



Kain Magur/ Gang Magur

Upcoming

- ❑ Tourist Carrying Capacity Assessment: An Indicator for Sustainable Tourism on Saint Martin's Island
- ❑ Participatory Water Management of Bangladesh: A comparative assessment of (non)functionality of Water Management Organizations (WMOs)
- ❑ Channel Incidence of the Padma River

Inside

- ❑ Riverbank Erosion Prediction for Main Rivers, 2022
- ❑ Identification and Revitalization of Water Sources for Sustainable Water Resources Management of Chittagong Hill Tracts
- ❑ Remotely Sensed High-resolution Images Captured by UAV
- ❑ Addendum to EIA Study for the 420 MW Dual Fuel-based Combined Cycle Power Plant
- ❑ Environmental and Social Impact Assessment for Sustainable Management of Gorai River Basin, including Offtake



Center for Environmental and Geographic Information Services

(A Public Trust under the Ministry of Water Resources)

House 6, Road 23/C, Gulshan 1

Dhaka 1212, Bangladesh.

Phone: +88 02 222263581, 222282551, 222262542

Web: www.cegisbd.com, Email: cegis@cegisbd.com

the CEGIS NEWSLETTER

Safeguarding Environment for Future



Visit of the Honourable Deputy Minister Mr. AKM Enamul Hoque Shameem, MP at CEGIS

Honourable Deputy Minister of the Ministry of Water Resources Mr AKM Enamul Hoque Shameem M.P. has paid a courtesy visit to CEGIS on 7th June 2022. CEGIS family extended a warm but humble welcome to him and his entourage.

The Executive Director of CEGIS Mr Malik Fida A Khan apprised the visiting guest about the CEGIS. He shared the institutions' technical and research capacity and resources, highlighting CEGIS's contribution and knowledge support to developmental activities and projects of the government and beyond. He further added the institutions' involvement to provide technical support in the greater canvass of the water sector including river erosion, capital dredging and re-excavation, and

integrated water resource management and highlighted the detailed land use and its application of remote sensing for water resource management. Some of the noted projects were presented to the visiting guest i.e. "Bangladesh Delta Plan 2100", "National Adaptation Plan", "East Gopalganj Integrated Water Management Project", "Flourishing Borni Baor: An Approach to Sustainable Eco-Tourism", etc. He mentioned that CEGIS is a not-for-profit organization that operates on a national and international level and in the meantime earned a good name in the professional arena.

The directors of CEGIS' shared their expertise with the honourable Deputy Minister on the diverse issues

Cont'd on page 4

Riverbank Erosion Prediction for Main Rivers, 2022

Sudipta Kumar Hore, River, Delta and Coastal Morphology Division

Riverbank erosion, one of the major natural disasters in Bangladesh, causes untold miseries every year to thousands of people living along the banks of the rivers of Bangladesh. Bank erosion alone has rendered millions homeless and has become a severe social hazard. Structural interventions to protect against riverbank erosion are very costly. Along with structural measures, less costly nonstructural measures, like erosion prediction, could be used to reduce the loss due to riverbank erosion and lessen the suffering of people.

CEGIS has developed a unique tool using time series satellite images for riverbank erosion prediction in the Jamuna, the Ganges, and the Padma rivers. CEGIS has developed a unique tool using time series satellite images for riverbank erosion prediction in the Jamuna, the Ganges, and the Padma rivers. Erosion prediction is being used for river management. National agencies, responsible for river management for planning & designing bank protection work as well as emergency interventions are using the prediction. Since 2004, the methods are being applied to predict bank erosion and morphological changes of the Jamuna, the Padma, and the Ganges rivers under different projects of BWDB and WARPO. The results of the applied methods are in good agreement with the actual erosion in the field. In 2007, CEGIS disseminated erosion prediction to the community on a pilot basis at four locations along the Jamuna and the Padma Rivers. The community took the prediction positively and used it to save their properties. The predictions have proved to be useful means of reducing the suffering of the erosion vulnerable people, which instigated UNDP to take initiatives to include the erosion vulnerable people in the Safety Net Programme utilizing the experiences of CEGIS. It is to be mentioned here that BRAC disseminated the erosion prediction results to the local community to reduce the loss of properties and suffering of people during the period from 2016 to 2018. CARE Bangladesh also disseminated erosion prediction results to the local community living along the banks of the Jamuna River in 2020.

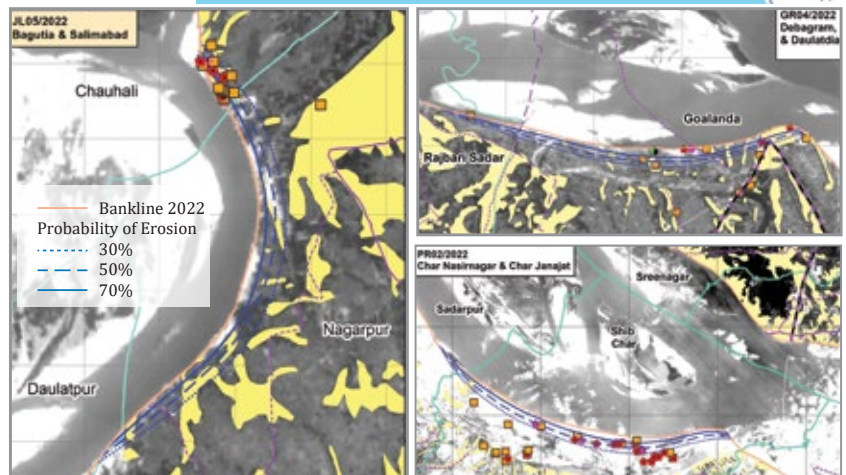
Like the previous years, CEGIS has predicted seventeen (17) probable vulnerable locations for 2022 along both banks of the Jamuna, the Ganges, and the Padma rivers for three different probabilities (70%, 50%, and 30% probability of erosion) which is supported by Research and Development fund of CEGIS. Among these, nine (9) locations are in the Jamuna River; six (6) are in the Ganges, and two (2) are in the Padma River. The prediction is not only limited to the identification of the vulnerable locations but also provides information on the vulnerability of the land, settlement, and other physical infrastructures of the predicted locations.

The riverbank erosion is predicted to occur in twelve (12) districts situated along the banks of the major rivers. These are Kurigram, Jamalpur, Gaibandha, Sirajganj, Tangail, Manikganj, Pabna, Kushtia, Rajbari,

Rajshahi, Faridpur, and Madaripur.

It was predicted that riverbank erosion in the Jamuna River would be about 540 ha whereas for the Ganges and the Padma rivers it would be 560 ha and 700 ha correspondingly. Moreover, 165 ha of settlement; 2.265 km of road (National, Upazila, and Rural roads); 2.80 km of embankment; 27 educational institutions; 5 hat/bazars; 16 mosques, 1 health center; 2 non-government offices; 2 graveyard, one regulator and 1 orphanage would be subjected to riverbank erosion in 2022.

Additionally, CEGIS regularly monitors erosion prediction to assess the robustness of the prediction tool. It was observed that erosion prediction made in the previous year (2021) showed a good match with the occurrences although there were few locations of slight riverbank erosion where erosion was not predicted. However, the overall accuracy of this prediction tool is 70-80%.



Riverbank Erosion in the Main Rivers

Contract Signing for Different Studies

During the first quarter of 2022 (April-June), CEGIS signed 12 (Twelve) contracts with different organizations and clients. The contract title with the date of signing is marked below:

i) "Strategic Environmental Assessment (SEA) Under Payra Kuakata Comprehensive Development Plan focusing on Eco-Tourism" Project with Urban Development Directorate (UDD) on 03 April 2022; ii) "ESIA Study for Feasibility Study for Integrated Development and Water Resources Management of Kutubdia and Matarbari Island" with Bangladesh Water Development Board (BWDB) on 18 April 2022; iii) "Survey by Acquisition of Satellite Image under Payra Kuakata Comprehensive Development Plan focusing on Eco-Tourism" Project" with Urban Development Directorate (UDD) on 28 April 2022; iv) "Consultancy Services for Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Study for 2x600 MW±10% Hi-efficiency GT class Gas/ RLNG Based Combined Cycle Power Plant at Maheshkhali Power Hub at Cox's Bazar, Bangladesh" with Bay of Bengal Power Company (Pvt.) Limited (BBPCL) on 11 May 2022; v) "Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Study for a

100-120 MW Grid Tied Solar Power Plant (AC) at Maheshkhali Power Hub at Cox's Bazar, Bangladesh" with Bay of Bengal Power Company (Pvt.) Limited (BBPCL) on 11 May 2022; vi) "Feasibility Study for Survey (Bathymetric for river excavation work, cross-section and long section survey, observation and evaluation work, design data collection, determination of effectiveness of existing old pumps by BUET and determination of suitability for construction of new pump house) including Detail Feasibility Study of Chandpur Irrigation Project" with Bangladesh Water Development Board (BWDB) on 22 May 2022; vii) "ESIA Study for Integrated Water Resource Management & Development of Polder no-72 under Sandwip upazila in Chattogram District" with Bangladesh Water Development Board (BWDB) Limited on 26 May 2022; viii) "Mouza & Plot Based National Digital Land Zoning Project" with Ministry of Land (MOL) on 29 May 2022; ix) "Improvement of Navigability of Chattagram-Hatiya route via Bhasan Char" with Bangladesh Inland Water Transport Authority (BIWTA) on 05 June 2022; x) "Investigation of Morphological Processes at Downstream of Bangabandhu (Jamuna) Bridge and Erosion Control with Environmental and Social Impact Assessment (ESIA) along Left Bank of Jmuna River at Manikganj District- ESIA Component" with Bangladesh Water Development Board (BWDB) on 07 June 2022; xi) Environmental and Social Impact Assessment (ESIA) and video filming/ documentary of re-excavation of small rivers, khals and water bodies (1st phase and proposed 2nd Phase)" with Bangladesh Water Development Board (BWDB) on 15 June 2022; xii) Preparation of Water Development Plan (WDP) at Moheshkhali - Matarbari Area (MIDI) of Cox's Bazar District with Department of Public Health Engineering (DPHE) on 30 June 2022.



Dr. Khurshid Zabin Hossain Taufique, Director, UDD and Mr. Malik Fida A Khan, Executive Director of CEGIS along with other officials were present at the signing ceremony for SEA project of UDD

CEGIS Environmental Lab: Digital Rangefinder ... (Cont'd from page 5)

should consider brighter color, longer range and shiny finishes provide a longer range than dull finishes. Shooting perpendicular to a target offers better coverage than shooting to a target at a sharp angle. Overcast skies increase the unit's maximum range, and sunny skies decrease the unit's maximum range. Target quality affects the precision of measurements.

Working Principle

After power ON Tru Pulse, to select a target, such as tree/building. For this, target should be 75 meters from the operator. Then to look through the eyepiece and use the cross-hair to aim at the target. If the HD indicator is not displayed, to press the UP or DOWN button until the HD indicator is displayed. Then to press and hold the FIRE

button. The LASER status indicator is displayed while the laser is active. If it fails to confirm target, to release FIRE button and repeat this step after removing the FIRE button once the distance is displayed. The measurement flashes one time and then is displayed steady until press a button or the unit's power is OFF. By pressing UP or DOWN button to scroll through measurement modes and see results acquired for each function. Then to repeat steps from target to take another measurement. Simultaneously, to press and hold the UP and DOWN button for 4 seconds to power OFF.

CEGIS used Tru Pulse 360 to measure the height of the trees at Sundarban and/or any other places for different studies and Ecological & forestry research projects. CEGIS can use Rangefinder to measure the height of trees and can also use in plant and forestry research and natural resources management studies.

Identification and Revitalization of Water Sources for Sustainable Water Resources Management of Chittagong Hill Tracts

Sumiaya Amin Preota, Water Resource Management Division

Chittagong Hill Tracts area is more diversified than any other region of Bangladesh due to extensive rugged mountainous terrain, dense forests, unique hydrogeology, and tectonic influences that have made this area distinct from the other regions of the country. And it has generated different diversified natural water sources, that also includes unique natural Springs. But unfortunately, these springs are becoming perennial to seasonal day by day and some are drying out and becoming dead. Moreover, the count and status of the natural water sources are not well documented in this region. For documenting all the natural water sources and increasing the longevity of existing spring flow, Chittagong Hill tracts Development Board (CHTDB) has assigned CEGIS.

The study is divided into two parts: One, an Inventory survey has been carried out for the entire CHT to document all the natural water sources along with its other detailed status. This will not only facilitate future initiatives in the spring-dependent area but also formulate measures to revive the springs in the CHTs. In parallel, a pilot initiative has also been taken to revitalize selected six (6) springs.

For the revitalization step, the spring recharge area is being delineated using a combination of hydrogeological field investigation and Geographic Information System (GIS) based Overlay Modelling. All the possible influential factors that affect the recharge rate in the hilly region have been considered as input data to make the GIS-based model for identifying the recharge area. Moreover, catchments and their flow to the respective streams of the springs have been estimated using a hydrological model.

Incorporating all the above outputs, appropriate interventions will be suggested for implementation in the selected spring to improve the flow which will ultimately support its revitalisation.

The suggested interventions will be simple, eco-friendly, and cost-effective. The interventions will be divided into two groups: Interventions for Spring Revitalization, such as percolation tank, a recharge well, shallow dug pond induced recharge, terraced field, bush layering, etc., and Interventions for Improved Water Supply, such as tube



Waterfall at Bilaichori, Rangamati

wells, Gravity Flow System, Rainwater Harvesting System, etc. These technologies will be finalized based on the water source status, dependent para water demand, and geological-geotechnical properties of the concerned area.

This project is still on and with completion, will make way to revive the springs in CHTs focusing on effective water management of the spring sheds without harming biodiversity.

Visit of the Honourable Deputy Minister ... (Cont'd from page 1)

of their work scope. The session turned warm and interactive with a little informal touch of experience sharing but full of enthusiasm.

Honourable Deputy Minister Mr. AKM Enamul Hoque praised the specialists' level of expertise in CEGIS and expressed his deep pride in its growing success at home and abroad. Further, he appreciated CEGIS' efforts to alleviate the organization into a centre of excellence. He emphasized that CEGIS should move proactively to disseminate its milestone accomplishments and hoped

that concerned GoB agencies and beyond will take its acknowledged services. He encouraged the CEGIS authority to nourish the young professional and facilitate their knowledge and skills to cater for the growing demand for water sector aligned national plans and programs in the days ahead following the 100 years long Bangladesh delta plan- the brain child of the honourable Prime Minister Sheikh Hasina.

He shared his aspiration for CEGIS's continued growth and conveyed his sincere wishes to the CEGIS family and thanked them for orienting him.

CEGIS Environmental Lab: Digital Rangefinder

Md. Rafiqul Alam, Water Resources Management Division

Rangefinder is a "one observer" electronic instrument with a horizontal base and depends in principle on rays reflected through prisms at either end of the tabs that form the base. Its measures range from a fixed horizontal base and cover from any height. No leveling or data points are required. It uses to measure distance from one object to another, usually anybody and a target. Its applications include survey, sports, navigation, focusing on photography, choosing golf clubs according to distance, forestry, and hunting. However, rangefinders use in different naval, military applications, from helping ships navigate the world's oceans to pinpointing enemy targets. CEGIS Rangefinder which model is LTI Tru Pulse 360. It consists of an LCD, mounted within the optical system and when activated, displays articles for targeting yards/meters and display indicators. It consists of a laser range sensor that emits invisible eye safe, infrared energy pulses. Tru Pulse determines distance by measuring the time it takes for each pulse to travel from the Rangefinder to the target and back. Laser may active for maximum 10 sec. Once target is acquired or laser has timed out, operator can release FIRE button. It consists of an integrated tilt sensor which measures vertical angles. Tru Pulse uses to calculate height and elevation and determine slope-reduced horizontal distances. Generally, the device measures inclination when the operator presses the FIRE button. However, in the continuous target mode and height measurement mode, the inclination reading appears in the display and the display updates as operator's aiming point change as long as he presses.



It utilizes electronic compass technology, evaluates local magnetic environment during each field calibration, and provides user feedback on quality calibration. It consists of digital processor with ASIC chip which combined with a high-speed CPU, allows Rangefinder to deliver accurate measurements. It works on Tru Vector Technology, which enables the instrument to take an accurate Azimuth and inclination reading. It can be tilted, rolled or upside down, it will still measure correct Azimuth and inclination in any direction that operator is viewing. It always knows its position in 3D space. It has 3 buttons that access the unit's internal software, which controls the integrated sensors.

Nature:

Kain Magur: the threatened fish of the south-west estuary in Bangladesh

Md. Amanat Ullah, Ecology, Forestry and Biodiversity Division



Plotosus canius (Kain Magur/Gang Magur)

Kain Magur/Gang Magur or Gray eel catfish (*Plotosus canius*) is a prominent fish in the south-west coastal region of Bangladesh. It originated from the Plotosidae family and is found in India, Sri Lanka, Bangladesh, Myanmar, and Papua New Guinea. Its body is deep brown, long, anteriorly depressed, and posteriorly compressed, tail gradually tapering. The head is large and completely covered with skin. The mouth is transverse with a longer upper lip. It has four long barbels and three spines associated with anterior fins that have potent venom. It can grow up to 5 kilograms.

In Bangladesh, Kain Magur dwells within the brackish water of rivers, canals, and creeks of Sundarbans and adjoining areas. It feeds on shrimps, insects, mollusks, and fishes, spawning from February to August and mostly in peak rainy times. It tastes delicious.

The Kain Magur population is declining due to over-exploration, destruction of breeding grounds, and water quality change. According to the red list of IUCN Bangladesh (2000), this species has been cited as "Near Threatened" in Bangladesh. Under Schedule 2 of the List of Protected Wildlife under the Wildlife (Conservation and Security) Act, 2012, of Bangladesh, this is a protected species. Schedule 2 of Bangladesh's Wildlife (Conservation and Security) Act, 2012, declared this species protected.

Measurement modes are slope distance, vertical distance, horizontal distance, inclination, Azimuth, 3-point height routine, and missing line routine.

Target modes are standard, continuous, closest, and farthest filters. System setup modes are unit selection, Bluetooth enables, Tilt Sensor calibration, Horizontal angle Menu, Declination Menu, and Compass calibration menu. Laser sensor, integrated tilt sensor, and compass measure slope distance, horizontal distance, vertical distance, inclination, and Azimuth, or instantly calculate the height of any object or missing line between two points remote from the position. Measurement data is available for download to PC. It automatically provides a target's best accuracy and acquisition distance. While selecting a target, the operator

Remotely Sensed High-resolution Images Captured by UAV

Premanondo Debnath, Remote Sensing Division



*Crab Farming in Burigoalini, Shyamnagar, Satkhira
UAV Platform: Mavic 2 Pro , Altitude: 70m (Photo Resolution 2cm/pix)*

Addendum to EIA Study for the 420 MW Dual Fuel-based Combined Cycle Power Plant

Eva Chowdhury, Power, Energy and Mineral Resources Division

According to International Monetary Fund (IMF) and World Bank, Bangladesh is among the three fastest-growing economies. It has achieved the status of a lower-middle-income country from the least developed country. Therefore, the Government of Bangladesh now aims to achieve a 'high-income country' by 2041, given that electricity plays a vital role in social and economic development. Currently, Bangladesh is facing a sharp increase in the power supply demand. The absence of a sustainable power supply would significantly hinder achieving the expected target of sustainable development goals (SDGs) by 2030. Therefore, the Government has given top priority to the development of the power sector.

In this regard, Rural Power Company Limited (RPCL), an enterprise of the BPDB, adopted a plan of constructing a Power Plant with a capacity of 420 MW at Shambhuganj of Mymensingh, on the left bank of the Old Brahmaputra River right beside their existing 210 MW Combined Cycle Power Plant (CCPP). As per the Environmental Conservation Rules, 1997 (amended in 2005) of Bangladesh, the Project falls under the 'Red Category' Project that requires carrying out an Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) to get site clearance and environmental clearance certificate respectively from the Department of Environment (DoE). However, RPCL has obtained Site Clearance and EIA approval from the DoE for 360 MW Power Plant capacity. For the increased capacity of 420 MW, DoE has suggested submitting a

supplement to the existing EIA Report. In this connection, RPCL has entrusted the Center for Environmental and Geographic Information Services (CEGIS), a Public Trust under the Ministry of Water Resources of the Government of Bangladesh and a pioneer scientific organization with vast experience in carrying out EIA for rendering consultancy services for reviewing the EIA of the 360 MW ($\pm 10\%$) Dual Fuel-based Power Plant and prepare an addendum EIA report for the 420 MW Dual Fuel based (HSD & Gas) CCPP to be constructed at Shambhuganj, Mymensingh.

RPCL has decided to run the proposed Power Plant using Natural Gas as the primary fuel. The required gas would be transported through a 13 km long gas pipeline (diameter of 12-inch having pressure of 1000 PSIG) from Mymensingh Town Border Station to the Plant Site. CEGIS has provided the consultancy services in preparing an Environmental Management Plan for the Gas Pipeline as suggested by the DoE.

According to the nature of the Project and considering the norms of the DoE, an area encompassing a radius of 5 km and 10 km centering the Stack has been considered the direct impact zone and the study area for the proposed Power Plant Project respectively. CEGIS has completed this Project successfully by following International Finance Corporation's (IFCs) Sustainability Framework 2012 (IFC) and its Performance Standards (PS) on Social and Environmental Sustainability and Equator Principle -III, 2013.



Environmental and Social Impact Assessment for Sustainable Management of Gorai River Basin, including Offtake

Md. Atiqur Rahman, Water Resources Management Division

The perennial river Gorai is the major distributary of the Ganges River. The river provides freshwater inflows to Bangladesh's south-western (SW) region. Freshwater is essential to maintain the ecological and environmental balance in the SW Region. The dry season flow of the Gorai river has declined due to the reduction of the flow of the Ganges River after the commissioning of the Farakka Barrage. As a consequence, the salinity has ingressed further inside the region. A project has been taken by Bangladesh Water Development Board (BWDB) that aims to augment the dry season flow in the Gorai River.

A Char has been developed using the dredged material as a pilot project at the left side of the offtake of the Gorai River used as a deflector to divert water to the Gorai from the Ganges. The augmentation will be done using this deflector, dredging of Gorai, and bank protection at different places along the bank of the Gorai. CEGIS is studying the impact of these infrastructures on the study area. After receiving the technical feasibility result from IWM, CEGIS will use a pre-developed model to quantify the effect.

As the Ganges water carries loads of sediment, maintenance dredging is required for the sustainability of the project at different strategic locations. The salinity intrusion and siltation situation will improve by ensuring dry season freshwater flow to the Gorai. If the salinity egresses, agricultural production will increase. At the same time, the ecological balance will be maintained. The study is expected to be completed by this year.



Bank protection along the bank of the Gorai River

Event Outline (Apr-Jun 2022)

April 11-15: Mr. Malik Fida A Khan, Executive Director, CEGIS attended the 77th India-Bangladesh Joint Committee meeting held in Kolkata, India;

April 27: Sharing the updates of National Adaptation Plan of Bangladesh among the Ministry of Environment, Forest and Climate Change for finalisation;

May 18: Seminar on Application of Unmanned Aerial Vehicles and Unmanned Surface Vehicles with Hojung Solution, Korea;

May 22: Discussion meeting between CEGIS Study Team and Gazaria Power Ltd. regarding ESIA Study and Hydro-graphic & Hydro-morphological Study for Proposed 660 MW Combined Cycle Gas Turbine Power Station at Meghna Ghat, Gazaria, Munshiganj;

May 23: Conceptual meeting for Feasibility Study of Borni Baor, Gopalganj;

June 06: 54th Board of Trustees (BoT) Meeting;

June 07: Visit of Mr. AKM Enamul Hoque Shameem, MP, Honorable Deputy Minister, Ministry of Water Resources, GoB;

June 14: Training on Air-Sense for air monitoring among the multi-disciplinary professionals;

June 29: Knowledge exchange and discussion on climate risk assessment model/tool development for infrastructure and data availability with UNOPS, Oxford University, and GCA.

Editorial Board

Motaleb Hossain Sarker A. M. M. Mostafa Ali
Md. Sarfaraz Wahed Md. Mostafizur Rahman

Advisory Editor

Mahmudul Islam

Design and Layout

Sonkor C. Sinh
Farzana Yeasmin