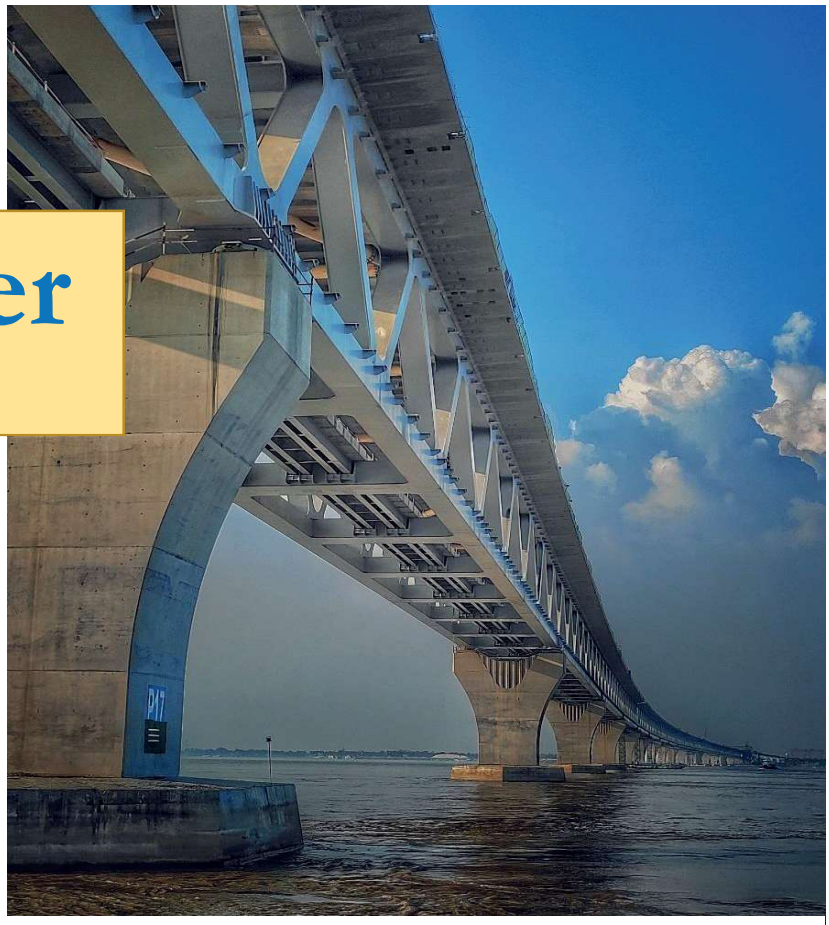
River Research Institute
Ministry of Water Resources
Govt. of the People's Republic of Bangladesh

RRI Newsletter

Quarterly Newsletter of the River Research Institute
Issue – 18 June 2023



Content

APA Signing Ceremony

DG of RRI, S M Abu Horayra, and Secretary, MoWR Mr. Nazmul Ahsan signed Annual Performance Agreement (APA) on 15.06.2023 for the Financial Year 2023-2024 at Pani Bhaban.

Hybrid Modelling Approach in RRI

Bangladesh is a riverine country and one of the biggest Delta in the world, which experiences floods, riverbank erosion, drought, storm-surge, cyclones and different types of natural disasters every year due to climate change. The consequences of these disasters are affecting the livelihood of the people significantly, which also hinders the economic development of Bangladesh.

River problems are complicated, and generally, water resources development project is very costly. Riverbank erosion mitigation, river training, river dredging, flood control, and irrigation & drainage system development are also very complicated and price-worthy processes both in technical and financial aspects. That's why when any project or scheme is taken up, extensive scientific investigation, research, and study are required in order to arrive at the correct engineering solution before implementation in the field. Researches and studies carry great importance to find out the correct engineering solution. Considering these to make the project sustainable and cost-effective, Bangabandhu took the initiative a project "River Research Institute" in 1973 and approved it in ECNEC in July 1975. **(Cont'd on page 5)**

Mandate of RRI

The activities of RRI as per Act 53 of 1990 are directed towards the achievement of the following objectives:

- To carry out studies for the design of river training, riverbank protection, flood control, irrigation & drainage works and to conduct research in river engineering, sediment control, estuary, and tidal effects by means of the physical model.
- To conduct mathematical model studies on river flow & regional flow network, hydrology, surface & groundwater utilization, and environmental issues with special attention to salinity intrusion & water quality with a view to developing the water resources.
- To perform tests on construction materials required for river training, river bank protection, flood- control, irrigation, and drainage structures and to inspect and evaluate the quality of the construction works thereof.
- To conduct training programs on the above-mentioned subjects and publish reports and periodicals related to technical aspects.
- To advise the Government, Local Authority, or any organizations regarding the problems and best approach towards the solution on the above-mentioned subject.
- To co-operate and conduct joint venture research work with other similar local or foreign organizations.
- To take any necessary steps for performing the above-mentioned works.

Activities of RRI

River Research Institute (RRI) has been working as a Statutory Public Authority under the Ministry of Water Resources, Government of Bangladesh. Since its establishment, RRI has been conducting multi-disciplinary and problem-oriented tests and research in the fields of River Hydraulics, Hydraulics of Structure and Irrigation, Estuarine & Coastal Hydraulics, Soil Mechanics, Material Testing & Quality Control, Sediment Technology, Hydro-chemistry, and Geo-chemistry and Instrumentation. This institute comprises three Directorates: Hydraulic Research Directorate (HRD), Geo-technical Research Directorate (GRD), and Administration & Finance Directorate.

Hydraulic Research Directorate conducts study and research in the areas of Flood control and Drainage, Bank Protection and stabilization, Sediment Control, River Training and Navigation, Coastal and Harbor Engineering, Hydraulics of structure and Irrigation through Physical and Mathematical Modelling. HRD is well equipped with both indoor & outdoor facilities for carrying out physical model studies in the above areas. This Directorate has a Mathematical Modeling wing, which is performing from 2009.

Geotechnical Research Directorate conducts tests and research in the fields geotechnical investigations, such as soils as construction and foundation supporting material for planning & design of different infrastructures, material testing and quality control of construction materials for use in the construction of different infrastructures, Sediment & Chemical analysis of soil and water, water quality and water pollution of river. GRD has already developed skilled manpower and is well-equipped with modern laboratory facilities to conduct research and important engineering tests.

The activity of the Administration & Finance Directorate includes the areas of the overall administration of RRI, financial management, public relation, internal security & store keeping of materials, training, maintenance of RRI auditorium, rest house & vehicles, publications of Annual Reports, Journals, and\ newsletter, etc., and maintenance of physical facilities of RRI.

Dhaka Office, 72, Green Road, Dhaka maintains liaison among the Government & Semi-Government organizations, NGOs, and Consulting firms for RRI interest. Moreover, this office operates a laboratory named Dhaka Laboratory that is able to conduct tests of soil, sediment, and water samples and carry out basic research.

Recently Completed Physical Model

Physical Modeling Study for Dredging and Bank Protection Works along Tetulia River at Bakerganj and Bauphal Upazillas under Barishal and Patuakhali Districts

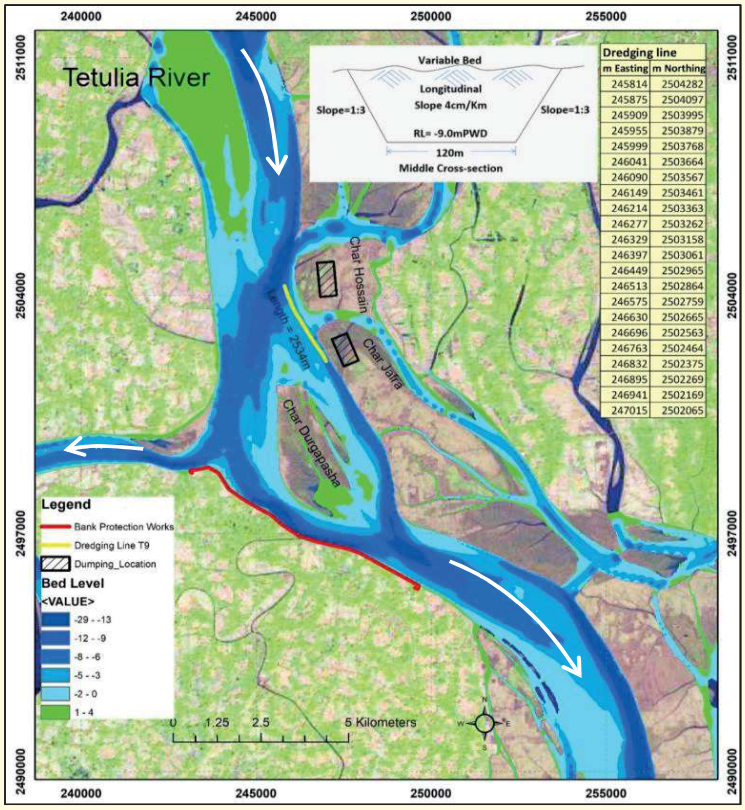
Tetulia River originates from the Lower Meghna River at the north of Bhola district. The river flows through Tetulia, Nimdi, Kalaiya, and Purbamunia and end in up to the Bay of Bengal as the Buragouranga channel at Rangopaldi of Galachipa upazilla under Patuakhali district. It used to flow with a strong or rapid current. However, the hydrodynamics has changed in recent years due to the formation of many sand bars. The river separates Bhola island from the mainland. Ramnabad Island is located at the west bank of the river. An offshoot of the Meghna River from Shahbajpur meets the Tetulia River. The total length of the river is about 84 km and the average width is 6 km.

Dhulia Bazar, Gangapur Bazar, Manipur Bazar, Kalaiya port, Dasmuni Bazar are some of the important places nearby the Tetulia River. Tendency of severe erosion is visualized at different parts on both banks. A number of places under Bauphal and Galachipa upazillas are facing severe bank-erosion. On the other hand, the chars and islands that have been formed at various locations on the Tetulia, are now becoming the sites for settlements and crop cultivation.

At present the vast area from Dhulia Launch ghat area in Bauphal upazilla of Patuakhali district to Durgapasha area in Bakerganj upazilla of Barisal district are facing severe bank erosion. In fact, unabated right bank erosion at this river stretch has been taking place over the last four decades as can be seen from the available historical satellite images. In the seventies of the 20th century, the river at the erosion prone area used to be a single-channel river with a few small sized chars in the middle of the channel. However, with the passage of time these small sized chars grew in size causing changes in flow pattern and consequent braid-dominance with anabranches. A number of consequences have been visible including reduced flow depths, over-flow of banks and bank erosion. Such issues are constituted by sediment transport and deposition characteristics along the river bed.

BWDB has taken up a project for protection of area about 7.5 km from Dhulia Launch ghat area under Bauphal upazilla of Patuakhali district to Durgapasha area under Bakerganj upazilla of Barishal district from the erosion of Tetulia River with provision of dredging of Tetulia River with a length of around 2835 m. It aims to divert the flow from the eroding bank to the center of the channel thus reducing bank erosion. It is very important to select a suitable dredging alignment that would be sustainable and would bring benefit in terms of reduction of near bank flow velocity. The overall objective of the physical model study is to fix suitable alignment of dredging of the Tetulia River at Dhulia-Durgapasha and determine suitable location for dredged material disposal and type, dimension and orientation of river training works for stabilizing the river bank.

Strong currents, wave action, tidal influences and upstream torrents are the governing factors for flow. Sediment load influences formation and migration of shallow-depth channels and sand bars. Uneven deposition and distribution of sediment cause river bed variation and corresponding channel changes along the river reach. Banks constituted of fine materials increase fragility leading to lateral shifting of banks. As a consequence, important installations like roads, educational institutes, market areas, farmlands and many other public and private establishments are gobbled up. The outer (concave) bank is gradually advancing towards the countryside. Along with bank protection work, dredging activity would be taken up for safety of the bank from severe erosion. So, fixation of



dredging alignment using physical modeling technique is the main purpose of the present approach.

Some of the recommendations of this model study are listed below:

- The bank protection work (7.0 km is for the protection of right bank of Tetulia River and 0.5 km is for the protection of left bank of Karkhana River from its offtake) proposed by BWDB tested in different tests work well and it is recommended to implement in the field. There should be provision for keeping adequate geo-bags/CC blocks ready for emergency dumping.

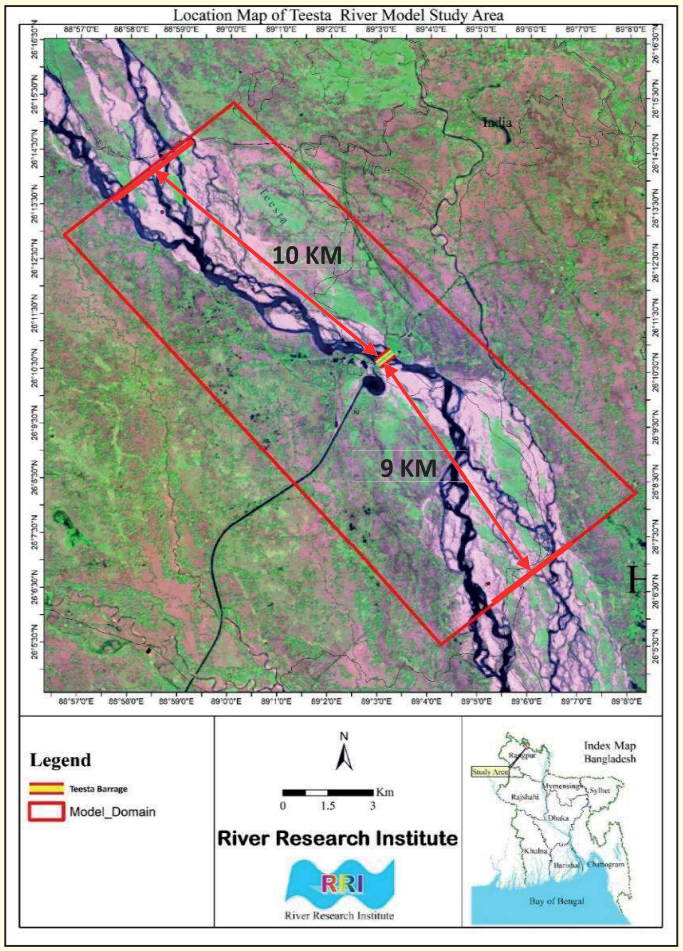
- Bank protection work and dredging considered under test T9 are the recommended interventions to achieve the project objectives in terms of erosion protection as it provides better results from technical and economical point of view.
- Maintenance dredging for two successive years as suggested under test T9 is recommended. Without maintenance dredging the objective of the proposed capital dredging may not be fulfilled.
- The recommended length of dredged channel is 2.534 km in the left side channel having bottom width 120m, bottom level -9.0 mPWD, longitudinal bottom slope 4cm/km and side slope 1:3. The position (Easting, Northing) of centerline of the recommended dredged channel is given in the report.

Some Ongoing Physical Models

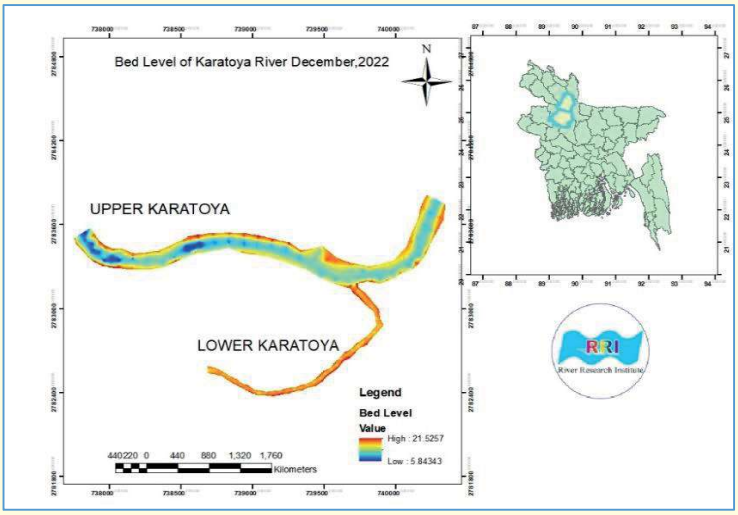
Physical Modeling Study for Feasibility Study for Augmentation, Conservation, and Wise Use of Surface Water Resources through Dredging of the Upstream of Teesta Barrage and Bank Protection Work of the Teesta River

Objective of the study

The main objective of the physical modeling is to investigate feasibility of augmentation and conservation of surface water resources through the dredging upstream of Teesta barrage and also of the construction of a road cum regulator in the downstream of the existing flood bypass. The specific objectives of overall distorted morphological model are to investigate the sustainability of dredging at the upstream of Teesta barrage; identify the possibilities of irrigation expansion through conservation of surface water resources; determine the long-term impacts of dredging/re-excavation on surface water and ground water resources; identify the main course of the Teesta River in the downstream of the Teesta barrage; investigate the feasibility of bank protection of the Teesta River within the study reach; and provide hydraulic design parameters of the proposed interventions.



Physical Modelling Study for Feasibility Study for the Management of Karatoa River System and Rehabilitation of FCD Projects on Both Bank of Nagar River in Bogura District



Objective of the study

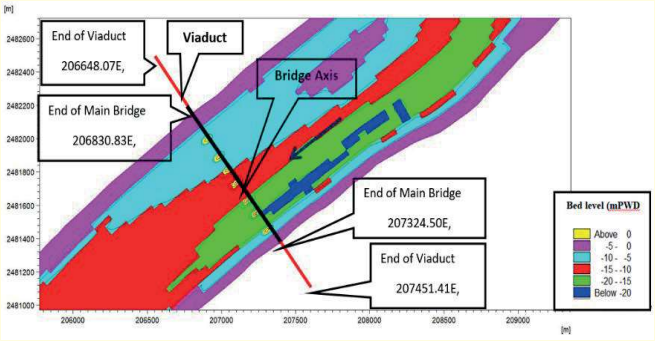
The Jamuneshwari-Karatoa is one of the oldest branches of the Teesta River. It flows towards South-East direction and is divided into two branches at Gobindogonj upazila of Gaibandha district. One part flows towards the east through the Katakhali River and falls into the Bangali River. Another branch flows towards the west as Lower Karatoa. From Gobindogonj upazila, the lower Karatoa flows through Shibgonj, Bogura Sadar, Shahjahanpur & Sherpur of the Bogura district and finally falls into the Bangali River at the Khanpur area of the Sherpur upazila. This combined flow is called Karatoa and enters Sirajgonj District. The flow path of the river Karatoa is of a meandering type; its flow path has changed several times in the past and so has its name. As a result, it has become difficult to identify the main branch of this river. At present it is considered as a part of the Deonai-Choralkatha-Jamuneshwari-Karatoa river system.

The study's main objective is to the overall management of the Karatoa River basin and to assess the feasibility to take up the proposed implementation project titled "Karatoa River Improvement Project" and rehabilitation of the FCD project along the banks of Nagar River in Bogura District.

The specific objectives of the study are to improve the water retention capacity of the Karatoa River system; Flood and erosion risk management of the Karatoa River basin; Review and revisit the proposed interventions of the "Karatoa River Improvement Project"; Rehabilitation of existing flood embankment, drainage, and irrigation structures along Nagar River; Design of proposed interventions; Environmental and Social Impact Assessment; and Preparation of DPP of the subsequent investment project.

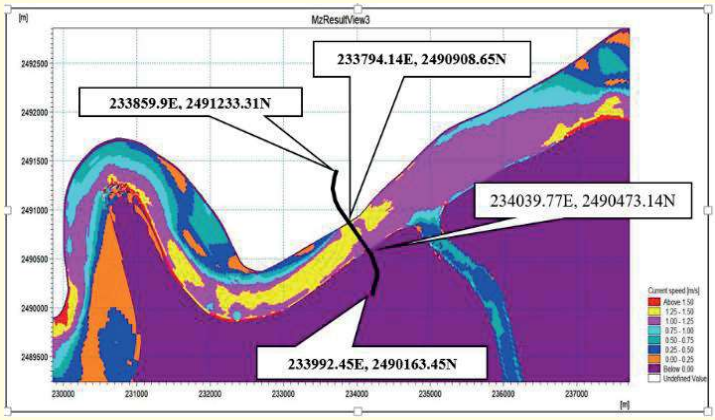
Some Ongoing Mathematical Models

Hydro-Morphological Study for the proposed Bishkhali Bridge at 6th km of Binapani – Kachua – Betagi – Mirjaganj - Patuakhali Highway (Z-8052) on the Bishkhali River under RHD



The proposed Bishkhali Bridge is at 6th km of Binapani-Kachua-Betagi-Mirjaganj-Patuakhali Highway (Z-8052) on the Bishkhali River under RHD. Binapani – Kachua – Betagi – Mirjaganj - Patuakhali Road is a RHD zilla road (Z-8052) which starts from Binapani of Kanthalia upazila under Jhalokathi district and connect with the Patuakhali district. This road is the shortest way of road communication for the people of the area with Barguna, Patuakhali, Pirojpur and Jhalokathi. The location of the proposed roadway bridge is at around Shouljalia–Betagi ferry ghat over the Bishkhali River. The river system at and around Bishkhali is complex. At present Ferry service has been provided by RHD to cross the river.

Hydrological and Morphological Study for the proposed Laxmipasha Bridge at 23rd km of Barisal (Dinarerpul)-Laxmipasha-Dumki highway (Z-8044) on the Porar Dhon River.



Barisal district is located in the South-Central Region (SCR) of Bangladesh. Barisal (Dinarerpul)-Laxmipasha-Dumki Road is a RHD Zilla road (Z-8044) which starts from Dinarerpul of Barisal district and ends at Dumki upazilla under Patuakhali district. This road is the shortest way of road communication for the people of the area with Patuakhali, Barisal and Dhaka. The location of the proposed roadway bridge is at Laxmipasha of Bakergonj upazilla. The proposed "Laxmipasha Bridge" over the Porar Dhon river is at 23rd km of Barisal (Dinarerpul)-Laxmipasha-Dumki Road. At present Ferry service has been provided by RHD to cross the river.

Hybrid Modelling Approach….(Con'd from page 1)

Following the course of time, the Government of Bangladesh established RRI as a Statutory Public Authority under the Ministry of Water Resources in 1990 by an ordinance (Act 53) in view of formulating plans and actions to develop the water resources of Bangladesh in a sustainable manner. As per Act 53, RRI has been providing planning and design support services through physical & mathematical modeling and geotechnical investigations with a view to enhancing its activities and lifting up the standard of service in the international level in the field of water resources engineering and geotechnical engineering, specially for river training, riverbank protection, river dredging, flood control, irrigation & drainage system development, river restoration projects taken by the different organizations of different ministry. RRI is the only Government research organization where both physical and mathematical modeling facilities are available. So, it is possible to receive specialized services from a single source organization at low cost and less time for making a project sustainable and cost-effective through a hybrid modeling approach.

Dr. Md. Alauddin Hossain
Principal Scientific Officer

Nature-based solutions

Nature-based solutions (NBS), which encompass activities inspired and supported by ecosystem processes to fulfill human and societal needs, are widely recognized for their potential to play a significant role in ensuring the long-term resilience and sustainable development of river landscapes for the benefit of both humanity and nature. The utilization of NBS is favored over purely technical solutions due to their ability to minimize adverse side effects and instead generate co-benefits for present and future generations. In contemporary times, NBS holds substantial importance as an integral component of global initiatives aimed at addressing climate change, preserving biodiversity, advancing ecosystem restoration, and facilitating a green recovery following the SARS-COV-2 pandemic.

The field of NBS research has experienced remarkable growth, buoyed by targeted funding from institutions such as the European Union. The number of scientific papers published on NBS has increased exponentially, surging from a mere three in 2015 to over 250 in 2020. While ongoing scholarly discourse concerning the precise definition and conceptualization of NBS persists, noteworthy progress has already been achieved, yielding valuable insights into the effective planning and implementation of NBS. In the domain of river landscape development, recent research has addressed diverse challenges, encompassing approaches to stormwater management, flood risk mitigation, and climate change adaptation and mitigation. Notably, initial special issues focusing on NBS are emerging, with early examples centering on resourceful circular cities, equity considerations in urban NBS implementation, and hydro-meteorological risk reduction through NBS. **(Cont'd on page 11)**

Development Project of RRI

Protection of Islampur, Melandaha Upazila of Jamalpur District from the erosion of Old Brahmaputra River, Alaikhal and branch of Jamuna using Bamboo Bundling Structures.

Background of the project

Bangladesh is a riverine country with an area of about 147,570 square kilometers. The total area of the country is about 9734 square kilometers covered by rivers, beels, lakes, and haors i.e. open water bodies. River erosion is a huge problem in this riverine Bangladesh. Every year many poor people are becoming destitute under the influence of river erosion and as a result, they are losing fertile land. Prevention of river bank erosion through bamboo banding structures is effective in small and medium river bank erosion-prone areas. About 250 km of rivers including old Brahmaputra River, Dashani, Janizriam River, Alaikhal and Yamuna tributaries flow over Jamalpur Sadar, Malondah, Dawayanganj, and Islampur upazilas of Jamalpur District. Every year the banks of rivers break in different places in the Jamalpur district. On the two banks of the mentioned river, there are vast arable lands, educational institutions, mosques, temples, including Bhitebari and Hatbazar, and many valuable infrastructures. Therefore, in the proposed DPP, 9 km of riverbank conservation work has been included through bamboo banding at 8 places to protect the banks of the old Brahmaputra River and Jamuna branches of Islampur and Melandah Upazilas of Jamalpur district. Hundreds of acres of fertile arable land have already been lost in the rivers in various parts of the proposed area. There is an urgent need to protect the area through bamboo banding structures at the mentioned places. Through the implementation of the proposed project, the socio-economic conditions of the country will be improved by preventing the erosion of the river banks, increasing the freshness of the river, and reclamation of the valuable croplands, government schools, mosques, temples, cemeteries, half-built/raw houses, etc.

Image: S M Abu Horayra, DG, RRI along with Abdullah Al Imran, PD and other officials visited the project site.

Objectives

- To protect various structures/wealth including houses, roads, markets, and croplands located in the project area by preventing the erosion of the old Brahmaputra River and Jamuna River in the Jamalpur district.
- To improve the socio-economic condition of the project area and protect the natural balance.
- To maintain river flow and main channel flow by increasing navigability.

Progress

The duration of the project is July 2022 to December 2023. The estimated cost of the project is 492.50 lac taka. Allocation of the budget in the 2022-2023 fiscal year is 100 lac taka. The work order of all the eight packages is awarded. Physical works have been ongoing for the last six months under careful observation. The progress of physical work up to now is 44% of the total works of the project while the financial progress is 10%.

MoUs and Internship Program of RRI

As per the direction of DG, RRI, and According to RRI's mandate to engage in collaborative research and project activities with domestic and foreign organizations, preparations have already been made to sign MoUs with several domestic universities and institutions. These MoUs will serve as catalysts for human resource development and foster the exchange of technical information through collaborative research and project endeavors among institutions.

In the most recent collaboration process, two undergraduate students from Patualkhali University of Science and Technology (PSTU) embarked on a project internship at the River Research Institute (RRI). Their main focus was to fulfill their internship requirements by gaining practical experience. During their time at RRI, they were introduced to the various official activities and laboratory facilities of RRI. Dr. Fatima Rukshana, Principal Scientific Officer, RRI was their internship project's external supervisor. Dr. Rukshana guided them to enhance their knowledge and working capacity related to river erosion and river pollution. Both students actively participated in separate hands-on exercises, facilitated by the knowledgeable RRI personnel.

A group of interns from IUT led by IWM team visited RRI for gaining practical knowledge about RRI research and studies.

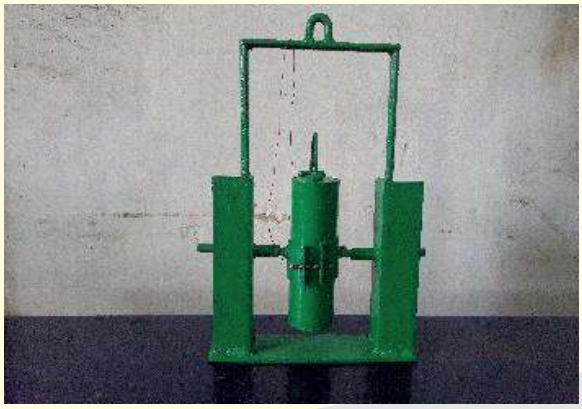
The IWM & the RRI team participated in a round table conference to find out a common field of collaboration.

The staff of the month declaration, a new era!

Present DG of RRI, S M Abu Horayra started "the staff of the month declaration" from January 2023 based on the performance of each employee. Then he awards the best of the best performer for the month for encouraging the employee for the betterment of the institution. In this context, six staffs have been awarded Certificates and Chrest for the month of January, February, March, April, May and June 2023 and they are respectively Mr. Md. Soleman, Pumpman; Mr. Kazi Md. Solaiman, MT-A; Mr. Md. Rezaul Karim, MT-B; Mrs. Sabiha Begam, UDA; Mr. Ashraful Alam, Store Assistant; and Mr. Md. Sha Alam, ST-B. Noticed that DG of RRI congratulated Mr. Ashraful Alam for achieving 1st place in the training "Information and Communication Technology" held at RPATC in Dhaka. DG believes that such a type of recognition inspires them to devote themselves in their respective field.

RRI's Innovation

RRI innovation team has innovated a depth-based water sampler. This equipment will help researchers to collect water from different depths of the river and allow them to study the water quality of the water column of the river.



Courtesy visit to RRI

A team of MoWR led by Mr. Nazmul Ahsan, Secretary visited the Teesta Physical Model at RRI.

A team of MoWR led by Mr. Nazmul Ahsan, Secretary visited RRI demonstration model of the river system in Bangladesh.

A team of MoWR led by Md. Mizanur Rahman, Additional Secretary visited RRI demonstration model of the river system in Bangladesh.

Md. Mizanur Rahman, Additional Secretary, Md. Lutfur Rahman, Joint Secretary, S M Abu Horayra, DG, RRI are seen in a workshop regarding the 4th IR at RRI Conference room.

The DG, RRI S M Abu Horayra welcome the newly appointed DG of BWDB Mr. Md. Romjan Ali Pramanik along with the management.

Dr. Monjur Ahmed, Chairman of the National River Conservation Commission visited RRI along with his team in June 13, 2023.

Greetings and Gratitude from RRI, Never forget them!

Kabir Bin Anwar (born 4 January 1964), Ex-Senior Secretary of the Ministry of Water Resources was the 23rd Cabinet Secretary of the Bangladesh Government, serving from 15 December 2022 to 3 January 2023. Mr. Anwar was a member of the Board of Governance of the RRI. He was the President of the Bangladesh Administrative Service Association. He is the Chairperson of a non-profit organization "Isabela Foundation", named accordingly his mother. He went on his post-retirement leave on 3 January 2023. The Cabinet Secretary was warmly greeted by the DG, RRI S M Abu Horayra and Director (Finance & Admin) Mr. Md. Bakahid Hossain. From the RRI family, we wish him good health and all the success in the future.

Sheela Rani Chowdhury was the Principal Scientific Officer of River Research Institute. She has done extensive research activities in the field of Soil Mechanics and Ground Water Hydrology Division. She was the co-principal investigator of the "Arial Khan soil characterization" and "Investigation of bank failure of the Padma River at Daulatdia and Paturia point" research studies. She joined River Research Institute in December, 1990 as a Scientific Officer. In her academic career, she completed a B.Sc. (Hons) and an M.Sc. Degree in Physics from Rajshahi University. She also completed Post Graduate Training (PGT) in Water Resources from IHE, Delft, The Netherlands and from India. She is a Life Member of the Bangladesh Physical Society. Mrs. Chowdhuri was a longest serving professional and contributed a lot in RRI. After a very successful career, she retired from RRI in October 2022. From the RRI family, we wish her good health, good time and all the success in the future.

Swapan Kumar Das was the Director (additional charge) of River Research Institute. He is one of the most knowledgeable physical modelers of the country. He was the team leader of various physical model studies including the Gorai offtake model, Ganges Barrage, Bangabandhu Multipurpose Bridge, Bangabandhu Railway Bridge, Padma Multipurpose Bridge, Payra Bridge, and many more. He has also done extensive research activities in hydro-morphology and soil mechanics. He was the coordinator of the launching material study for bank protection and concrete block-matt to prevent bank erosion studies. He was also the advisor of geotechnical investigation research of the Arial Khan River. He joined River Research Institute in March, 1989 as Scientific Officer. In his academic career, he completed a Bachelor's degree in Civil Engineering from Engineering College, Khulna, and a Master's degree in Water Resources Engineering from Bangladesh University of Engineering and Technology. He also completed his Post Graduate Training (PGT) in water resources from IHE, Delft, The Netherlands, India, and Canada. Mr. Das was a longest serving professional and contributed a lot in RRI After a very successful career, he retired from RRI in February 2022. From the RRI family, we wish him good health, good time and all the success in the future.

Md. Abul Ala Moududi was the Principal Scientific Officer of River Research Institute. He is one of the pioneer physical modelers of the country. He has done some high-end physical models including Ganges Barrage, Bangabandhu Multipurpose Bridge, Bangabandhu Railway Bridge, Padma Multipurpose Bridge, Payra Bridge, and many more. He has also done extensive research activities in hydro-morphology. He was the co-principal investigator of the launching material study for bank protection and concrete block-matt to prevent bank erosion studies. He joined River Research Institute in December, 1992 as a Scientific Officer. In his academic career, he completed a Bachelor's degree in Agriculture Engineering from Bangladesh Agricultural University, Mymensingh and a Master's degree in Water Resources Engineering from Bangladesh University of Engineering and Technology. He also completed his Post Graduate Training (PGT) in Water Resources from IHE, Delft, The Netherlands. Mr. Moududi was a longest serving professional and contributed a lot in RRI After a very successful career, he retired from RRI in September, 2022. From the RRI family, we wish him good health, good time and all the success in the future.

Professional Developments of RRI Scientists

Recently Completed Higher Studies

Engr. Md. Zubayerul Islam has recently obtained his M.Sc. degree in Hydrology and Water Resources from Hohai University, China, with full funding provided by the Chinese Government through the Chinese Scholarship Council (CSC) scholarship. He completed a Bachelor's degree in Agricultural Engineering and M.S. in Farm Structure from Bangladesh Agricultural University. He joined River Research Institute in July 2010 as a Scientific Officer and now serving as Senior Scientific Officer. His Master's thesis title was, "An Assessment of Satellite-Derived Rainfall Products Relative to Ground Observations over Haor Region (North-East) of Bangladesh" and found that TRMM-3B42D shows less bias with the ground observed value. IMERG products had a relatively higher bias. The correlation coefficient (CC) ranged from 0.15 to 0.44 all over the study area. IMERG products show higher POD (84 to 92) and FAR values. But TRMM products have a lower FAR value trend. For the Very High Rain (VHR) category, IMERG products overestimate, except for the TRMM-3B42 product. All satellite products were overestimated for the Low Rain (LR) and Very Low Rain (VLR) categories.

Engr. Omar Al Maimun has recently earned his M.Sc. degree in Hydrology and Water Resources from Hohai University, China, with full funding provided by the Chinese Government through the Chinese Scholarship Council (CSC) scholarship. He completed his Bachelor's degree in Civil Engineering from Dhaka University of Engineering and Technology. He joined River Research Institute in December 2013 as a Scientific Officer and now serving as Senior Scientific Officer. During his master's thesis, he studied "Application of Satellite Precipitation Products to Hydrological Simulations in the Jadukata River Basin in Bangladesh and India" where the quality of three satellite precipitation products (SPPs) such as IMERG-final (IMERG-F), TMPA version 7 (3B42V7) and Climate Forecast System Reanalysis (CFSR) was statistically evaluated using statistical parameters in five weather stations located in North-East region of Bangladesh. Afterward, the semi-distributed hydrological model SWAT was used for streamflow simulations to investigate the hydrological utility of multiple SPPs in the upper part of the Jadukata River basin. He showed that for Bangladeshi flood forecast authorities, CFSR and 3B42V7 can be reliable data sources for hydrological simulation in the ungauged upper Jadukata River basin in India.

Taznin Naher recently earned her Master's degree in Water Science and Engineering from the IHE-Delft Institute, in The Netherlands. Prior to that, she completed a Bachelor's degree in Agricultural Engineering from Bangladesh Agricultural University and a Master's degree in Water Resources Development from Bangladesh University of Engineering and Technology. She joined River Research Institute in June 2017 as a Scientific Officer. She possesses extensive research experience in climate-smart activities and water savings technologies. Her true passion lies in sustainable river management and developing innovative solutions that balance social, economic, and environmental needs. Her diverse educational background and commitment to advancing the field make her a valuable asset in addressing water-related challenges.

Ongoing Higher Studies

Doctor of Philosophy (Ph.D.) Program

Md. Matiar Rahman Mondol is pursuing a Doctor of Philosophy (Ph.D.) degree in environmental engineering at the Department of Civil Engineering, Bangladesh University of Engineering and Technology (BUET). He completed his Bachelor's degree in Civil Engineering and Master's in Environmental Engineering from BUET. He joined River Research Institute in March 1998 as a Scientific Officer and now serving as Principal Scientific Officer. In his Ph.D. thesis, he is conducting an experiment to remove Iron, Manganese, Arsenic, and other pollutants from the groundwater by contact oxidation method.

Mohammad Mehedi Hasan is pursuing a Doctor of Philosophy (Ph.D.) degree in environmental system engineering at the University of Regina, Canada. He completed his Bachelor's degree in Agricultural Engineering from Bangladesh Agricultural University, a Master's degree in Environmental Engineering at the Department of Water Resources Engineering, Bangladesh University of Engineering and Technology (BUET), and another Master's degree in Water Resources Engineering from KU Leuven, Belgium. He joined River Research Institute in March 2010 as a Scientific Officer and now serving as Senior Scientific Officer.

Nayan Chandra Ghosh is pursuing a Doctor of Philosophy (Ph.D.) degree at the Department of Physics, Bangladesh University of Engineering and Technology (BUET). He completed a Bachelor's degree and a Master's in Physics from Jagannath University and earned his M.Phil in Physics from BUET. He joined River Research Institute in February 2014 as a Scientific Officer and now serving as Senior Scientific Officer. In his Ph.D. thesis, he is designing a study to evaluate the adsorptive and photocatalytic performance of some magnetic nanoparticles (MNPs) doped metal-organic frameworks (MOFs) in order to adsorptive removal of heavy metals and photodegradation of organic dyes in wastewater. MOFs are very promising materials for adsorption and photocatalysis, and employing MNPs with MOFs will facilitates the recovery, recycling, and reusing of the materials. These purification methods are cutting-edge technologies in the field of science and are expected to find a better, cost-effective, and easy solution for wastewater purification.

Master's Program

Md. Johurul Islam is pursuing a Master's degree at the Department of Water Resources Engineering, Bangladesh University of Engineering and Technology (BUET). He completed his Bachelor's degree in Civil Engineering from BUET. He joined River Research Institute in March 2008 as a Scientific Officer and now serving as Senior Scientific Officer. In his master's thesis, he is studying the effect of the semi-permeable groyne on the river bank protection.

Md. Tofiquzzaman is pursuing a Master's degree in Water Resources at the Department of Civil Engineering, Dhaka University of Engineering and Technology (DUET). He completed his Bachelor's degree in Civil Engineering from DUET. He joined River Research Institute in December 2013 as a Scientific Officer and now serving as Senior Scientific Officer. In his master's thesis, he is studying the "effect of upstream parallel flow on the groins in a series and its mitigation" and is expected to provide an advanced concept for stabilizing the groins in a series by reducing local scour around the groin heads on that series.

Abdullah Al Imran is pursuing a Master's degree in Water Resources at the Department of Civil Engineering, Khulna University of Engineering and Technology (KUET). He completed his Bachelor's degree in Civil Engineering from KUET. He joined River Research Institute in December 2013 as a Scientific Officer and now serving as Senior Scientific Officer. In his master's thesis, he is planning to conduct a study regarding the Integrated Water Resource Management of the rivers of Jamalpur district.

Post Graduate Diploma

Md. Moniruzzaman is pursuing a Post Graduate Diploma in Water Resources Development at the Institute of Water and Flood Management, Bangladesh University of Engineering and Technology (BUET). He completed a Bachelor's degree and a Master's in Physics from Rajshahi University He joined River Research Institute in December 2013 as a Scientific Officer and now serving as Senior Scientific Officer. In his PGD thesis, he is designing a study to investigate the effect of sand mining on river beds and hence river erosion.

Professional visits

An RRI team led by the Director General visited the hydraulic laboratory of KUET, Khulna.

An RRI team visited a durable bamboo treatment laboratory at the Bangladesh Forest Research Institute (BFRI), Chittagong.

Nature Based Solutions….(Con'd from page 5)

Nevertheless, significant knowledge gaps remain regarding planning and implementation practices, effectiveness evaluation, monitoring mechanisms, and governance considerations. These gaps are particularly pronounced in the context of NBS application in river landscapes, which, compared to NBS implementation in urban areas, has received relatively less scientific attention. Demonstrative case studies are crucial to showcasing the conditions under which NBS can effectively address ecological, social, and economic challenges and outlining strategies for successful planning and realization in diverse contexts. In the Global South, where scientific evidence on NBS impacts in different contexts remains limited, additional research is urgently needed. Furthermore, a deeper understanding of the co-benefits associated with NBS is imperative to harness synergistic solutions effectively. Insights are also required on fostering collaborations among diverse disciplines, stakeholders, and decision-makers to establish robust governance and business models for NBS implementation. Moreover, examples illustrating the integration of scientific, indigenous, and local knowledge to tailor NBS to specific contexts and enhance the likelihood of successful implementation are essential.

In comparison to conventional technical solutions, NBS exhibits equivalent performance while offering supplementary social and ecological benefits. It is therefore advisable to undertake comprehensive assessments of the potential effects of NBS and compare them with alternative approaches. Moreover, incorporating stakeholder preferences and considering the diverse range of co-benefits can contribute to informed decision-making and effective NBS planning. However, certain prerequisites, such as the availability and appropriate use of space and water quality considerations, may be necessary for the successful implementation and realization of NBS benefits.

In the specific context of mitigating flood risk through flood retention, the evidence substantiates that nature-based solutions (NBS) offer comparable flood security, reduced costs, heightened ecosystem services benefits, and greater biodiversity values when contrasted with technical alternatives. The likelihood of successful NBS implementation is contingent upon favorable conditions, including ample space for floodwater retention, the quality of the floodwater, and limitations on economic activity and residential development within flood-prone areas. Additionally, the effectiveness of NBS interventions can be further amplified through a comprehensive understanding of their co-benefits and the preferences of stakeholders, which enable decision-makers to conduct multi-criteria assessments and identify the most appropriate and desirable NBS measures for a given locality.

RRI is trying to find out nature-based solutions to prevent bank erosion, increase navigability, and contribute to ecology via bamboo bundle structure through development projects, although its performance is still to be evaluated as NBS.

Nayan Chandra Ghosh, M.Phil.
Senior Scientific Officer

New Face of RRI

Mr. Nazmul Ahsan joined as Secretary of the Ministry of Water Resources (MoWR) on the 15th of December 2022. Prior to that, he was working as a chairman of Petrobangla. He completed his BSc. (Hons) and MSc. in Physics from Dhaka University. He joined civil service in 1994 and served the country by holding various key government positions. For his significant contribution to public service, he was nominated twice as the best District Commissioner of the Khulna division in 2015 and 2016 and was also awarded the prestigious public service award in 2017. He is a member of the Board of Governance of RRI. The Secretary was warmly greeted by the DG, RRI S M Abu Horayra along with the MoWR management. RRI family welcome him cordially.

S M Abu Horayra joined RRI on 25 November 2022 as Director General. Mr. Horayra is a 20th BCS Cadre Officer of Public Administration Ministry. Before joining in RRI, Mr. Horayra served as a Project Director of Novotheatre Construction Project in Rangpur. Before that Mr. Horayra served as a CVRP Project Officer for Rangpur Guchchhogram Phase-2. As a Government employee, he worked in different places of the country after joining in BCS job. He completed MBA (Major in Public Administration) and Masters in Public Administration from Dhaka University. He has experience in human resources, administrations, operations strategy and planning. He is an active member of PAA.

Tarik Jamil Tamim joined RRI on 22nd February 2022 as Store Officer. He completed B.Sc .(Hons) in Agricultural Science and Masters in Agricultural Chemistry from Patuakhali Science and Technology University. He was born on 17th November, 1993. His home district is Barisal. RRI family welcome him cordially.

GDS Electro–Mechanical Automated Triaxial Test Equipment

The GDS Triaxial Automated System (GDSTAS) is a load frame-based tri-axial testing system. The system includes load frames, tri-axial cells, pressure controllers and software.

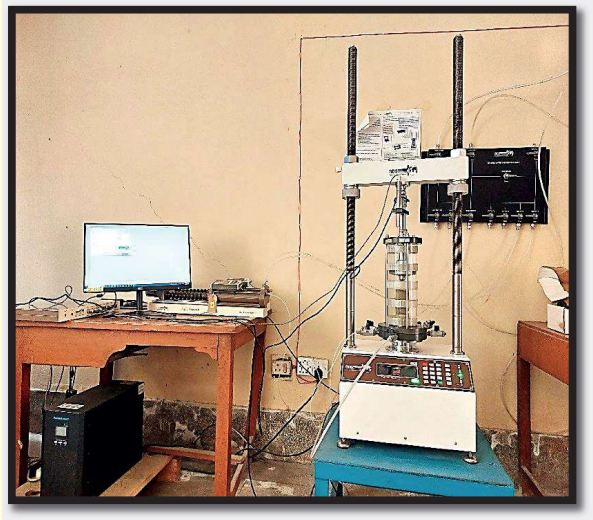


Image: Triaxial Testing Machine

Shear strength and other parameters of soil strength for different types of soil samples can be measured. The types of tests are –

- Unconsolidated Undrained Test (UU)
- Consolidated Undrained Test (CU) with and without pore pressure,
- Consolidated Drained Test (CD)

Through the above tests different parameters of soil can be determined such as - Cohesion c, angle of internal friction ϕ, pore pressure, stress- strain curve, shear strength (τ), elastic modulus etc. which are required for determination of bearing capacity, ultimate bearing capacity of soil for stability analysis, foundation stability analysis of slope. Recently this equipment has been procured for RRI laboratory.

Figure: GDS Triaxial Automated Machine

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