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Upcoming

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the CEGIS NEWSLETTER

Safeguarding Environment for Future

Developing Operational Shadow Price for Water

Rifat Jahan Sadia, Water Resources Management Division

The UN initiated a High-Level Panel for Water, the Honorable Prime Minister is one of its member. Under her direction, the Prime Minister's office launched a project for estimating the value of water. The Centre for Environmental and Geographic Information Services (CEGIS) has been engaged in this regard for a Study on Developing Operational Shadow Prices for Water to Support Informed Policy and Investment Decision Making Process under the Water Resources Planning Organization (WARPO).

The specific objective of the study is to estimate the economic value of water in four sectors, namely, Agriculture, Industry, Municipal Residential Use and Ecosystems. The industry sector was further divided into four subsectors: Power Generation, Construction, Food and Beverage, and Apparel.

Valuing water has been included in the strategy for water resource management in the 8th Five Year Plan of the country. It is expected to allow the use of the social value of water, institutionalize and strengthen the relevant agencies so that water value can be mainstreamed in the regular investment decision-making process in terms of project development, appraisal, water use policy etc.

Sediment Pollution of Dhaka's Peripheral Rivers: Deep Layers are Less Polluted than Top Layers

Farhan Nafis Hridoy, River, Delta and Coastal Morphology Division

Rapid urbanization is posing multiple levels of anthropogenic stresses and natural challenges to the peripheral network of rivers around Dhaka City. Polluted river bed, the habitat for different aquatic species, can disrupt the benthic ecosystem, which consequentially may degrade the overall river health and affect humans both directly and indirectly. Deposition of pollutants from other points and diffuse sources into the river can make the river bed to act as a reservoir and long-term source of toxic substances through slow accumulation.

Heavy metals do not undergo bio-degradation, and accumulation occurs faster than the organic pollutants. Table below represents the heavy metals in the river bed sediments around Dhaka City studied between 2010 and 2021 in different year periods and Toxicity Reference Values (TRV-set by US EPA). In most cases of other studies, conducted on sediments from the top layer (within 0.15 m from the bed surface) indicated high contamination levels above the TRV values. However, the survey conducted by CEGIS using a composite sample of sediment found that the values to vary greatly from those of the other experiments. The composite samples were prepared by mixing samples from three depths: 0.15 m, 0.5 m and 1.0 m from the river bed. Analysis showed that the contamination levels of all the metals at all locations were within the maximum threshold values.

Sampling Locations of River Bed Sediment

The grain size distribution of the rivers surrounding Dhaka shows that the significant portion of bed sediment is characterized as silty sand, where the sediment is mostly finer at the top. Finer particles have higher transportation rate than heavy particles. This means that contaminations are mostly with finer sediment, and the accumulation of toxic substances are slower than their transportation. Therefore, a higher pollution level was found in different studies where the top-most layers are considered. Pollution from industrial discharge and wastewater seems to be spatially distributed throughout the river, resulting in higher pollution levels at the top layers than in the deep layers. The flow velocities of the rivers are also not much to cause significant turbulence or higher disturbance which resulted accumulation at deep layers. The recent dredging activities for navigational channel development could be also a reason for the sediment's lower contamination status as the contaminated layer is removed (CEGIS, 2021).

However, it is crucial to control solid waste and wastewater from discharging openly into the rivers. Therefore, the study by CEGIS emphasized establishing STP (Sewage Treatment Plant) and CETP (Central Effluent Treatment Plant) to tackle the pollution of both water and sediment of the rivers surrounding Dhaka.

Heavy Metals in the Bed Sediment of Dhaka's Peripheral Rivers

Sources	Studied River(s)	Heavy Metals (mg/kg)				
		Lead (Pb)	Cadmium (Cd)	Nickel (Ni)	Copper (Cu)	Chromium (Cr)
Ahmad et al., 2010	Buriganga	64.71 – 77.13	2.36 – 4.25	147.06 – 258.17	21.75 – 32.54	155.01 – 218.39
M. S. Islam et al., 2015	Buriganga, Turag, Shitalakhya	45 – 1846	8.5 – 29	139 – 606	65 – 405	112 – 2471
Sarkar et al., 2016	Tongi canal	21.54 – 30.22	0.059 – 0.168	29.46 – 40.87	178.5 – 261.4	89.28 – 163.0
Mohiuddin et al., 2016	Buriganga	13.1 – 85.6	0.5 – 7.0	79.5 – 278.4	88.3 – 650.3	106.9 – 279.8
CEGIS, 2021	Buriganga, Turag, Tongi canal, Balu, Shitalakhya	1.9 – 26.6	0.3 – 0.9	6.0 – 16.3	1.4 – 18.1	0 – 7.7
Toxicity Reference Values (by US EPA)		35.8	0.99	22.7	31.6	43.4

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Contract Signing for Different Studies

During the third quarter of the year 2021 (July - September), CEGIS has signed number of contracts with different organizations. The contract titles with date of signing are given below:

i) "Environmental and Social Impact Assessment (ESIA) for sustainable management of Gorai River basin including offtake" with Bangladesh Water Development Board (BWDB) on 1 July 2021, ii) Coastal Embankment Improvement Project, Phase-1, Consultancy Services for Feasibility Studies and Preparation of Detailed Design for the Following Phase (CEIP-2) with Haskoning DHV Nederland B.V on 19 July 2021, iii) "Baseline Survey for Cumilla-Chandpur-Brahmanbaria District Irrigation Area Development Project" with Bangladesh Agricultural Development Corporation (BADC) on 17 August 2021, iv) Conducting the service Environmental Monitoring Report (EMR) & Social Safeguard Report (SSR) of "Augmentation and Rehabilitation of Distribution System in DESCO Area" with Dhaka Electric Supply Company Limited (DESCO) on 17 August 2021, v) "Environmental Impact Assessment (EIA) for 9 (Nine) nos of Bridges over different rivers at Narayanganj, Mymensingh, Feni, Bagerhat, Barishal, Cox's Bazar and Madaripur Districts" with Local Government Engineering Department (LGED) on 23 August 2021, vi) "Techno-economic Feasibility Study of 8 Bridges over Different River at Nrayanganj, Tangail, Feni, Barishal, Cox's Bazar and Madaripur Districts" with Local Government Engineering Department (LGED) on 23 August 2021, vii) Carrying out the Route Survey and updating of IEE & EIA of the project titled "Improvement of Natural Gas Transmission and Distribution Capacities of TGTDCL" with Titas Gas Transmission and Distribution Company Limited (TGTDCL) on 19 August 2021, viii) Carrying out the Route Survey and IEE & EIA of the project titled "Replacement of Existing Gas Network of TGTDCL along the Joydevpur-Mymenshingh 4-Lane Highway" with Titas Gas Transmission and Distribution Company Limited (TGTDCL) on 19 September 2021, ix) Carrying out the Route Survey and IEE & EIA of the project titled "Replacement of Existing Gas Network of TGTDCL along the Dhaka-Tangail 4-Lane Highway of SASEC Road Connection Project of RHD" with Titas Gas Transmission and Distribution Company Limited (TGTDCL) on 19 September 2021, x) "ESIA Study for Feasibility Study for Rehabilitation of Barishal Irrigation Project (BIP) with Bangladesh Water Development Board (BWDB) on 1 September 2021, xi) Erosion and Flood Risk Assessment of Sonagazi 50 MW Solar Power Plant Construction Project in Bangladesh with M/s. TÜV SÜD Bangladesh (Pvt.) Ltd. on 15 September 2021.

(From left) Mr. Fazlur Rashid, Director General, BWDB, Mr. Malik Fida A Khan, Executive Director, CEGIS and Dr. Shamal Chandra Das, Project Director and Superintending Engineer (Civil), Directorate of Planning-1, BWDB are seen in the Signing Ceremony of ESIA Study of Barishal Irrigation Project

Training and Capacity Building ... (Cont'd from last page)

training was organized in two batches was consisting of 20 professionals in each batch. The training of the first batch was held from September 18 to 22, 2021 in BADC Sech Complex, Dholadia, Mymensingh premises and the second batch was held in CEGIS, Dhaka premises. Mr. Md. Ziaul Hoque, Member Director of Minor Irrigation, BADC was the Chief Guest while Mr. Md. Shahabuddin Talukder, Chief Engineer (S&W), Mr. Md. Ferdous Rahman, Chief Engineer, Planning Division, and Mr. Md. Lutfor Rahman, Chief Engineer (MI) of BADC were the Special Guests of the training program. The training mainly covered the concept and application of GIS, geo-processing and spatial data analysis, map projection and procurement planning, application of *nothi* system of E-GP and E-Filling.

Inaugural (left) and Feedback from the Participants (right) of Training on E-GP, E-Filling, GIS AutoCAD for Skill Development of BADC Professionals

Under the Joint Cooperation Programme (JCP) between Bangladesh and the Netherlands, a training on Scientific Writing was conducted by the team members of CEGIS, IWM, Wageningen University, and Research and Deltares during July 8 to 12, 2021. As part of JCP activities, the LUCK incubator project an i-CLUE demonstration session was also conducted during September 15 to 28, 2021.

Climate Vulnerability and Infrastructures Assessment for Nine LIUPC Cities in Bangladesh

Ahmmed Zulfiqar Rahaman and A.S.M Julker Naem, Climate Change and Disaster Management Division

Bangladesh is threatened by climate change risks attributed to climate variability, uncertainties, and impacts, as one of the most climate vulnerable countries in the world. The vulnerability dimension is more likely to aggravate further in the future. Poor people, marginal farmers, labors, slum households, disabled or aged people and women are the most concerned vulnerabilities posed by negative impacts of climate change. Rapid urban sprawl under tremendous population pressure is particularly making the cities vulnerable to climate change and thus, posing a hindrance to achieving the development vision.

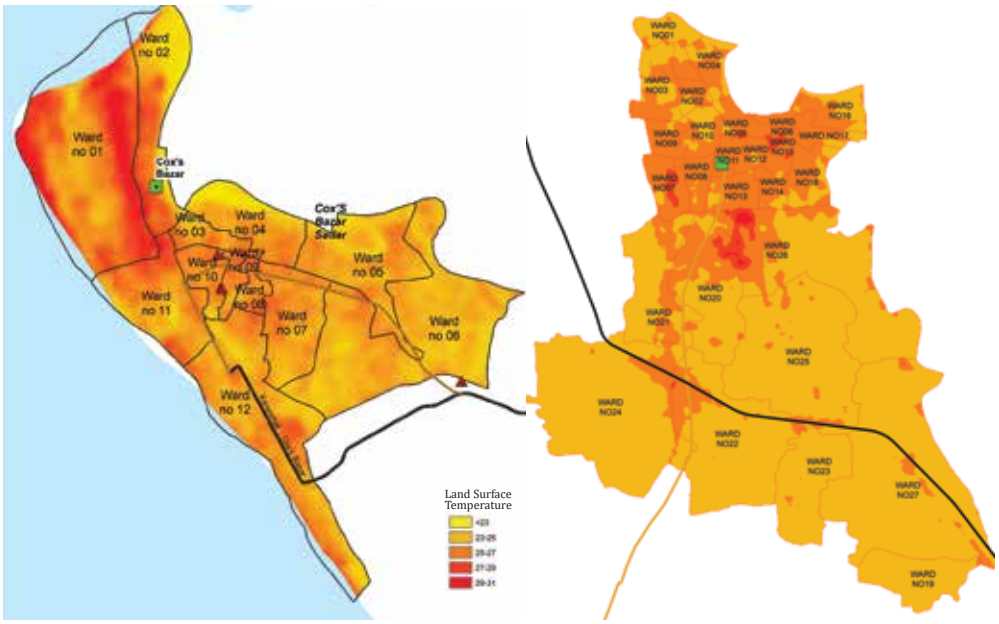
In this regard, UNDP has undertaken Livelihoods Improvement Programme for Urban Poor Communities (LIUPC). CEGIS, in association with Climate Adaptation Services, is assessing the city-level climate change vulnerabilities in 9 selected cities. These include 5 City Corporations and 4 Pourashavas. A vulnerability assessment has already been performed for 4 cities: Cox's Bazar Pourashava, Gopalganj Pourashava, Noakhali Pourashava and Cumilla City Corporation.

City Level Workshop at Rangpur City Corporation (left) and Focus Group Discussion at Saidpur Pourashava (right)

The study team comprehensively assesses climate change vulnerabilities from both physical and socio-economic contexts, assessing the present condition of small-scale urban infrastructures and recommending climate resilient infrastructures to improve livelihoods of the poor urban communities in 9 cities. An integrated and participatory approach has been followed to conduct these assessments engaging local vulnerable and communities through FGDs and city level workshops which will reduce vulnerabilities of poor urban neighborhoods and enable achievement of the development vision of the Government of Bangladesh.

Almost all the cities face urban drainage problems due to short duration but intensive rainfall, inadequate waste management, ad hoc planning and construction. Seasonal flooding or flash floods occur with high frequency and magnitude, making the infrastructures and poor communities vulnerable. Drought-prone cities face drinking water crisis or shortage of irrigation water. On the other hand, coastal towns are being flooded due to cyclone or storm surges of higher intensity, sea level is rising, and salinity intrusion is aggravating. Both sudden extreme events and slow onset events impose negative impacts due to climate change on the physical and socio-economic elements of the cities. For instance, loss of income and seasonal handicraft jobs in Cox's Bazar increased hypertension patients and heatstroke in Noakhali for increased salinity, increased salt concentration in drinking water in Gopalganj, etc. Increased Lighting and long duration heat wave are reported as the two most unprecedented hazards observed by local communities and ward councilors.

To alleviate the climate vulnerabilities and increase urban resilience, development of drainage infrastructures, easy access to a micro-credit loan, expansion of e-commerce, installation of drinking water purification or desalinization infrastructures, training to community people and women on alternative livelihoods, increase knowledge level on climate-smart agriculture and framing, strengthening early warning and dissemination system up to community level, construction of roadside sheds, proper solid and liquid waste management etc. are the priority adaptation found from the recommendations of the assessments.



Urban Land Surface Temperature of Cox's Bazar Pourashava (left) and Cumilla City Corporation (right)

CEGIS Environmental Lab: Multi-parameter Water Quality Meter

Md. Rafiqul Alam, Water Resources Management Division

This instrument is of U-50 series, model U-53, and its origin is Japan. It is battery operated, sensor and microprocessor-based equipment. It can log data and down load data to PC. It features with integrated control unit and sensors. It can measure 11 parameters simultaneously with a single probe and is perfect for in-situ tests. It is used for water quality measurements, inspections and monitoring of river water, groundwater and wastewater. It has multiple applications in different studies, including environmental impact assessment and monitoring, researches, engineering, with common usage in water pollution studies for verification of EC, TDS, and DO, pH, TEMP, SAL and TURB level for different purposes, especially for hygiene investigations and environmental impact and monitoring.

It is the perfect tool for diagnosing problematic water quality levels of drinking water, wastewater, river water, reverse osmosis etc. The main applications of this

Multi-parameter Water Quality Meter

instrument include hygienic investigations and water quality control as per national standards. Measurement can be taken in a single measurement or interval measurement mode. Measurement can be taken as a single measurement that stores data manually, and interval measurement stores data automatically and continuously. After turning the power ON, the DO readout value is to be checked that has been established before starting measurement (takes around 20 min). Calibration should be done before measurement or when CAL DUE is shown. Selection of measurement mode is needed to lower the sensor probes slowly when submerging them in the samples. If the sample is non-flowing, the cable should be moved slowly to ensure that fresh sample is continuously supplied to the DO sensor. When the measurement values are stable, MEAS key should be pressed and Enter for saving Data or ESC for cancel.

Measuring Parameters, Ranges, and Methods

pH Range: 0 to 14, glass electrode method; DO Range: 0 to 50 mg/L, Polarographic method; EC Range: 0 to 100 mS/cm, Four AC Electrode method; Salinity Range: 0 to 70 ppt, Conductivity Conversion method; TDS Range: 0 to 100g/L, Conductivity Conversion method; Temperature Range: -10 to +55°C, Platinum temperature sensor method; Turbidity Range: 0 to 1000 NTU, Tungsten lamp 90º transmission scattering method.

This instrument in CEGIS, is used in different studies for analyzing pH, DO, Salinity, Turbidity, EC, Temperature and TDS of water samples for several periods in environmental compliance monitoring of surface and groundwater etc. This instrument can be used in water resources and environmental impact assessment and monitoring studies.

Nature: Nagalingam (*Couroupita guianensis*) Tree: A Cannonball Tree

Uzzal Kumar Saha
Ecology, Forestry and Biodiversity Division

Nagalingam (*Couroupita guianensis*) Tree

Couroupita guianensis Aubl, commonly known as cannonball tree, is frequently grown in the tropical and subtropical regions as a deciduous tropical tree under the lecythidaceae family. This tree was recorded and named by French Botanist Jean Baptiste Christophore Fusee Aublet in 1775. Cannonball tree is a good indicator for a healthy ecosystem. A mature tree attains a height of about 50 to 70 feet with a dense crown having leaves clustered at the tip of the branches. This tree has been widely planted in a number of different tropicals to semi-tropical areas around the world. A fruit of this tree is woody, globes, hard-shelled, reddish-brown, which matures to a cannonball size, having a diameter of 8-10 cm. March to September is the flowering season of this tree. Each flower has a 6-lopped calyx and 6 spreading petals, which are large, pleasantly fragrant, showy and rose-pink to red flowers bloom in racemes. Leaves typically drop once but sometimes twice per year, frequently responding to dry weather. The tree is planted in our country and is found in Ramna Park, Curzon Hall (Dhaka University), Suhrawardy Udyan, Notre Dame College campus, National Botanical gardens etc., in Dhaka. These plant's leaves, flowers, and fruits are used for medicinal purposes. The leaves of this plants are used to treat skin infections, including protozoan diseases in humans. The tree is currently considered as a threatened medicinal species in the sub-continental region. Cannonball tree is also a cultural or religious conviction of Hindus and Buddhist society.

Night Time Light

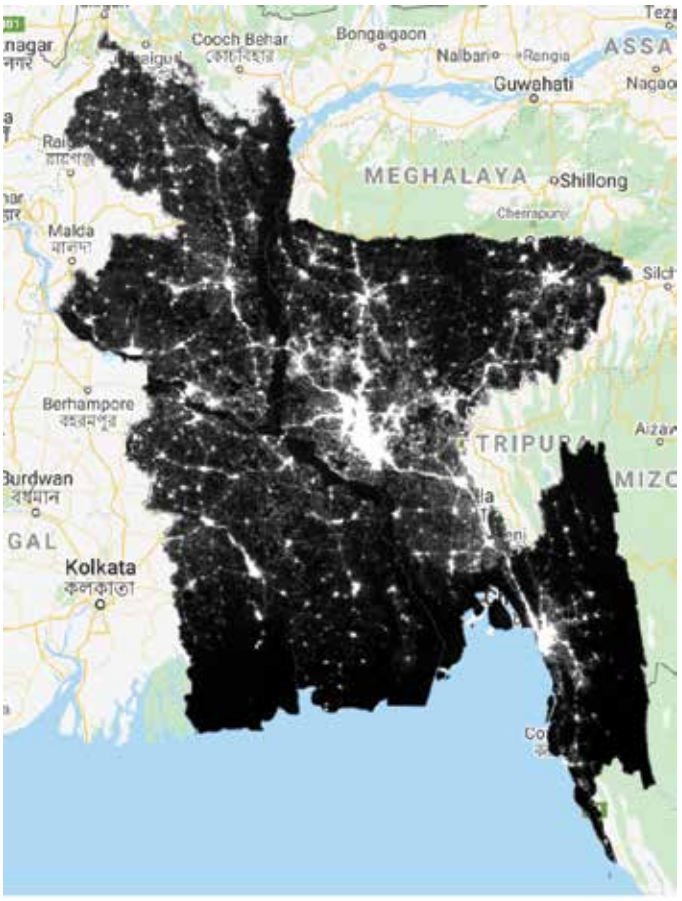
Mohammad Shahidul Islam, Remote Sensing Division

Remote Sensing Data offers a view of changing the landscape through deforestation and urbanization from space due to rapid increase in population. Satellite data of nighttime light (NTL) emissions offers a unique perspective for investigations on some of these changes. The Visible Infrared Imaging Radiometer Suite (VIIRS) instruments aboard the satellites provide global daily measurements of nocturnal visible and near-infrared (NIR) light that is suitable for Earth system science and applications studies.

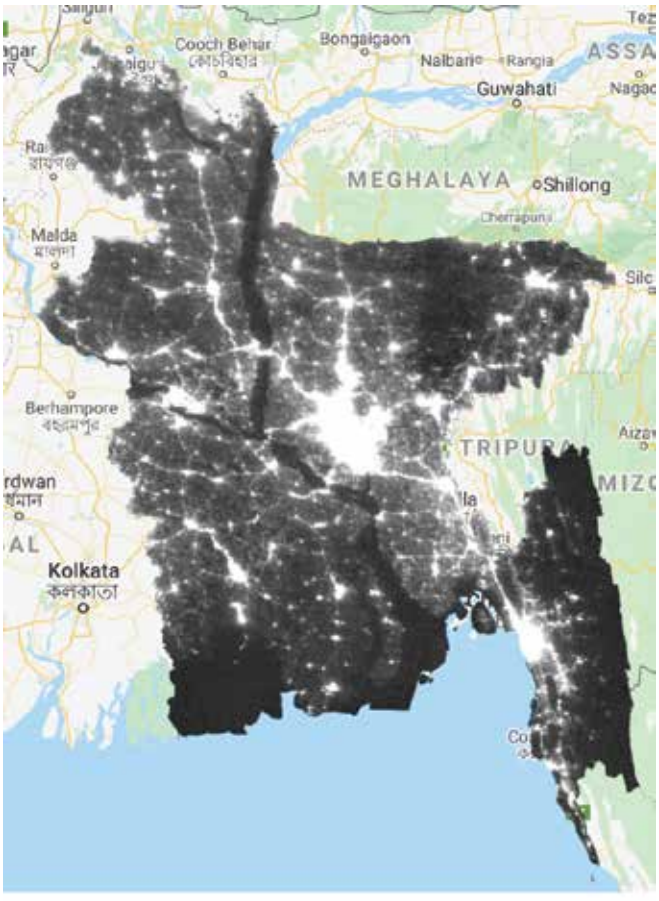
View of night time lights provide a unique perspective of the planet. The U.S. Department of Defense launched the Defense Meteorological Satellite Program (DMSP) to collect nighttime light emissions with the Operational Linescan System sensor. This data is available between 1 January 1992 and 1 January 2014. While DMSP OLS provides long-term data to map urban extent, it has several disadvantages i,e: i) its spatial resolution is very coarse (2.7 km), ii) the radiometric resolution is 6 bits, resulting in saturated pixel values in urban centers and weak detection of small urban settlements and iii) given the lack of on-board calibration, radiometric quantities are not consistent across space or time. This inconsistency can cause issues when analyzing time series.

To improve the quality of the data, NASA launched the Suomi NPP satellite in 2011 and the NOAA-20 satellite in 2018. Both satellites carry the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument, which also collects NTL emissions and continues the long-term NTL data record. The VIIRS day-night band improves upon the older DMSP OLS with higher spatial and radiometric resolution. The VIIRS data has a spatial resolution of 375 and 750 meters (depending on the band), daily temporal resolution, and more complete global coverage and higher quality data.

NTL contributes to a variety of Earth Science studies and applications. It helps in assessing progress towards meeting many of the United Nation's Sustainable Development Goals (SDGs), specifically addressing the needs of conflict-affected populations (SDG-1); quantifying the effectiveness of local electrification projects in the developing world (SDG-7); building infrastructure resilient to disasters, promoting inclusive and sustainable industrialization, fostering innovation (SDG-9); and ensuring that cities and human settlements are inclusive, safe, resilient, and sustainable (SDG-11). The high spatial resolution and the daily temporal resolution of VIIRS DNB images provide information on the location of where power outages and blackouts after the disasters. NTL data provide insight into the social, economic, and cultural patterns and behaviors within the urban environments from electrification, conflict-induced migration, holidays, and more. The steady increase in the growth center's nighttime lights pattern over the decade suggests a growing economy in the country.



Night Time Light, 2014



Night Time Light, 2021

Sector Action Plan on Environment and Climate Change

Bhuiya Md. Tamim Al Hossain, Ahmmed Zulfiqar Rahaman, Sifath Ara Hossain
Climate Change and Disaster Management Division

The economy of Bangladesh has been classified into 14 sectors in Seventh Five Year Plan. Eventually, the Government of Bangladesh (GOB) has decided to prepare a Sector Action Plan for each of the sectors prepared specified in the coming Eighth Five Year Plan (2021-2025). Accordingly, the Agriculture, Water Resources and Rural Institution Division of the Planning Commission has processed the "Sector Action Plan" preparation. It aims to achieve the goals set in the 8th FYP (2021-25) under the project titled "Formulation of Sectoral Plan and Capacity Development of Concerned Officials for More Effective Public Investment". The Agriculture, Water Resources and Rural Institution Division engaged the Center for Environmental and Geographic Information Services (CEGIS), the Centre for Climate Change and Environmental Research (C3ER), Brac University for preparing the Sector Action Plan on 'Environment and Climate Change'.

A total of 35 strategies have been identified in this SAP ECC, focusing on tackling environment and climate change risk and vulnerabilities on Agriculture, Fisheries and Livestock; managing land, water, environment and ecosystem resources in an integrated way to achieve food and nutrition security. A thorough review and series of consultations with relevant stakeholders have facilitated the identification of a set of actions under SAP ECC. In prioritizing the activities, criteria followed include country demand-driven and aligned with national development agenda; ability to facilitate green growth and environment-friendly development; aligned with global commitments; ability to transform and build climate-smart agriculture; able to fulfill farmer's dream; able to manage environment and climate change risk efficiently; made on existing strategic pathway and developments; ability to facilitate climate change adaptation and mitigation; attractive for private sector investment; have opportunities for social and gender inclusion and flexible and adaptive to institutionalize etc.

C1T1: Climate Smart Agriculture
- Total Project:15 Nos. (Short= 7, Medium= 7, Long= 1)
- Total Investment Cost: 7625 Crore BDT

C1T2: Land and Water Management
- Total Project:18 Nos. (Short= 7, Medium= 11)
- Total Investment Cost: 23550 Crore BDT

C1T3: Emission Reduction from Agriculture
- Total Project: 9 Nos. (Short= 7, Medium= 2)
- Total Investment Cost: 6100 Crore BDT

C2T4: Pest, Diseases and Agro-Ecosystem Management
- Total Project: 9 Nos. (Short= 7, Medium= 2)
- Total Investment Cost: 5425 Crore BDT

C3T5: Enhanced Finance
- Total Project: 7 Nos. (Short= 4, Medium= 2, Long= 1)
- Total Investment Cost: 69500 Crore BDT

C4T6: Institutions and Governance
- Total Project: 9 Nos. (Short= 9)
- Total Investment Cost: 4500 Crore BDT

C4T7: Knowledge Management and Capacity Development
- Total Project: 17 Nos. (Short= 12, Medium= 5)
- Total Investment Cost: 7540 Crore BDT

A total of 84 actions or projects have been identified and prioritized, consisting of 53 short term, 29 medium terms, and 2 long term projects. Along with recognizing the need of continuous capacity development initiatives to make transformations among institutions, farmers, fishermen and other stakeholders, potential sources of fund strategies for financing, strategies for delta fund establishment, strategies for private sector engagement, result-based monitoring and evaluation framework have been developed in this SAP ECC to fulfill the goals and objectives of both the ECC sector and the nation in a boarder context. For improved management, implementation, coordination and monitoring of the SAP ECC, a new unit/commission naming National Environment and Climate Change Unit has also been proposed, which will oversee the development mechanism of SAP ECC and its fruitful implementation.

Coastal Resilience: Developing New and Innovative Approaches in Bangladesh and India along the Bay of Bengal

Dewan Mohammad Ariful Islam, Water Resources Management Division

The large coastal zones of Bangladesh and India are home to many communities and their asset. The coastal zone of Bangladesh and India spans over 580 km and 7500 km of coastline, respectively. In Bangladesh, the coastal area consists of nineteen coastal districts and hosts nearly 28 per cent of the country's population (i.e., almost 42 million). The coastal population of Bangladesh is also projected to grow to 61 million by 2050. On the other side, the total population in the coastal area in India is around 200 million, which is about 14% of the total population. Both countries have substantial percentage of poor people, and the vulnerability of these coastal areas is one of the factors contributing to the challenge in reducing poverty. The coastal zones of Bangladesh and India are highly exposed to various hazards, with cyclones and coastal erosion being the most prominent ones. In Bangladesh, the high population density around large river deltas and its coast exacerbate the disaster vulnerability. About 70 per cent of the population is exposed to cyclones. Based on the Global Assessment Report GAR in 2015, the current annual average loss is estimated as 3 billion US $ and most of this loss is due to cyclones (> 95%). Due to frequent coastal hazards in Bangladesh, poor people are losing their homes and assets. Lands are being eroded, and saline water is also intruding on the coastal land. Many projects on coastal embankments, women empowerment, coastal forestation, and construction of cyclone centers have been completed by BWDB, LGED, DDM, DoF, DPHE and others to protect lives and assets in the coastal districts. Beside these completed projects, many other projects are ongoing with the aid of different governmental and non-governmental organizations. However, Coastal Resilience means building the ability of a community to "bounce back" after hazardous events such as hurricanes, coastal storms, and flooding – rather than simply reacting to impacts. To make the coastal people resilient to the natural calamities in the coastal region, CEGIS has worked with Deltares of the Netherlands in a World Bank funded project titled" Improving empirical evidence and analytical support on investments in coastal resilience in Bangladesh and India". The main goal of this project was to make better-informed decisions for coastal resilience and new innovative approaches and investments based on past experiences. The approaches and experiences were selected based on the criteria provided by Deltares of the Netherlands. After that, to achieve this goal, CEGIS has reviewed and analyzed past and ongoing investments and interventions in the coastal zones of Bangladesh to assess the best practices. CEGIS with Deltares also arranged several workshops to collect expertise experiences. Ultimately, this technical assistance aimed to support the government in improving the quality of resilient investments and improving the DRM service delivery in the coastal zone and developing evidence-based guidance to future investments for the coastal areas of Bangladesh along the Bay of Bengal. It also aims to further enhance coastal resilience and reduce the risk by evaluating past and ongoing interventions in a highly participatory process with the local stakeholders.

Coastal Districts of Bangladesh

Consultation Workshop with World Bank Authorities, Intellectuals, and Deltares

Training and Capacity Building Programs

Sharing of knowledge and capacity building are essential parts of CEGIS's vision and mission. CEGIS therefore organizes training programs as part of different external and internal projects. Several external and internal training programs both national and international were organized during July-September 2021 period.

CEGIS organized a training program for 40 BADC professionals of Mymensingh on GIS, AutoCAD and E-GP. The training was titled as, "Training on E-GP, E-Filling, GIS AutoCAD for Skill Development of BADC professionals", which was organized under the "Mymensingh Division and Tangail and Kishoreganj of Dhaka Division Minor Irrigation" project. This five days long

Cont'd on page 3

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