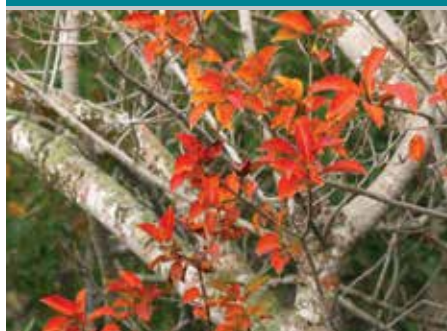




The Gewa Tree is famous in the area for its incredibly vibrant leaves

Upcoming

- ❑ Initiative to Break the Build-Neglect-Rebuild Cycle in Bangladesh's Coastal Polders
- ❑ One Name Shared by Many Streams: Ichamati Rivers Across the Map

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- ❑ Forest Landscape Restoration Training
- ❑ Delineation of Hill Cutting Areas in the Hilly Region of Bangladesh



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the CEGIS NEWSLETTER

Safeguarding Environment for Future

Pioneering River Identification and Conservation Initiatives



An unidentified river in the coastal region of Bangladesh captured through drone

As a deltaic nation, Bangladesh is intricately shaped by its vast and dynamic river systems. These rivers serve as the country's arteries—driving water management, sediment transport, agriculture, fisheries, and sustaining unique ecosystems and biodiversity. However, documenting and conserving these waterways poses significant challenges due to their constantly shifting nature.

To address this, the Bangladesh Water Development Board (BWDB), in collaboration with the Center for Environmental and Geographic Information Services (CEGIS), has embarked on pioneering river identification and conservation initiatives.

The efforts began with publishing the second edition of "Rivers of Bangladesh" in 2011. BWDB and CEGIS utilized high-resolution Landsat

satellite imagery to identify 405 rivers during this project. At that time, rivers narrower than 30 meters were excluded, setting the stage for further refinement.

By 2022, a decade later, advancements in technology prompted the launch of the third edition, which incorporated 10-meter resolution Sentinel-2 satellite imagery and involved GIS-based analyses, field verification, and stakeholder engagement. This latest initiative emphasized the importance of protecting existing rivers, focusing exclusively on flowing waterways while excluding canals, wetlands, and beels. The initiative's guiding motto was "Protecting existing rivers for the future."

The project ensured a robust and accurate data collection through a series of regional workshops that engaged a diverse array of stakeholders—government officials,

Cont'd on page 3

Design, Monitoring, and Supervision Consulting Services for the DPHE Component, Cox's Bazar under Emergency Assistance Project (EAP)

The Department of Public Health Engineering (DPHE) is undertaking a project to enhance water supply and sanitation infrastructure in Cox's Bazar, Ukhiya, and Teknaf, with the support of the Asian Development Bank (ADB). The Center for Environmental and Geographic Information Services (CEGIS) and O.Creeds Ltd. (OCL) provide consulting services for the design review, monitoring, and supervision of this initiative. This project addresses significant water and sanitation challenges due to the influx of displaced Rohingya refugees, the resulting pressure on local infrastructure, and the ongoing drinking water crisis in Teknaf.

Key components of the initiative include a thorough design review and supervision of a surface water-based piped water supply system, which is crucial for ensuring effective implementation and sustainable operation. A pre-feasibility study is currently being conducted to evaluate the feasibility of establishing a water transmission main from Palongkhali to Teknaf Municipality, alongside the conceptual design of mini-piped water supply systems intended for 20 unions within Cox's Bazar District, utilizing solar-powered groundwater sources.

The project further emphasizes the development of water supply infrastructure, which encompasses the construction of transmission pipelines, reservoirs, and treatment facilities to guarantee a consistent and sustainable water supply for both host communities and displaced Rohingya populations. To address sanitation and waste management concerns, the project includes a

review and recommendations for improving integrated waste management facilities in Cox's Bazar Municipality, along with faecal sludge management (FSM) assessments. The initiative adheres to ADB safeguard policies, incorporates community awareness campaigns, and ensures compliance with regulatory standards to promote environmental and social sustainability.



Palongkhali Reservoir, Palongkhali, Ukhiya, Cox's Bazar

Additionally, a long-term operation and maintenance (O&M) framework is being established to secure the sustainability and efficiency of the provided water and sanitation services.

The specific objectives of this study include:

- Comprehensive design review, oversight, and commissioning of the Cox's Bazar water supply system.
- Conducting a pre-feasibility study for a transmission main from Palongkhali to Teknaf Municipality.
- Developing a conceptual design for a rural mini-piped water scheme for 20 unions.
- Assessing integrated waste management and sanitation facilities.
- Ensuring compliance with environmental and social safeguards.

The project is advancing, with several key components at varying stages of implementation. Significant progress has been made in constructing the Cox's Bazar Municipality Water Supply System, including surface water treatment plants, reservoirs, and transmission pipelines, which are nearing completion. However, challenges remain, including land disputes, pending installations (such as the substation for intake and sludge disposal), and final commissioning. For the Ukhiya and Teknaf Water Supply System,

Cont'd on page 4



Field visit of team members near Palongkhali Reservoir

Contract Signing for Different Studies

During the 1st quarter of the year 2025 (January to March), CEGIS has signed notable 5 (Five) contracts with different organizations and clients. The contract titles with clients and dates of signing are given below:

- i) "Initial Environmental Examination (IEE) Study of Submarine Cable Installation" with Summit Communications Ltd. on 19 February 2025;
- ii) "Development of GIS based constituency boundary delimitation tool for the upcoming National Parliament Election" with Bangladesh Election Commission (BEC) on 20 February 2025;
- iii) "Feasibility Study and Detailed Engineering Design for Water Supply and Sanitation for 22 Coastal Towns" with Department of Public Health Engineering (DPHE) on 23 February 2025;
- iv) "Environmental and Social Impact Assessment (EISA) for Ashuganj-Palash Green Project of BADC" with Bangladesh Agricultural Development Corporation (BADC) on 23 February 2025; and

- v) "Engagement of the ICT Support Team for the ICT section" with Bangladesh National Museum (BNM) on 1 March 2025.

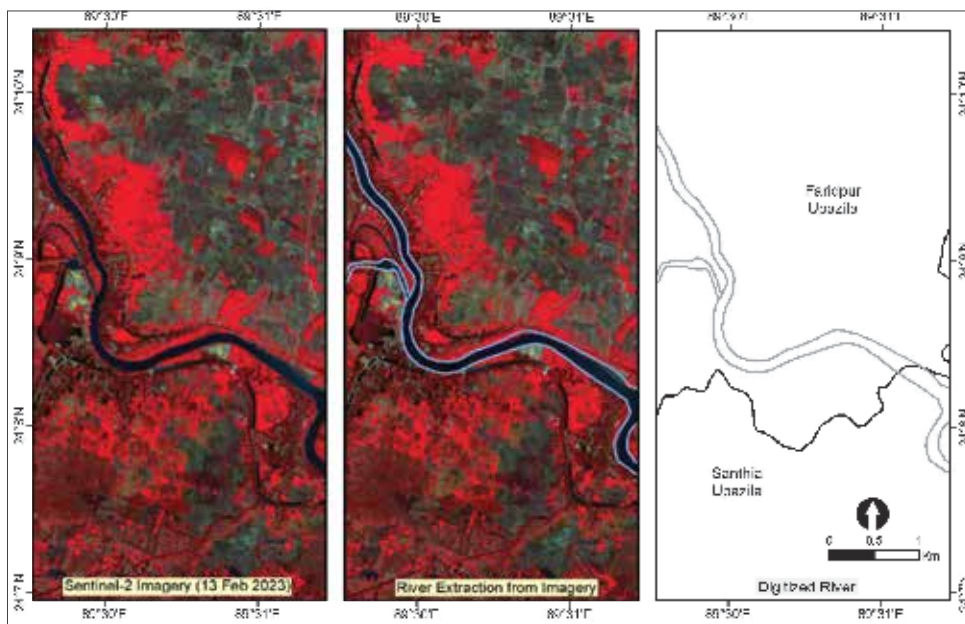


Mr. Md. Shafiqul Hassan, Project Director, Chattogram Hill Tracts Inclusive and Resilient Urban Water Supply and Sanitation Project of DPHE and Mr. Motaleb Hossain Sarker, Deputy Executive Director (Operations) of CEGIS with other professionals from both organization were present in the contract signing ceremony on the Feasibility Study and Detailed Engineering Design for Water Supply and Sanitation for 22 Coastal Towns Project

Pioneering River ... (Cont'd from page 1)

scientists, academics, and environmentalists. A significant outcome was the establishment of a unified national river inventory as a living document, recognizing that future adjustments may be necessary based on ongoing validation.

verified river records, culminating in forming an 11-member national committee to finalize the river list. After addressing discrepancies, a draft list was presented for validation during a national workshop in December 2024. This comprehensive effort resulted in a finalized inventory of 1,415 rivers, set for publication on April 14, 2025, coinciding with the Bengali New Year.



Stream feature extraction from high-resolution satellite imagery

CEGIS' involvement showcases its leadership in environmental research and geospatial intelligence by combining innovative technology with inclusive validation and transparent governance. This initiative sets a new benchmark for the sustainable management of Bangladesh's rivers. Ultimately, this initiative underscores the notion that rivers are living legacies, integral to the nation's history and identity, and emphasizes the commitment to ensuring that every river is recognized and protected for future generations.

Following a directive issued by the Ministry of Water Resources, district-level committees reviewed and

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River, Delta and Coastal Morphology Division*

The Unveiled Beauty of Gewa Trees in the Sundarbans



The aesthetic appeal of the Gewa Tree in the Sundarbans

Nestled within the dense mangrove forests of the Sundarbans lies one of nature's most understated marvels — the Gewa Tree (*Excoecaria agallocha*). Known locally for its strikingly colorful leaves, the Gewa transforms into a spectacle of vibrant hues during the pre-monsoon period. As the temperature drops, its foliage turns brilliant shades of yellow and red, reminiscent of the famed maple leaves. This breathtaking change is primarily due to the decrease in chlorophyll and the presence of anthocyanins, pigments that lend the leaves their deep reds and purples. Carotenoids also contribute by adding a golden tint, amplifying the visual charm of the forest during this time.

Beyond its seasonal beauty, the Gewa Tree plays a crucial ecological role. Its root system is a wonder in itself — adaptive, exposed, and rising above the saline waters of the mangrove terrain. These roots captivate visitors' eyes and stabilize the muddy soil, resisting the erosion caused by tidal flows. In doing so, they help preserve the delicate biodiversity of the mangrove ecosystem by sheltering different crabs.

However, the tree's allure comes with a note of caution. The latex, a milky sap found in its trunk and leaves, is toxic. Contact with the skin or eyes can lead to severe irritation and allergic reactions. Thus, while the tree beckons with its beauty, it demands a respectful distance.

Ecologically, the Gewa is considered a secondary succession species, typically establishing itself after other mangrove trees like Kewra and Golpata have paved the way. As the forest matures and salinity levels decrease, Gewa trees begin to dominate. They thrive along riverbanks and canals, where tidal waters routinely flow, asserting their place in the evolving mangrove landscape.

With an average height ranging from 8 to 15 meters, and sometimes taller in ideal conditions, the Gewa is moderately sized but significantly impactful. Its roots, foliage, and adaptability make it a visual delight and a vital guardian of the Sundarbans' dynamic ecosystem.



The root system of Gewa Tree contributes in reducing soil erosion

*Sbarif Tanver Abammad
Ecology, Forestry and Biodiversity Division*

Design, Monitoring, and Supervision ... (Cont'd from page 2)

Ongoing work includes reservoir and embankment construction in Palongkhali and the installation of pipelines. Yet, the completion of water treatment facilities and household connections is still pending. Technical challenges have also emerged in Teknaf, where water scarcity and contamination continue to prevail. The pre-feasibility study regarding the transmission main from Palongkhali to Teknaf and the conceptual design for mini-piped water schemes are currently underway, involving data collection, hydraulic modelling, and route surveys along roads and embankments. Environmental and social safeguard assessments are conducted to ensure compliance with national regulations and ADB policies. Upcoming deliverables include the Conceptual Design Report for the Mini Piped Water Scheme, progress reports, and the final Pre-feasibility Report. Immediate priorities encompass design reviews, resolving power supply issues, and preparing bid documents for forthcoming works.

The following steps will focus on finalizing the pre-feasibility study for the transmission main, completing the conceptual design for mini piped water schemes in Teknaf, addressing any remaining construction works, and ensuring the commissioning of completed infrastructure. Design reviews, compliance with ADB safeguards, and stakeholder engagement will be prioritised.

The project is steadily progressing towards enhancing water supply infrastructure. Ongoing efforts are being made to resolve technical challenges, optimize resource allocation, and ensure long-term operational sustainability, all aimed at improving public health and resilience in Cox's Bazar and the surrounding areas.

*Md. Atiqur Rahman & Noshin Tabassum Bhuiyan
Water Resources Management Division*

Biennial Transparency Reports: Bangladesh Advances in Climate Governance

CEGIS is actively involved in formulating Bangladesh's first Biennial Transparency Report (BTR1). Following adopting the Paris Agreement at the 21st Session of the Conference of the Parties (COP21) to the UNFCCC in December 2015, signatory countries committed to an enhanced transparency framework (ETF). The ETF aims to improve transparency and clarity and strengthen understanding of countries' efforts to fulfil the objectives of the Paris Agreement.

Under this framework, countries are expected to track and report their progress toward achieving their Nationally Determined Contributions (NDCs) and to communicate adaptation actions. This includes sharing good practices, priorities, needs, and gaps with global stakeholders, as Article 14 of the Agreement stipulates. In addition, countries must submit National Communications (NCs) every four years and Biennial Transparency Reports (BTRs) every two years, beginning in December 2024. The primary aims of the BTR are to monitor emissions reductions, strengthen accountability, and enhance global climate action.

To develop the first BTR for Bangladesh, the Department of Environment (DoE) has initiated a project titled "Bangladesh: Enabling Activities for the Preparation of a

Combined Initial Biennial Transparency Report and Fourth National Communication (BTR1/NC4) to the United Nations Framework Convention on Climate Change (UNFCCC)." The final output will include a National Inventory Report of anthropogenic greenhouse gas (GHG) emissions by sources and removals by sinks. It will also track the progress of implementation and achievement of NDCs and provide information regarding climate change impacts, adaptation, financing,



Consultation meeting with the stakeholders for data collection in DoE Head-Office

technology development and transfer, and the capacity-building support needed and received.

The Department of Environment has entrusted CEGIS with assessing the baseline situation and facilitating actions under the Paris Agreement. CEGIS is already

Cont'd on page 7

Delineation of Hill Cutting Areas ... (Cont'd from page 8)

cutting—a staggering 2,145 hectares across 314 sites. The primary drivers of this extensive hill cutting in Cox's Bazar are largely associated with resettlement efforts and housing construction for Rohingya refugees. Meanwhile, within the Chittagong Hill Tracts (CHTs), the Bandarban district reported the highest level of hill cutting among all analyzed areas, totalling 536 hectares from 816 sites. In contrast, the northern and northeastern hilly regions of the country—such as Jamalpur, Sherpur, Mymensingh, Netrakona, Sunamganj, Moulvibazar, and Brahmanbaria—exhibited minimal hill-cutting activity, generally less than 5 hectares. Exceptions were observed in Sylhet, with 115 hectares of cutting, and Habiganj, which had 48 hectares.

The primary factors contributing to hill cutting encompass various forms of human interference. These include expanding agricultural land, establishing tea gardens, rural settlements, and residential areas. Moreover, the construction of infrastructure such as markets, religious buildings (like Buddhist temples and mosques), socio-economic projects (including stadiums, children's parks, roads, flyovers, rail lines, mobile towers, and filling stations), and educational institutions (primary schools, colleges, and universities) also play a

significant role in driving hill cuts. Other developments like brickfields, Rohingya camps, military installations, police camps, Border Guard Bangladesh (BGB) camps, and graveyards contribute to the pressures on the hilly landscape. Interestingly, natural processes such as landslides also serve as drivers of hill cutting; materials dislodged during landslides are often excavated to facilitate maintenance and construction efforts for communication systems during the rainy season, which occurs from June to August.

Under the study, a web-based Natural Resources Management Information System (NR-MIS) has been developed to enhance management and monitoring, providing geospatial information about hill-cutting areas, including their precise location and spatial coverage, along with insights into the underlying drivers of hill-cutting throughout the hilly regions of Bangladesh. The NR-MIS will serve as a crucial tool for continuous assessment and monitoring, enabling stakeholders to keep a real-time check on the state of forest resources and implement effective management strategies aimed at preserving Bangladesh's invaluable forests.

Rathindra Nath Biswas & Sazun Miah
Remote Sensing Division

Final Evaluation of the ECCCP-Flood Project: Strengthening Climate Resilience in Bangladesh's Flood-Prone Communities

CEGIS has recently completed the final evaluation of the Extended Community Climate Change Project - Flood (ECCCP-Flood) for the Palli Karma-Sahayak Foundation (PKSF) in Bangladesh. This project was designed to address critical challenges such as poverty, water scarcity, and food insecurity faced by communities vulnerable to floods in Nilphamari, Lalmonirhat, Kurigram, Gaibandha, and Jamalpur. Conducted between October 2023 and March 2024, the evaluation followed Global Climate Fund (GCF) guidelines and assessed the project's effectiveness using both quantitative and qualitative methods. A total of 660 beneficiaries and 330 control group households participated in the evaluation.

The project achieved several notable outcomes. It significantly enhanced the capacity of local institutions, enabling them to respond more effectively to climate change impacts. A major success was the widespread adoption of climate-resilient agricultural practices—nearly 90% of farmers incorporated innovative techniques that improved productivity and promoted long-term sustainability. Household-level climate adaptation measures exceeded expectations, as implementing organizations effectively transferred

the baseline to BDT 10,489 (US\$95) in the final evaluation. Additionally, about 94% of households



Public consultation in the project areas

reported no significant economic or non-economic losses with project support, and flood-related deaths decreased dramatically from 120 to just 5.

The project also led to improved access to safe drinking water and better sanitation infrastructure, significantly



Field visit in the project areas

acquired knowledge into practice for the benefit of local communities.

One of the most impactful interventions was the plinth raising of homesteads, which protected people and assets during floods and served multiple functions: safe storage of grains, space for kitchen gardening and income-generating activities, secure sanitation facilities, access to clean drinking water, and reduced disease prevalence. This intervention also fostered stronger social bonds by building a greater sense of neighborhood. As a result, economic losses per household dropped from BDT 34,003 (US\$404) during



contributing to community well-being. Furthermore, its ability to deliver lasting positive change in flood-affected regions through infrastructure development and enhanced livelihood opportunities is among its most remarkable successes. By strengthening local institutions, the project empowered communities to address climate challenges more effectively. Its impact has extended beyond the target locations, positively influencing neighboring areas as well.

Mobasher Bin Ansari
Socio-economic and Institutional Division

Forest Landscape Restoration Training

CEGIS has conducted a three-day long training in Rangamati on Forest Landscape Restoration under the project "Investing in Climate Change Adaptation through Agroecological Landscape Restoration: A Nature-Based Solution for Climate Resilience - 2 Climate Change Risk and Adaptation/Restoration Option Assessment in Bangladesh (53348-001)." This comprehensive study aims to develop, assess, and promote innovative strategies to significantly enhance climate change adaptation initiatives by restoring agroecological landscapes. It focuses on empowering local communities by providing them with the necessary tools and knowledge to effectively restore and manage their climate-resilient landscapes, which are crucial for achieving food and nutrition security.



Orientation in the field and awarding certificates to participants

As one of the core study objectives, an extensive training program on forest landscape restoration was conducted in March 2025. This training targeted the capacity-building of various local stakeholders, including representatives from local governance, farmers, members of indigenous communities, and other relevant parties such as CRLIWM-CHT officers, personnel from non-governmental organizations (NGOs), and civil society organizations (CSOs). The curriculum included in-depth instruction on a range of vital subjects, including advanced agroforestry practices, the identification and cultivation of native tree species, practical strategies for forest fire management, and the establishment of tree nurseries. The training included comprehensive practical demonstrations highlighting

the benefits and challenges associated with agroforestry practices. These sessions focused on how agroforestry can effectively generate livelihoods and income for communities while preserving the health of watersheds and ecosystems.

This 3-day training session was conducted in two batches from 16th to 18th March 2025 at Sabarang Community Center in Rangamati. Representatives from all 3 CHT districts participated in this training session. The training session covered topics such as the basic concept of climate change, hands-on training on climate change risk and vulnerability assessment, good agriculture practice in CHT, selection and identification of site-specific agroecological restoration models,



concept and context of agroecology in CHT and good practice for landscape, application of remote sensing and GIS in forest landscape restoration, soil management and erosion control in CHT, hands-on demonstration on using UAV technology, soil test and water quality test.

The training encouraged collaboration among government agencies, researchers, and local practitioners, enhancing collaborative restoration initiatives. All the participants received a certificate of completion, recognizing their proficiency in forest landscape restoration and climate adaptation strategies.

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Climate Change and Disaster Management Division*

Biennial Transparency Reports ... (Cont'd from page 5)

collecting data on climate change impacts and adaptation measures, as well as information related to financing, technological development and transfer, and the capacity-building support necessary and received. CEGIS is also responsible for compiling and analyzing relevant data about national circumstances, institutional frameworks, legal regulations, implemented measures, plans for adaptation, financial support, technological assistance, and capacity-building.

CEGIS is hosting workshops and consultations across the country involving government agencies, local

organizations, and community representatives to ensure that all voices are heard. These meetings aim to gather input from various sectors, ensuring the final report is accurate and comprehensive.

This initiative is crucial for Bangladesh to enhance its climate governance and respond effectively to climate challenges, demonstrating a commitment to transparency and global cooperation.

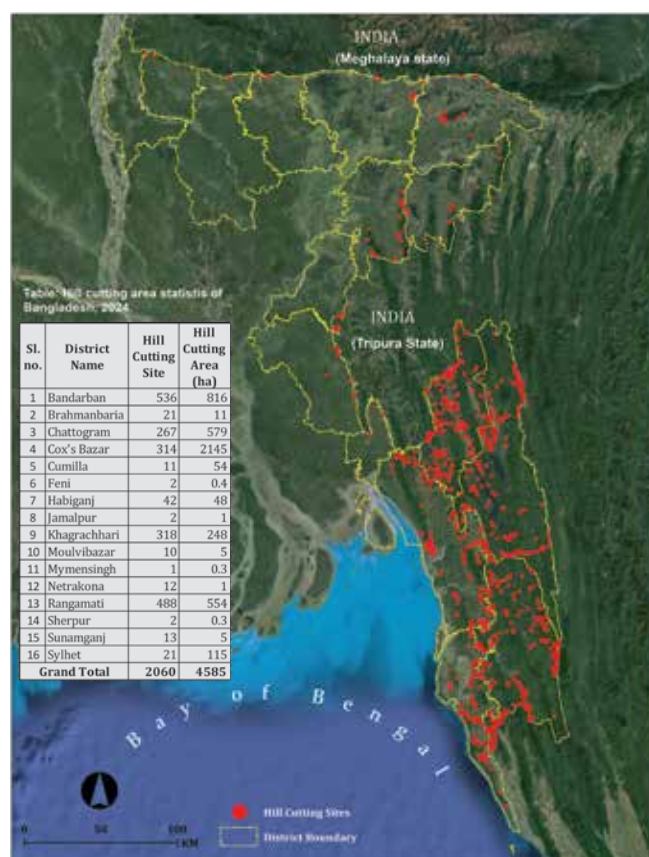
*Arifur Rahman & Md. Tanvir Alam Tarafder
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Delineation of Hill Cutting Areas in the Hilly Region of Bangladesh

The Bangladesh Forest Department, under the Ministry of Environment, Forest and Climate Change, has undertaken a vital initiative to generate comprehensive land cover maps and natural capital assessments. This endeavour is part of the Sustainable Forests and Livelihoods (SUFAL) Project, which seeks to establish integrated and collaborative forest management plans. A critical objective of this project is to accurately delineate hill-cutting areas across the Tertiary Hilly region of Bangladesh. This initiative is essential for protecting and conserving existing hills while fostering the development of advanced environmental management strategies for sustainable forestry.

The Remote Sensing Division of CEGIS has been assigned to delineate hill-cutting areas utilizing high-resolution multispectral satellite imagery from WorldView 3/4, accessible on the Google Earth platform. The spatial resolution of this high-resolution imagery, at 0.3 meters, enables precise identification of land features. The advanced capabilities of satellite imagery, alongside Geographic Information System (GIS) tools and techniques, proved advantageous in delineating hill-cutting areas efficiently; these methods are both cost-effective and significantly reduce the time needed for analysis while producing extensive and accurate results.

The analysis commenced with the optical WorldView 3/4 imagery for 2024, which was utilized to delineate hill-cutting areas. This was achieved through visual interpretation and on-screen digitization techniques



Spatial distribution of hill cutting sites in the hilly region of Bangladesh

throughout the hilly regions of Bangladesh. During this verification process, high-resolution photographs of



Hill cutting area in Lama, Bandarban; (A) Hill Forest Cover in 2012, (B) Hill Cutting for Brickfield from Forest Cover in 2024, and (C) Birds eyes view of UAV to capture hill cutting scenarios in 2024

within a GIS environment. In addition, historical data was incorporated by considering a time series of WorldView imagery spanning from 2004 to 2024. This chronological perspective allowed for the demarcation of previously cut hill areas and the analysis of changes in hill forest cover over time. To ensure the accuracy of the delineated hill-cutting areas, a dedicated team from the Remote Sensing Division conducted ground verification

identified hill-cutting areas were captured using digital smartphone cameras, supplemented by UAVs (Unmanned Aerial Vehicles) to obtain aerial views.

This exhaustive analysis identified an estimated 4,585 hectares of hill-cutting area across 2,060 sites within the Tertiary Hilly region of Bangladesh. Particularly, the Cox's Bazar District exhibited the most significant area of hill

Cont'd on page 5

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