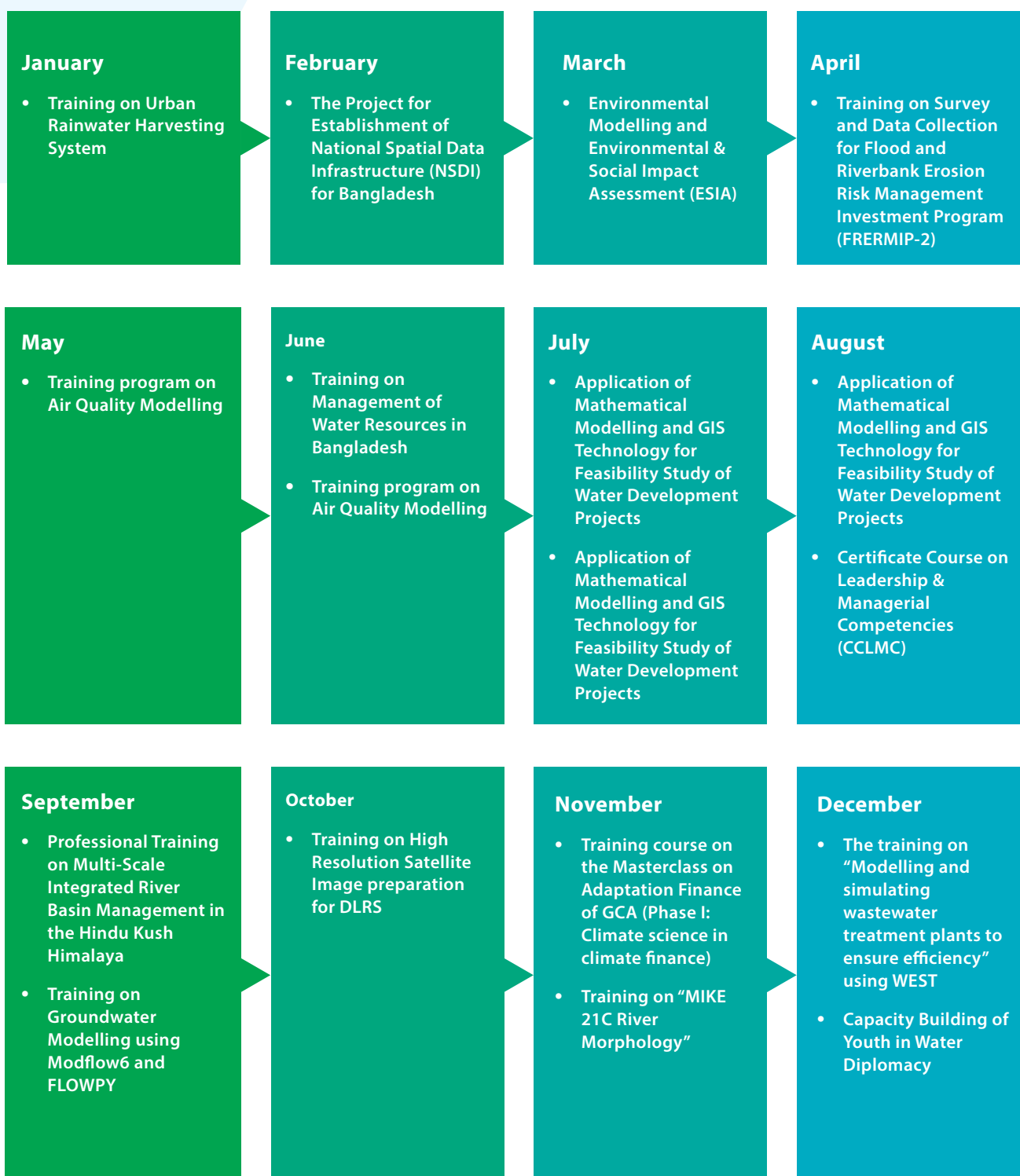
এইডা আমি জানি
কোন সার কতটুকু দিতে হবে!



Institute of Water Modelling (IWM)
A Trust under the Ministry of Water Resources

Training & Capacity Development

Training and Technology Transfer is a regular activity of IWM at updating the human resources of the Institute as well as the service users with the new knowledge and technology and to cope with the new challenges in the water sector. Following is the brief on the HRD programmes conducted in 2023.





Training on 'Application of Mathematical Modelling and GIS Technology for Feasibility Study of Water Development Projects', Bangladesh Army



Industrial Training for Civil and Environmental Engineering (CEE) students of Islamic University of Technology (IUT), Bangladesh, Gazipur



Training on High Resolution Images capture using Unmanned Aerial Vehicle (UAV)/Drone



Training on Survey and Data Collection for Flood and River Erosion Risk Management Investment Program (FRERMIP-2), BWDB

Some of our Major Events

Mr. Nazmul Ahsan, Honorable Secretary and Chairperson, IWM Board of Trustees (BoT) visited IWM Bhaban



Mr. Nazmul Ahsan the newly appointed Secretary of the Ministry of Water Resources, and Chairperson, IWM Board of Trustees (BoT) visited the IWM Bhaban on 4th January, 2023. On this occasion he was welcomed by Md. Zahirul Haque Khan, the Executive Director of IWM.

Director General of Department of Bangladesh Haor and Wetlands Development Visits IWM



Md. Akhtaruzzaman, Director General, Department of Bangladesh Haor and Wetlands Development (DBHWD) with High Officials made a visit to IWM. Mr. Zahirul Haque Khan, Executive Director of IWM welcomed Md. Akhtaruzzaman and his team with a floral bouquet. Executive Director briefly presents the activities of IWM. They were highly impressed with the work environment of IWM and discussed about the future collaborations in Sustainable Development and Water related research for Haor and Wetlands area.

IWM Participated in the 11th International Perspective on Water Resources and the Environment (IPWE 2023)



IWM participated in the 11th International Perspective on Water Resources and the Environment (IPWE 2023). Since 2006 ASCE-EWRI arranged a series of ten conferences to help bring together engineers and scientists from around the world that share common challenges.

International Collaboration



Md. Zahirul Haque Khan, Executive Director and Mr. S M Mahbubur Rahman, Deputy Executive Director (Planning & Development) of IWM meet with NAHRIM High officials in Malaysia

World Bank Team Visits IWM



Ms. Swarna Kazi, Senior Disaster Risk Management Specialist, the World Bank, Bangladesh and her team made a visit to IWM. Mr. Zahirul Haque Khan, Executive Director of IWM welcomed Ms. Swarna Kazi and her team with souvenirs & crest and briefly explained the activities of IWM. During her visit, discussions were held regarding the professional level cooperation between the World Bank and IWM field of expertise, potential research and frequent future collaborations. They visited different technological and professional capacities of the IWM.

Honorable Delegates of Embassy of the Kingdom of the Netherlands (EKN) Visits IWM



Executive Director of IWM welcomes Ms. Neeltje Kielen, Delegated Representative Water Affairs at the Embassy of the Kingdom of the Netherlands in Bangladesh with Souvenirs and Crest on August 09, 2023. She was accompanied by Md. Shibly Sadik, Senior Water Resources Policy Advisor. During the visit, discussions were held regarding the cooperation between EKN and IWM on water related study, research and future collaborations.

National Hurricane Center, USA Team Visits IWM



Executive Director Md. Zahirul Haque Khan of IWM welcomes High Officials of National Hurricane Center and Central Pacific Hurricane Center and discussed about future collaborations in costal water research

High Officials of Assam Government Visits IWM



Executive Director of IWM welcomes a High Official Delegates of Assam Government, India and discussed about future collaborations in transboundary water management

Honorable Delegates of the Ministry of Energy, Water Resources & Irrigation, Government of Nepal Visits IWM



Institute of Water Modelling (IWM) invited a group of high officials of the Ministry of Energy, Water Resources & Irrigation, Government of Nepal on a knowledge-sharing program in October 2023. The visit is in connection with the project of IWM titled 'Development of Flood Forecasting and Early Warning System for Karnali and Narayani River Basins in Nepal'. During the visit, discussions were held regarding the cooperation between Ministry of Energy, Water Resources & Irrigation, Government of Nepal and IWM on water related study, research and future collaborations.

Some of the Major Contract & MoU Signing Ceremony



Contract Signing Ceremony with Department of Hydrology & Meteorology (DHM), Nepal for Development of Flood Forecasting and Early Warning System for Karnali and Narayani River Basins in Nepal

Memorandum of Understanding (MoU) between Institute of Water Modelling (IWM) and United International University (UIU), Bangladesh.



Memorandum of Understanding (MoU) between Institute of Water Modelling (IWM) and United International University (UIU), Bangladesh. Under this MoU both organizations will work collaborate in the sector of water supply, sanitation, hygiene, water quality monitoring and assessment, water sources protection, water and wastewater treatment, designing rainwater harvesting systems, environmental and social impact assessments, knowledge partnership, policy development, research and capacity building.

MoU between RRI & IWM for Future Joint Collaboration



A team led by Mr. S M Mahbubur Rahman, Deputy Executive Director, (Planning & Development) IWM visited the River Research Institute (RRI) and signed a Memorandum of Understanding (MoU) between RRI & IWM for future joint collaboration.

Major Workshops

Bangladesh Country Programme: Green and Climate Resilient Development



Institute of Water Modelling (IWM) has been engaged to provide support in formulating Bangladesh Country Programme 2024-2027 for Green and Climate Resilient Development with funding from the Food and Agriculture Organization (FAO). Ms. Sharifa Khan, Senior Secretary, ERD, Mr. Robert D Simpson, Country representative, Food & Agricultural Organization (FAO) along with senior officials from ministry, development partners, NGOs, civil society and private sector participated in the validation workshop at NEC-2, Planning Commission.

Inception Workshop on “Supporting to Accelerate Bangladesh Delta Plan 2100 Implementation”



Md. Zahirul Haque Khan, Executive Director of Institute of Water Modelling (IWM) participated in the Inception Workshop on “Supporting to Accelerate Bangladesh Delta Plan 2100 Implementation” at NEC-1 Conference Room, Planning Commission on 24th July 2023. The project aims to develop a Delta Approval Framework (DAF) with technical criteria based on ADM. It will also look into technical content, institutional aspects and legal framework of proposed Delta Act. Dr. Md. Kawser Ahmed, Member (Secretary) of General Economics Division (GED) of Bangladesh Planning Commission graced the occasion as Chief Guest. Khan Md. Nurul Amin, ndc, Chief (Additional Secretary) GED of Planning Commission were present as Special Guest. Ms. Neeltje Kielen, Delegated Representative Water Affairs at the Embassy of the Kingdom of the Netherlands in Bangladesh was also present as Special Guest. Md. Khorshed Alam, Joint Chief, Delta Wing chaired the workshop.

IWM Observing Different National Day

IWM Observes International Mother Language Day



Mr. Zahirul Haque Khan, Executive Director of Institute of Water Modelling (IWM) paying tribute to the language movement's martyrs by placing floral wreath, on International Mother Language Day 2023 at the Central Shaheed Minar, Dhaka. He was accompanied by Mr. S M Mahbubur Rahman, Deputy Executive Director (P&D), Mr. Md. Amirul Islam, Deputy Executive Director (Operations) and other senior officials of IWM.



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