



*Little Ringed Plover, a migratory bird
found in St. Martin's Island*

Upcoming

- ❑ Sandhya-Baleshwar River System: Integrated Water Resources Management in the Sandhya-Baleshwar River Basin

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the CEGIS NEWSLETTER

Safeguarding Environment for Future

UAV Photogrammetry and 3D GIS Database for Urban Planning



Plura View 3D Photogrammetric Workstation

Accurate geospatial information is fundamental to modern urban planning and municipal management. To support evidence-based decision-making, the Center for Environmental and Geographic Information Services (CEGIS) implemented a UAV-based mapping project for Pirojpur and Swarupkathi Paurashava under the Urban Development Directorate (UDD). The initiative demonstrates the application of advanced drone and GIS technologies for smart urban development in Bangladesh.

High-resolution UAV surveys were conducted using the DJI Matrice 350 RTK platform integrated with RTK positioning techniques. Ultra-high-resolution orthophotos with

3 cm spatial resolution enabled detailed mapping of buildings, roads, drainage networks, and vegetation. Rigorous photogrammetric processing generated orthophotos, Digital Surface Models (DSM), Digital Terrain Models (DTM), and 3D city models. A 10 cm resolution DTM provided valuable information for micro-topography, watershed delineation, and drainage analysis.

Ground Control Points (GCPs) and RTK-based surveys significantly enhanced the geometric accuracy of the final products, meeting engineering and urban planning standards. The project resulted in a comprehensive and up-to-date 3D GIS database for Pirojpur and Swarupkathi Paurashava, providing a reliable foundation for

Strategic Master Plan of Saint Martin's Island

The Saint Martin's Island is well-known for being one of Bangladesh's most ecologically unique and fragile landscapes. As the country's only coral-bearing island, Saint Martin supports rich biodiversity including coral communities, marine turtles, migratory birds, and hundreds of plant and fish species, yet this natural heritage has been under increasing threat from unregulated tourism, livelihood pressure, habitat degradation, and climate change.

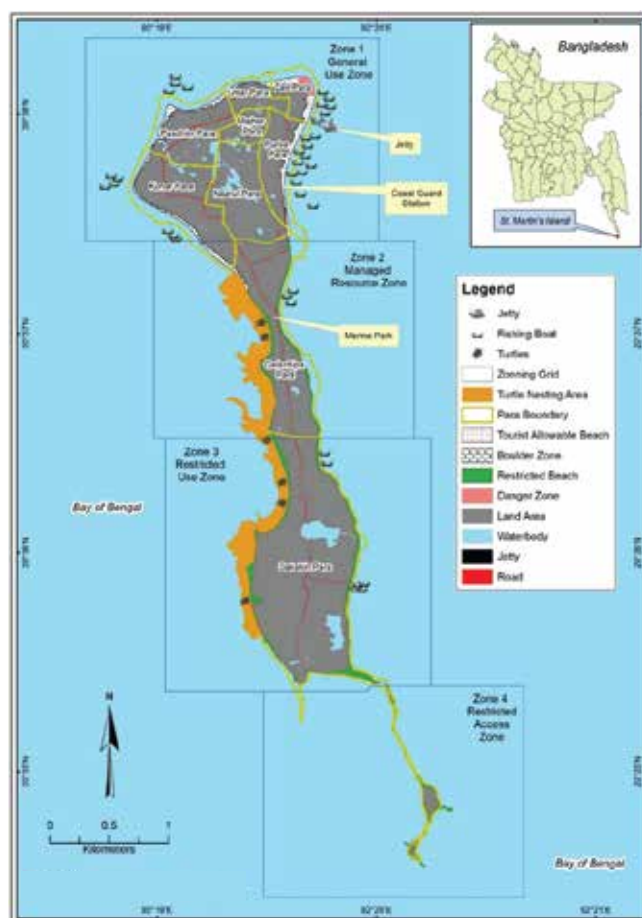
Center for Environmental and Geographic Information Services (CEGIS) has prepared a strategic Master Plan for this island which is a component of the "Ecosystem-Based Development, Management, and Conservation of the Saint Martin Project", initiated by the Department of Environment (DoE), GoB. The plan recommends limiting tourism to approximately 900 visitors (assessing tourist carrying capacity scientifically) per day within designated areas to prevent ecological degradation. Placing equal importance on socio-economic progress and sustainable natural resource management, ten sectors have been identified for the Master Plan, which comprises 32 focused programs across the ten sectors designed for efficient implementation by relevant agencies. The sectors that have been identified for the development of the program are: Planned development of the conservation area; Conservation of Fish Resources and Benthic Communities; Protection of Coral Resources and Associated Flora and Fauna; Conservation of Turtles and Nesting Sites; Stray Dog Vaccination and Management; Sustainable Tourism Management; Terrestrial Flora and Fauna Development and Conservation; Waste Management Initiatives; Groundwater Resource Management; Safety and Stewardship; Improvement of Livelihood; and Sustainable Tourism Management.

The Strategic Master Plan introduces a conservation management zoning framework that divides the island into four distinct areas: a general use zone, a sustainable use zone, a restricted use zone, and a restricted access zone. This ensures that critical habitats like coral reefs, mangroves, and turtle nesting sites receive the highest level of protection, while still allowing carefully managed human activities. Such spatial planning is essential to balance conservation with development and prevent further habitat loss.

Equally important is its emphasis on ecosystem-based management and climate resilience. The island is highly

vulnerable to sea-level rise, cyclones, and coastal erosion. By prioritizing the restoration of natural defenses, such as mangroves and coral reefs, the Master Plan strengthens the island's ability to withstand climate impacts while maintaining essential ecosystem services like shoreline protection and fisheries productivity.

Implementation of the 10 sectors, comprised of 32 focused programs, is organized into short-term (1–3 years), medium-term (1–5 years), and long-term (1–10 years) actions. The total estimated investment amounts to 908.7 million BDT, allocated across 5 high-priority programs (392.8 million BDT), 12 top-priority initiatives (282.0 million BDT), 12 medium-level undertakings (151.4 million BDT), and 3 low-priority actions (82.5 million BDT).



Newly Proposed Zoning of St. Martin's Island

The Strategic Master Plan aims to position Saint Martin's Island as a premier sustainable tourism destination while enhancing the quality of life for its residents and ensuring the long-term conservation of its natural resources through an integrated, multi-sectoral approach. Achieving this goal requires strong collaboration among government agencies, local communities, tourism stakeholders and environmental organizations to deliver sustainable outcomes and contribute meaningfully to the achievement of the Sustainable Development Goals (SDGs).

Umme Habiba Ilma

Ecology, Forestry and Biodiversity Division



Tourists Flux in St. Martin's Island

Contract Signing for Different Studies

During the 4th quarter of the year 2026 (January to March), CEGIS has signed notable 11 (Eleven) contracts with different organizations and clients. The contract titles with clients and dates of signing are as follows:

i) "Awareness and Capacity Building Support to Local government Institutions on waste management for Meghna River Protection" with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on 15 January 2026

ii) "Assessment of economic valuation of ecosystem goods and services and development of sustainable financing strategy for Halda and Morjat" with Department of Environment (DoE) on 18 January 2026

iii) "Technical Services for Monitoring of Environmental Parameters and Implementation of Environmental Management Plan along with Engineering Activities for the Operation Phase" with Bangladesh India Friendship Power Company Ltd. (BIFPCL) on 22 January 2026

iv) Developing Resilient Watershed Management and Monitoring Plan through Hydrogeological Analysis, Risk Mapping, and Nature-Based Solutions with Food and Agriculture Organization (FAO) 26 January 2026

v) "Preparing Two Full-Sized Project Proposals for the Green Climate Fund" with Department of Environment (DoE) on 28 January 2026

vi) "Development for Mobile Application (CAPI System) and Web Monitoring Application for Data Collection, Supervision and Monitoring, Validation, Data Management and Data Processing" with Bangladesh Bureau of Statistics (BBS) on 02 February 2026

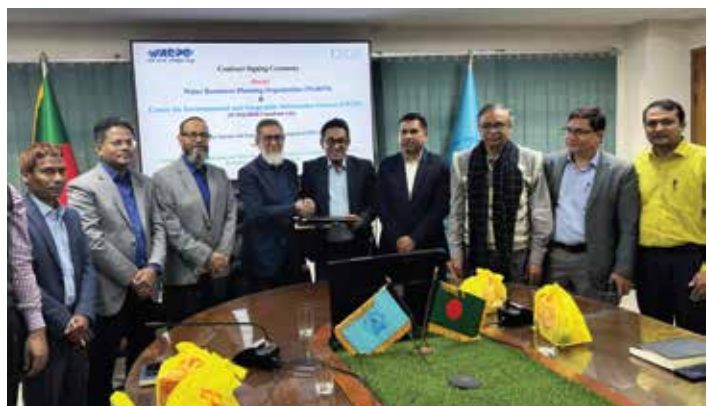
vii) "Development of guidelines for Gender mainstreaming guidelines for planning, implementation, and monitoring WASH interventions, aligning" with the National Strategy for Water Supply and Sanitation 2021 with WaterAid Bangladesh on 15 February 2026

viii) Participatory Rural Appraisal (PRA) Study of the Project "Aquifer Mapping Preparation and Water Stress Area Assessment in 13 Districts of the North-West Hydrological Regions of Bangladesh" with Water Resource Planning Organization (WARPO) on 16 February 2026

ix) "Development and Climate Change Resilience Policy Advisor" with Japan International Cooperation Agency (JICA) on 18 February 2026

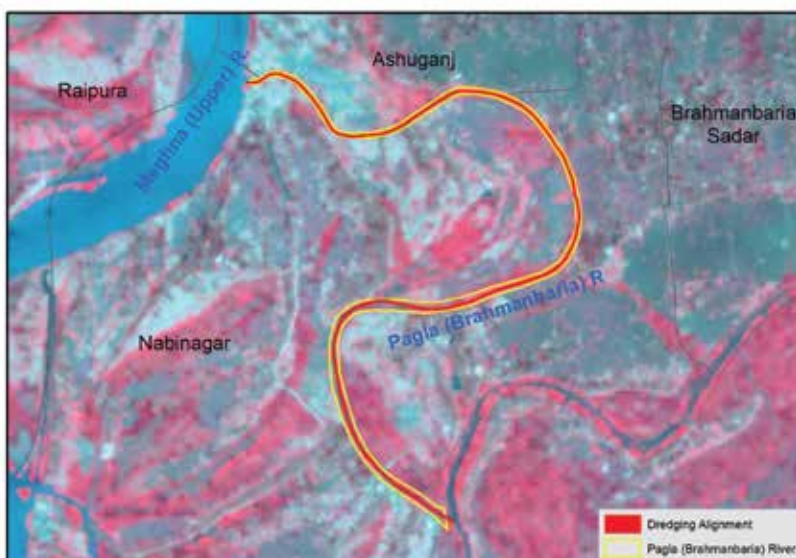
x) "Review of the Existing Guideline to Develop an Evidence-Based NbS Guideline and Pilot Nature-Based Slope Stabilization Interventions in Cox's Bazar" with Food and Agriculture Organization (FAO) on 08 March 2026

xi) "Development of Mobile Application and Web Based Monitoring Dashboard for Data Collection, Supervision, Monitoring, Validation & Data Management for Shipping Census 2026" with Bangladesh Bureau of Statistics (BBS) on 25 March 2026.



Mr. Mohammad Lutfur Rahman, PhD, Director General of WARPO, the Project Director Mr. Kazi Saidur Rahman, and the Executive Director Md. Motaleb Hossain Sarker of CEGIS and other officials from both organizations attended the contract signing ceremony for the Aquifer Mapping Preparation and Water Stress Area Assessment project in 13 districts of the North-West Hydrological Regions of Bangladesh

Feasibility Study of River Management ... (Cont'd from page 5)



Proposed dredging alignment at Pagla River for river management

management of dredged materials through land development and afforestation.

Environmental and social impacts were carefully evaluated, with positive outcomes such as increased economic activities and reduced flood risks considered as project benefits, while mitigation measures were proposed for potential negative impacts. The project will be implemented by BIWTA with technical support from CEGIS ensuring proper monitoring and effective execution. Overall, the initiative aims to enhance river functionality, strengthen climate resilience, and support long-term socio-economic development in the region.

Md. Mizanur Rahman
River, Delta and Coastal Morphology Division

Strengthening Dhaka's Power Infrastructure for a Sustainable Future

The Power sector plays a pivotal role in driving economic growth, industrialization, and urban development. Reliable and affordable electricity remains essential for sustaining this progress, particularly in Dhaka and its surrounding areas, where demand is rapidly increasing due to population growth and expanding industries.

To address this rising demand, the Dhaka Electric Supply PLC (DESCO) has undertaken a number of initiatives under the "Dhaka Power System Expansion and Strengthening Project". The project focuses on enhancing power distribution capacity through the construction of eight substations and approximately 30 km of underground 132 kV transmission lines, enabling improved and expanded electricity access for the consumers.

This project is funded by the Asian Development Bank



Safety Training of the Workers

(ADB) and is being implemented in compliance with national and international environmental and social standards, like the Environment Conservation Rules

(ECR) 2023 and ADB Safeguard Policy Statement (SPS) 2009. The project strictly follows the approved Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) to ensure sustainable and responsible development.



Meeting with the EPC Contractor, and DESCO Officials

To support effective implementation, CEGIS has been assigned to carry out regular environmental and social compliance monitoring of the construction activities which is expected to be completed within next four (04) years. Site visits are conducted on a bi-monthly basis, with interim and semi-annual reports are prepared to track compliance and progress.

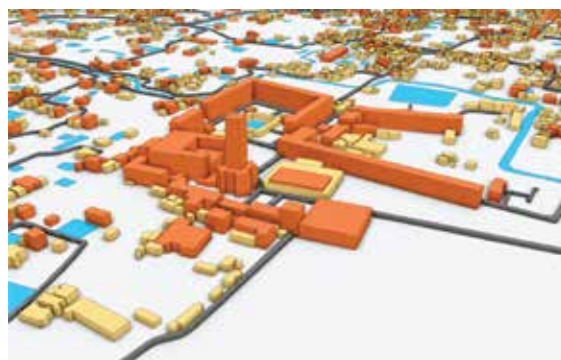
This initiative represents a significant step toward building a resilient, efficient, and sustainable power distribution system for the future of Bangladesh.

Eva Chowdhury

Power Energy and Mineral Resources Division

UAV Photogrammetry ... (Cont'd from page 1)

infrastructure planning, drainage management, and improved municipal services.



Sarsina Complex, Nesarabad, Pirojpur - Ultra High resolution 3cm Orthophoto (left), 3D Model (right)

By integrating UAV photogrammetry with advanced GIS technologies, CEGIS has demonstrated a scalable approach to smart urban governance. The project not only strengthens spatial data availability at the local level but also establishes a benchmark for future geospatial applications in Bangladesh, paving the way for resilient, efficient, and data-driven urban development.

The successful implementation of this project demonstrates the effectiveness of UAV photogrammetry and 3D GIS technologies in municipal mapping and urban

management. Its methodologies and outcomes provide a replicable model for future geospatial initiatives, supporting improved urban planning, efficient infrastructure management, disaster resilience, and sustainable development across Bangladesh. The

generated geospatial database will also facilitate long-term monitoring and informed decision-making for local authorities.

Premanondo Debnath
Remote Sensing Division

Feasibility Study of River Management and 'Capital and Maintenance' Dredging in the Brahmanbaria, Chandpur and Cumilla Districts of Bangladesh

The Government of Bangladesh has assigned the Bangladesh Inland Water Transport Authority (BIWTA) to carry out a feasibility study on river management and

capital and maintenance dredging in Cumilla District, Brahmanbaria District, and Chandpur District. Rivers in this region, which drain into the Meghna River, are facing severe sedimentation, reducing their flow capacity and causing navigation problems, flooding, and environmental degradation. These challenges are negatively affecting agriculture, fisheries, biodiversity, and local livelihoods.

The study assessed 26 rivers using field investigations, hydro-morphological analysis, and mathematical modelling, followed by a multi-criteria evaluation to prioritize interventions. As a result, 12 rivers were identified for priority dredging, with a total estimated dredging volume of 27.19 million cubic meters. The proposed interventions include developing navigation routes and landing stations, increasing river conveyance capacity, improving irrigation and agricultural productivity, restoring wetlands, and ensuring sustainable



Drone View over the Bulonjuri River in Brahmanbaria

Cont'd on page 3

Training Program on Public Procurement Rules (PPR) 2025

CEGIS has conducted a professional training program on newly updated Public Procurement Rules (PPR) 2025 to strengthen institutional understanding of the updated procurement procedure. Professionals from all divisions attended this maiden training. The training has covered key aspects of procurement processes under PPR 2025, including consultancy procurement methods (SSS, QCBS, FBS, LCS), preparation of EOIs, proposals and standard bidding documents, negotiation techniques, joint ventures and sub-consulting arrangements, contract documents (GCC and PCC), performance security, contract approval and management, evaluation procedures from the client's perspective, conflict of interest, differences between PPR 2008 and PPR 2025, and practical e-GP troubleshooting, etc. The sessions have been held on 4-5 January 2026 at the CEGIS Conference Room and was conducted by senior officials from the Bangladesh Public Procurement Authority (BPPA). With interactive question-and-answer segments

throughout, the training is expected to improve professional competence of the participants especially in addressing procurement issues from public sector. The program ended with awarding certificates of participation to the attendees.



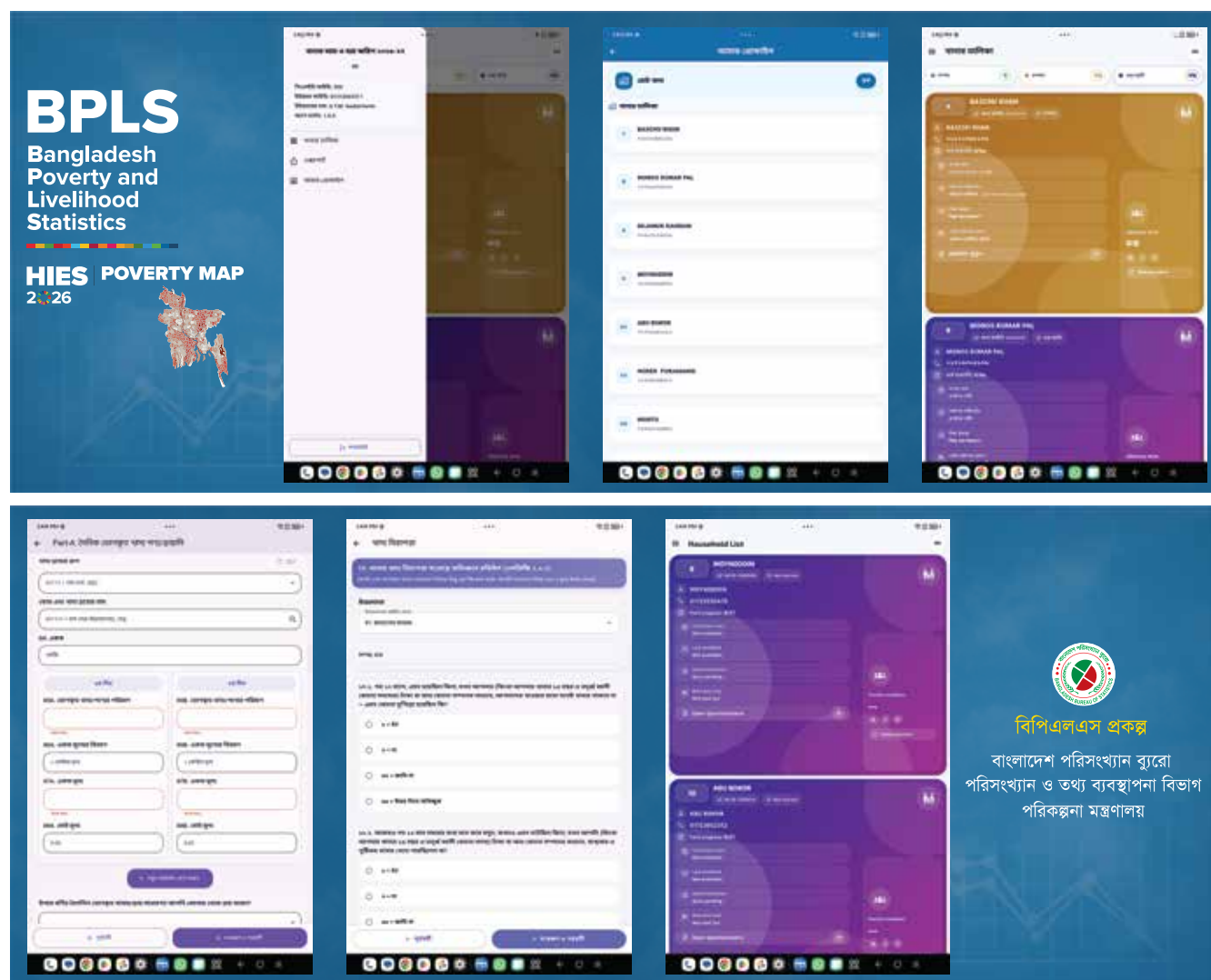
Mr. Malik Fida A Khan, Former Executive Director and Dr. Abdul Hamid, Adviser along with other professionals of CEGIS

Mobile Application Developed for the Modernization of the Household Income and Expenditure Survey (HIES)

The Bangladesh Bureau of Statistics (BBS), in collaboration with the Center for Environmental and Geographic Information Services (CEGIS), has officially initiated the development of a comprehensive digital platform under the Bangladesh Poverty & Livelihood Statistics (BPLS) Project. This initiative marks a significant step toward modernizing national data collection, supervision, and management systems.

dashboards, and GIS-enabled monitoring. It will also support both Bangla and English interfaces, making it useful for field staff, supervisors, and decision-makers.

Following the contract signing in February 2026, the project team has already completed requirement analysis, initial system design, and early-stage application development. Prototype interfaces and dashboard designs



Mobile Application Developed for the Modernization of the Household Income and Expenditure Survey

The project focuses on developing a Computer-Assisted Personal Interviewing (CAPI) mobile application, a web-based monitoring and management system, and a centralized data processing platform. These integrated components will enable real-time data collection, validation, monitoring, and reporting. This will improve the accuracy, efficiency, and transparency of large-scale national surveys, including the Household Income and Expenditure Survey (HIES).

The system is being designed and developed using modern, secure, and scalable technologies. It will include offline data collection, role-based access control, real-time

have also been prepared, demonstrating the system's practical and user-friendly approach.

The project also places strong emphasis on capacity building. Structured training and technical support will be provided to ensure long-term sustainability within BBS. Once completed, the platform is expected to strengthen Bangladesh's national statistical operations and thereby facilitating effective data-driven decision-making.

Md. Abdul Hadi, Md. Kamal Pasha, & A.T.M. Saidul Karim
Database, ICT and System Management Division

Study for North-Rajshahi Irrigation Project



The North Rajshahi Irrigation Project (NRIP) covers the drought-prone northwestern districts of Rajshahi, Chapai Nawabganj, and Naogaon, an area identified under the Barind and Drought-Prone Zone in the Bangladesh Delta Plan 2100. This region faces persistent water scarcity due to declining groundwater levels, irregular rainfall, and prolonged dry-season droughts, significantly affecting agricultural productivity and rural livelihoods.

Historically, irrigation in the region has depended heavily on groundwater extraction through Deep Tube Wells, particularly for boro rice cultivation. However, declining aquifer recharge, increasing irrigation demand, and climate variability have reduced water availability and led to up to 50% yield losses in some areas. These challenges highlight the urgent need for a sustainable shift toward surface water-based irrigation systems.

The NRIP feasibility initiative has been developed to address these constraints by expanding irrigation coverage across approximately 74,800 hectares. Building on earlier feasibility studies by JICA (1987–88) and BWDB (2005–06), the project aims to strengthen integrated water resources management, enhance climate resilience, and ensure long-term agricultural sustainability in one of Bangladesh's most water-stressed regions.

Expected Outcomes



A comprehensive feasibility report with an optimized irrigation development strategy for surface water utilization.



A modernized irrigation network design, including pumps, canals, regulators, and distribution systems, with cost estimates and engineering drawings.



A GIS-based hydrological and irrigation database, including command area maps, flood and drought risk maps, and water availability models.



A climate-resilient water management plan incorporating drought mitigation and conjunctive use strategies.



A full Environmental & Social Impact Assessment (ESIA) with management and mitigation frameworks.



A financially and economically evaluated investment plan, including NPV, IRR, and risk-adjusted feasibility analysis.



A phased implementation roadmap aligned with national development planning and donor financing requirements.



Strengthened institutional capacity for BWDB and Water User Associations for sustainable operation and maintenance.

Modeling Tools and Software used

SWAT (Soil and Water Assessment Tool), Delft3D, MODFLOW (GMS / Visual MODFLOW), ArcGIS, CROPWAT, and Microsoft Excel

Methodological Approach



Baseline Assessment and Data Integration:

Compilation and analysis of hydro-meteorological, hydromorphological, groundwater, land use, and agricultural datasets supported by field surveys and GIS mapping.



Water Resource and Irrigation Planning:

Assessment of seasonal surface water availability, revised irrigation command areas, crop water demand, and conjunctive use potential between surface and groundwater systems.



Hydrological and Hydraulic Modeling:

Development of rainfall-runoff, river hydraulics, groundwater interaction, and drought risk models to support evidence-based planning and scenario analysis.



Implementation Planning: Development of phased investment strategies, DPP-ready documentation, procurement packaging, and operational guidelines for long-term sustainability.



Environmental and Social Safeguards: Full Environmental and Social Impact Assessment (ESIA), stakeholder consultations, biodiversity screening, and preparation of mitigation and management frameworks.



Infrastructure and System Design: Identification and design of pump stations, canals, regulators, drainage systems, and connectivity with existing river and canal networks, supported by multi-criteria option evaluation.



Economic and Climate Risk Analysis: Cost-benefit assessment (NPV, BCR, IRR), sensitivity analysis, and evaluation of climate resilience and disaster risk scenarios.

Dhalai River in Seven Forms

In the northeastern region of Bangladesh, the name Dhalai appears across multiple districts and basins, yet it does not represent a single continuous river. Instead, seven distinct rivers carry the same name, each with its own origin, outfall, length, and channel geometry. A reach-wise examination reveals significant spatial variability and underscores the need to understand these rivers as separate hydraulic entities within the broader drainage framework of the Sylhet basin.

It is plausible that these seven rivers were once hydraulically connected or formed parts of a larger ancestral Dhalai system. With the progressive geomorphological evolution of the Sylhet basin — driven by sedimentation, avulsion, floodplain aggradation, and the rapid hydrological responses characteristic of the region — these channels gradually separated into distinct reaches. Over time, hydraulic linkages shifted, new pathways emerged, and older corridors diminished. Despite their physical separation, the rivers retained their original name, preserving a historical memory of their shared origin within an evolving fluvial landscape.

The Dhalai (Sylhet) originates in India and drains into the Piyain (Sylhet) over a length of 11 km. This reach is morphologically remarkable, with channel widths ranging from 85 m to as much as 935 m and an average width of 370 m. Such expansion indicates a major conveyance corridor capable of accommodating high monsoonal flows and facilitating extensive floodplain interaction within the Sylhet basin.

The Dhala (East)/Dhala is the shortest among the seven, extending only 5 km from Dhala (Sylhet) to its outfall at the Piyain (Sylhet). Despite its limited length, the channel remains comparatively wide, varying between 40 m and 85 m with an average width of 65 m. The broad cross-section suggests strong hydraulic interaction with the Piyain system, particularly during peak monsoon discharge when floodplain connectivity intensifies.

In Netrakona District, the Dhalai (Netrakona) originates from Saiduli/Borni (Netrakona-Kishoreganj) and flows 13 km before outfalling into the Mogra River. The channel width ranges from 30 m to 50 m, with an average width of 40 m. Compared to upstream segments, this reach appears more confined, reflecting reduced flow energy and a tendency toward localized sediment deposition within a lower-gradient setting.

The Dhalai (Mymensingh) extends 48 km from the Rangsha River to the Mogra River. It is comparatively narrow, with widths varying between 15 m and 45 m and an average width of 25 m. The slender geometry along a relatively long course indicates attenuation of hydraulic energy and progressive sediment accumulation across downstream floodplain environments.

The Dhalai (Habiganj) flows 20 km from the Satai River to the Ratna (Habiganj). Channel width ranges from 10 m to 84

m, with an average of 33 m. The pronounced variation between minimum and maximum widths reflects alternating zones of confinement and expansion, shaped by local topographic controls and seasonal discharge variability.

The transboundary Dhalai (Moulvibazar) flows 56 km from India before joining the Manu River. As the longest Dhalai reach in Bangladesh, it plays a critical role in transferring cross-border discharge and sediment into the Manu basin. Channel width varies between 35 m and 75 m, with an average width of 55 m, reflecting a moderately wide and hydraulically active reach



Distribution of the Seven Dhalai Rivers in Bangladesh

influenced by upstream hill-fed inputs.

The Dhalai-Bishnai extends 26 km from the Kangsho River to the Mogra River. With widths ranging from 25 m to 85 m and an average of 50 m, this reach functions as an inter-basin connector, facilitating seasonal discharge and sediment exchange between the Kangsho and Mogra systems. The variability in channel width suggests ongoing lateral adjustments shaped by hydrological fluctuations.

Collectively, the seven Dhalai rivers range in length from 5 km to 56 km, while their average widths vary from 25 m to 370 m. Some serve as transboundary inflows, while others operate as intra-basin connectors linking the Manu, Kangsho, Rangsha, Mogra, Piyain, Satai, and Ratna systems. A reach-wise analytical perspective therefore not only clarifies their present morphology but also hints at their shared geomorphic past. Recognizing this dual identity — distinct in present form yet possibly unified in origin — is essential for informed basin-scale planning and sustainable river management in northeast part of Bangladesh.

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