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CLIMATE RESILIENCE

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Editor
Zafar Sobhan

Supplement Coordination
Tasfia Huda
Zora Mohsin
Nafis Shahriar
AHM Mustafizur Rahman
Rubaiyat Kabir

Content Editor
Adiba Bintey Kamal
Magnus Mayeen Ahmed

Exclusive content partner
International Centre
for Climate Change and
Development (ICCCAD)

Graphic Design
Alamgir Hossain

Published and Printed
Kazi Anis Ahmed on behalf of
2A Media Limited

**Editorial, News &
Commercial Office**
FR Tower, 8/C Panthapath,
Shukrabad, Dhaka 1207
Phone: 48116830-31
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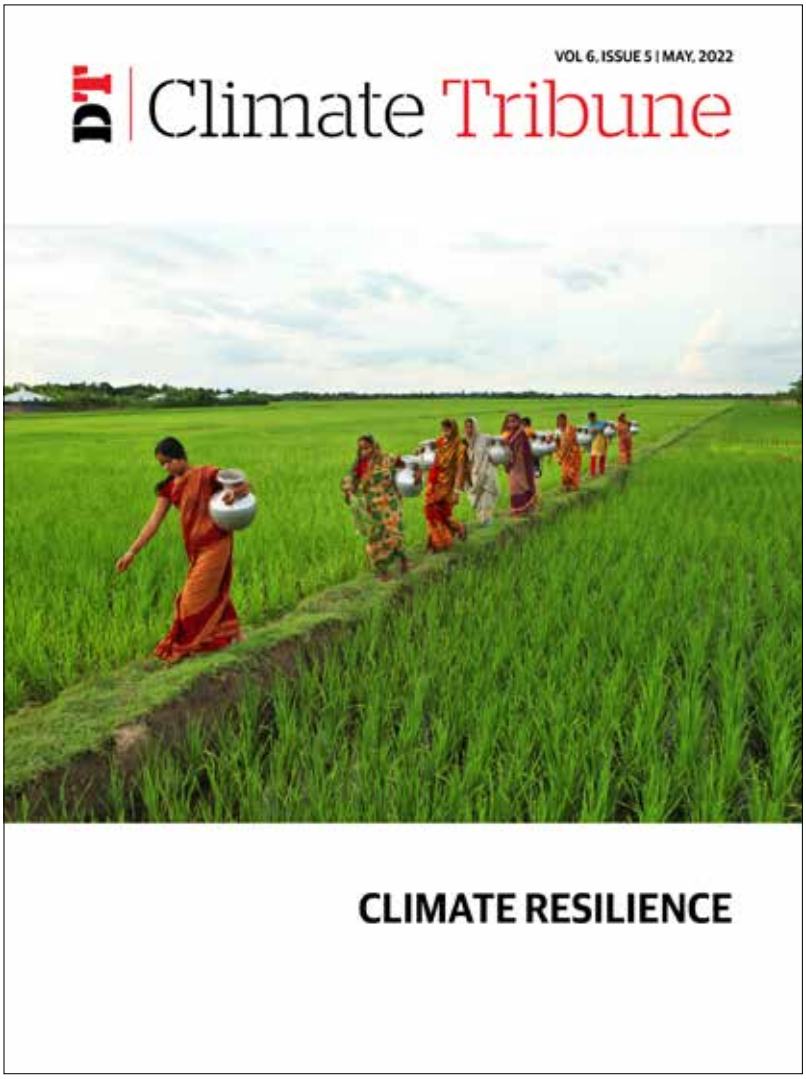
News-48116887 news@
dhakatribune.com info@
dhakatribune.com www.
dhakatribune.com



COVER: DHAKA TRIBUNE

COURTESY

IS BUILDING CLIMATE RESILIENCE FEASIBLE IN A REFUGEE CONTEXT?

THE IMPORTANCE OF CLIMATE RESILIENT FARMING FOR REFUGEES

Susan Nanduddu and Stephen Bright Sakwa

"Water is to adaptation as energy is to mitigation," Prof. Saleemul Huq.

Anyone can become a refugee. Today, the world is witnessing the displacement of four million Ukrainians resulting from the Russian invasion. Just like a war, climate change is a major contributing factor to migration. A 2021 World Bank report predicts that up to 216 ml people could become displaced due to climate change by 2050. Uganda is host to many refugees from neighbouring countries, the majority fleeing from violence in their home countries of South Sudan and the Democratic Republic of Congo.

"Stephen and I spoke to some of the refugees resettled in Uganda's Kiryandongo district, who acknowledged receiving food aid but described it as often insufficient."

To supplement the food aid that the refugees receive from humanitarian support, the Ugandan government offers refugees about an acre of land to farm. While some refugees have taken up rain-fed agriculture, they have not been spared by climate vagaries. Rainfall has become far less reliable, a trend predicted to worsen in the foreseeable future.

The area has also been profiled by the National Risk and Vulnerability Atlas of Uganda as recently as 2019 as being highly susceptible to drought. Cassava and maize, two of the main crops grown, are ranked as very high in their vulnerability to drought conditions, significantly increasing the chances of crop failure. Samuel Acidri, a member of the host community confirms it. "Last year, we lost everything

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> A 2021 World Bank report predicts that up to 216 ml people could become displaced due to climate change by 2050

we had planted during the first season because there was no rain," he says.

Catalytic grants to support the refugees

Climate resilience is the ability to anticipate, adapt, and respond to hazardous events, trends, or disruptions related to climate. Through a catalytic grant award jointly organized by ICCCAD, GRP, and CJRF at the Fifteenth International Community Based Adaptation Conference (CBA15), we set out to train 50 refugees in the Kiryandongo refugee settlement on adopting climate-smart agriculture as one way to supplement the inadequate humanitarian food aid during the COVID pandemic. We were inspired to act by news in the media that showed that food aid had been disrupted by COVID-19, as lockdowns affected supply chains and funding worldwide, meaning refugees were facing hunger and malnutrition.

Climate-smart agriculture, a solution to building climate resilience

Climate-smart agriculture (CSA) is an approach that helps guide actiond to transform agri-food systems towards green and climate resilient practices. To demonstrate the effectiveness of climate-smart practices, we partnered with Global Refugee Initiatives, a local non-governmental organization active in the settlement. A shallow well was constructed before the training to offer water for irrigation. Mulching, irrigation,

agroforestry, integrated pest management, and planting quick growing high value vegetables, were chosen as the relevant climate-smart agriculture practices for demonstration.

Mrs. Gloria Drani Ahmed is a refugee who has been in the settlement since 2014 due to an attack on her home area in South Sudan by rebels. During the first day's theoretical session, Gloria remarked that "irrigation is good, but using which water?" Alas, her fears became a reality during the practical training, when the new shallow well dried up after collecting only 80-litres of water. At least 400 litres were required for the demonstration but water was not available in the well.

Using their knowledge of the area, the participants moved to another shallow well further away, but the same thing happened. Gloria, who lives very close to the demonstration garden, offered water from her well, a product of her husband's own hands. It, too, dried up. It soon became clear that this occurrence was normal. The challenge remained as how the refugees would water their crops during the dry season when the shallow wells dry up?

With less than enough water, the participants wet the ground just enough to seed the vegetable beds and apply mulch material. Every participant engaged in the activities during the demonstration, including fetching water, mulch material, and preparing seedbeds. The experience was a steep learning curve for refugees from the Democratic Republic of Congo, who back home received rain nearly all year, thanks to the country's dense forest cover.

As part of the project, the refugees also received training on the importance of energy-saving through the practical construction of energy-efficient stoves that help reduce deforestation, which is commonplace in the settlement.

Can the refugees do it all on their own?

Building climate resilience among growing vulnerable refugee communities, including Kiryandongo refugee settlement, requires urgent and sustainable action from various actors, including businesses, development partners, and the government. Resilience building in a refugee settlement is possible, but only with anticipatory action and synergies by different actors is required. ■

COURTESY

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Stephen Bright Sakwa is a hands-on practitioner who has supported various communities to apply innovative solutions that enhance farmer resilience and positively impact the climate. He is the Founder of Restoration Safaris Uganda, an ecotour company which invests 15% of its profits in tree planting with smallholder farmers.

Susan Nanduddu is a facilitator for practical actions. Through her organisation, she facilitates multi stakeholder discussions in different formats. She is experienced in identifying good practice and providing visibility for it in the presence of policy makers and other practitioners. Susan is the Executive Director of the African Centre For Trade and Development (Actade).

SOUTH ASIA REGION RESILIENCE HUB BRING LOCAL VOICES VIRTUALLY TO COP26

SNIPPETS FROM THE REGIONAL RESILIENCE HUB AT COP26

MEHEDI HASAN

Celine d'Cruz and Fahad Haider

The Regional Resilience Hub at COP26 was home to the Race to Resilience (R2R) campaign connecting people, communities, organizations, and non-state actors driving climate action. The program was led by hubs from aroundSouth Asia, Latin America, Africa, South East Asia, East Asia, and the Pacific to bring local experience and knowledge on building resilience to impacts of climate. The International Center for Climate Change and Development (ICCCAD)ran the South Asian Regional Resilience Hub supporting local actors to bring their voices virtually to COP26. The objective of the hub was to share best practices, build collaboration, momentum, new opportunities, amplify messages, and setthe direction for future action on adaptation and resilience for COP26 and beyond.

The themes included finance, energy, nature, youth, adaptation and loss and damage, gender, science and innovation, and transport andcities.local activists, researchers, scientists, academia, and policy makers working with rural, urban, and coastal groups were invited to participate. The discussions for South Asia focused on adaptation, energy, nature, and cities.

There were plenty of interesting topics discussed which included waste picker networks and support professionals discussing the development of the greenhousegas emissions calculator 2.1 to measure the contributions of waste pickers to mitigate emissions globally, and Kholi communities from Mumbai describing being caught between land sharks and frequent flooding.

Apart from that, Bangladeshi scientists pointed out that energy and measuring megawatts must go hand in hand with reducing vulnerability.The young professionals present during the discussions shared the clean energy innovation in Biogas plants in the mountain villages of Nepal to build an ecofeminist approach to energy production.

Further during the discussions, NGOs working with women farmers from Maharashtra discussed the value of grassroots action and devolved decision making to build robust locally led adaptation. Women farmers in Maharashtra design, finance, and operationalize practices to produce innovations that reduce the impact of disaster risks to households and communities.

Climate researchers from the region discussed how science, civic diplomacy, technology, and community interventions provide an opportunity for mountain communities across the Hindukush river basin to create a common platform for building resilience against climate change induced water risks.

The case studies from the Indian and Bangladeshi side of Sundarban showed how transboundary research can lead to transformative knowledge and action around gender, livelihoods, natural resource management and social, economic, and ecological relationships.

Asian mega-deltas are a crucial natural resource ecosystems for more than 150 million people. The Living Delta's Hub supports communities to develop their adaptive capacity through continued knowledge exchange, research, and development programs.

> "The discussion on Nature focused on building evidence on nature-based solutions for climate change adaptation"

Recent years have witnessed unprecedented high intensity rainfall leading to flooding of major cities across India and the world. Cities in the Global South lack resilient infrastructure and appropriate disaster risk reduction strategies. The discussion explored the feasibility and technicalities in the development of Flood Early Warning Systems.

Outcomes on adaptation amplified support to community organizations,especially women and youth to lead action, set the climate agenda, and shape policies. Organized communities have the collective capability to find solutions, engage with local authority and influence local actors to improve their adaptive strategies. There was a call for more flexible and direct climate finance to support local adaptation, build local capacity, finance loss and damage and combine local knowledge with regional and global knowledge for mobilizing real change.

The discussion on Nature focused on building evidence on nature-based solutions for climate change adaptation. Case studies from Pakistan, India, Nepal, and Bangladesh

> South Asia is increasingly urbanized, with a growing number of people living in informal settlements in cities, many of whom are climate migrants

highlighted how climate finance is used to build resilience and support community adaptation.There was a call for COP26 to agree to increase investment in local level solutions to most vulnerable communities.

The outcomes on the Nature discussions focused on a balanced quantitative and qualitative approach with a better understanding of institutional and knowledge gaps to improve effective implementation, management, and scaling up of nature-based solutions. Participants discussed the need for a holistic understanding of Nbs, including the socio, ecological, and economic attributes and their outcomes for people, climate, and biodiversity and a more effective communication with policy makers to influence integrated policies. There was an emphasis to incorporate traditional and indigenous knowledge and practices in Nbs' practices and policyand to frame the problem from within the local experience and perspective tohelp design more effective solutions for local communities and protect biodiversity.

On the topic of Energy, young professionals from Nepal shared their experience of using biogas technology to support women in the mountain communities to improve their living conditions. Bangladesh showcased one of the world's most extensive domestic solar energy programs and plans to have 40% of the country's energy from renewable sources by 2041. The 'Mujib Climate Prosperity Plan' marks a journey from climate vulnerability to resilience to climate prosperity.

Outcomes from the energy discussion made a call for an integrated & inclusive policy to create an enabling environment for improving solutions that support women and their entrepreneurship endeavors. Participants emphasized the need to measure and support rural households with incentives, accessories, and financial support through community-based systems. They also highlighted the need to coordinate between public and private sectors for technological improvement and effective service delivery. They stressed the need for the transfer of clean and green technology at an affordable cost to address climate change impact along with ongoing capacity development, training, research, planning, and skill development.

South Asia is increasingly urbanized, with a growing number of people living in informal settlements in cities, many of whom are climate migrants. Cumulative effects of poverty compounded with climate risks such as flooding, landslides, and heat stress increases vulnerability and creates food shortages, increasing food prices, and vulnerability. Case studies from waste picker groups in Bangladesh, India, Kenya, France, and Argentina show how the newly developed GHG Emissions tool 2.0 can measure their contribution to the carbon footprint reduction by waste pickers globally.

With increasing numbers of climate migrants and floating populations moving to cities, there is a need for data forcities to be able to respond better. The relationship between the formal and the informal city often explains how well the city adapts or does not adapt to a climate crisis. There is a call for urban development plans to consider climate risks to reduce loss and damage and build robust early warning systems backed by science and technology to reduce risks for the most vulnerable parts of the city and the rest. ■

Celine d'Cruz started her career working with migrant families living on the streets of Mumbai, through her NGO, SPARC. As a founder member of Slum Dwellers International (SDI) she spent most of her professional time supporting urban poor federations in cities of Africa and Asia. Celine is a visiting researcher with ICCCAD and supported the South Asia region virtual resilience hub at COP26.

Fahad Haider is a Renewable Energy Expert and currently works as a Research Officer at ICCCAD. He completed his Bachelors in Electronics Engineering as an international scholarship recipient at Macquarie University, and Masters in Renewable Energy from the University of New South Wales, Australia. He also supported the South Asia region virtual resilience hub at COP26.

BANGLADESH DELTA PLAN 2100 YOUTH ACTION TRACK

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Climate Tribune Desk

Bangladesh Delta Plan 2100 (BDP2100) Youth Action Track (YAT) is a program designed by Wageningen University (Netherlands) and the International Center for Climate Change and Development (ICCCAD), funded by the Netherlands, to link Bangladeshi young professionals to the BDP2100. Youth were connected to professionals and practitioners working on BDP2100 through dialogue and seminars, and were stimulated to contribute their suggestions and questions related to BDP2100, on agriculture, as well as urban, river and coastal topics.

The four month long YAT program kicked off in October 2021, after which youth received training sessions that included multiple assignments and group work activities. Participants not only enhanced their understanding of BDP2100 but were also trained to present and link BDP2100 to their own ideas and work. YAT representatives successfully participated at Gobeshona International Conference 2022 on 28th March to share their experience. At the Bangladesh Delta Plan 2100 International Conference, the YAT took part in the Youth Panel on May 26, 2022 along with experts about their ideas in relation to BDP2100 and discussed how the youth can be more involved. Also, YAT were selected to speak at the regional Asian Youth Adaptation Forum from the Global Center of Adaptation (GCA) on May 31, 2022, hosted in collaboration with ICCCAD.

“The four month long YAT program kicked off in October 2021, after which youth received training sessions that included multiple assignments and group work activities”

Side-event of Youth Panel Dialogue at BDP2100 International Conference

The Youth got the opportunity to share their ideas, questions and proposals to policymakers at Bangladesh Delta Plan 2100 International Conference. There were a number of responses and solutions, which were found through the dialogue session.

Here are some of the participants speaking about their experience:

Youth Action Tract Participants

Prantor Kumar Mondal
Research Student

The Bangladesh Delta Plan (BDP) 2100 is a long-term vision of the likely changes and interventions required to make the Bangladesh Delta safe by the end of the twenty-first century. I am extremely interested in working in the field of urban green infrastructure development. We require sustainable urban gardening as well as investments in green infrastructure. Gardens in our homes, balconies, and rooftops not only make our city green but will improve the health and well-being of people and address climate change issues. Covid-19 recovery plans offer a great chance to scale up nature-based solutions in cities in ways that protect, conserve, and restore our ecosystems and the services they provide. If I could talk to others about this problem and realistic, doable solutions, we could learn from each other.

Maria Mehrin
Student

Recently, the role of youth in the development of Bangladesh has been acknowledged significantly. However, there is no established platform at the government level where youth from all walks of life could go, share thoughts and contribute to the development of the country from their place. My message is to build an inclusive platform where youth will have regular interactions with policymakers.

> "The National Delta plan should prioritize Nature-based solutions in river and flood management over other technical measures and youth can be involved in implementing, monitoring and disseminating the policy to the local community"

Abdullah Eusuf Shishir
Postgraduate Student
Dept. of Urban and Regional Planning,
Jahangirnagar University

Bangladesh Delta Plan 2100 is a commitment for the future and for sustainability. A guideline for the coming plans and policies that will ensure the continuous progress in coming years. We take pride in our participation in Youth Action Track. All economic and spatial plans and policies should be aligned with the goals of BDP2100. Thus practitioners, policy makers and students should be given priority and opportunity to participate, so as to increase trust and transparency on BDP 2100.

Md Arif Chowdhury
Lecturer, Department of Climate and Disaster Management
Jashore University of Science and Technology

Every year, people are facing extreme effects of disasters on their life and livelihood, while income sources are damaged due to the change in climatic variables like temperature, and rainfall. To cope with the poverty and changing climatic scenarios, people are trying to involve themselves in different kinds of occupations or in some cases small-scale businesses. Besides, all over the world, different actions regarding business are facilitated under the climate change scenarios, while climate-friendly business plans should be initiated. Also, to improve the strength of vulnerable communities, it is highly important to ensure the engagement of youths in income generation activities, which will help to improve the socio-economic condition and decision-making aspects.

Faisal Mahmood
Program Officer
Pure Earth

What modern technologies and adaptive approaches including nature-based solutions can be taken for the future with climate change in consideration or what model can we follow to improve river management in BDP 2100? How can youth be integrated in the process?

The National Delta plan should prioritize Nature-based solutions in river and flood management over other technical measures and youth can be involved in implementing, monitoring and disseminating the policy to the local community. The socio-economic balance and development of the community can be assessed through youth and it will be easy to prioritize the plans and implementation programs.

Local technologies should be encouraged and regulated in small-scale projects. In many projects, there were some pilot strategies undertaken like Bamboo bandals to protect river-bank erosion, Jute mattress-based embankment slope protection, Vetiver plantation, building cross dams by auto dredging every flood season and dredging to improve navigation. These schemes should be regulated and monitored more efficiently and an NBS database or forms can be created to assess the advantages for the future and youth can be a huge resource in the process.

Ludmila Khan
Undergraduate Student
University of Dhaka

To make sure that Bangladesh properly utilizes its demographic dividend, there is no alternative to giving the stage to youths from all communities so that they can voice their needs as an active agent of change - a change that is very much needed to achieve a prosperous, resilient delta that leaves no one behind.

Md Saiful Islam
Research Student

The engagement of young people in Bangladesh Delta Plan 2100 (BDP2100) is crucial to raising awareness and making changes to youth-related issues and demanding change. It recognizes that young people play active roles as agents of positive and constructive change and helps them to achieve BDP2100.

The future of Bangladesh and our planet lies in our hands. It also lies in the hands of today's younger generation who will pass the torch to future generations. We are the youth who are looking forward to the proper development and progress, which will be for all of us to ensure and make an easier and more successful journey on BDP2100.

Md Amzad Hossain
Program Officer, Youth Mobilization Unit
The Hunger Project Bangladesh

I express my sincere gratitude to all of our BDP2100-YAT members for their immense contribution to the knowledge cooperation and support for capacity building of youth to the implementation of BDP2100. I have come to realize from the journey with BDP2100- Youth Action Track that the BDP2100 is a gift from our current generation to future generations. And this dream will come true when the full spectrum of young people of Bangladesh is included. There is a need to mainstream inclusive youth participation: impoverished young people, gender minorities, young people with disabilities, refugees, ethnic minorities and others in the policy and climate action landscape.

Dr Md Wasif E Elahi
Independent researcher and Casual Academic
University of New South Wales, Canberra, Australia

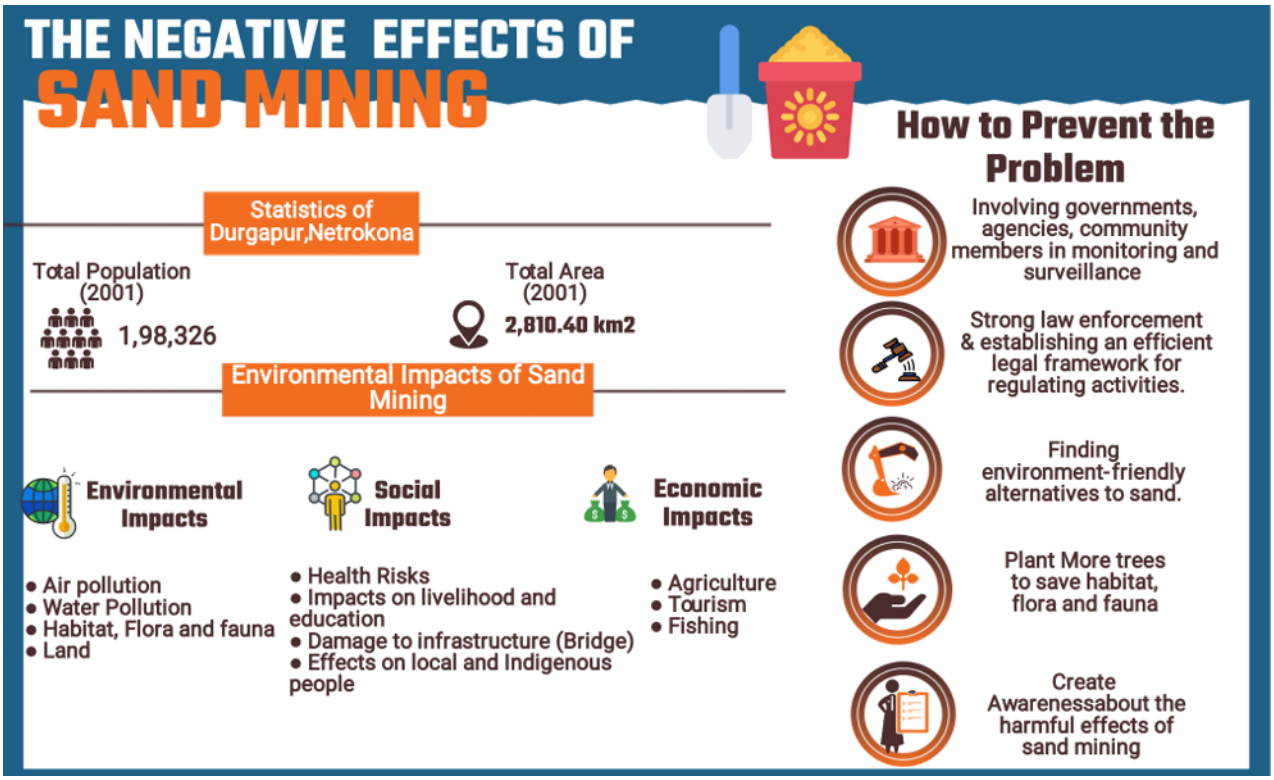
Youth is the future of our country. They are already involved in different activities at different levels for the development of Bangladesh. As BDP-2100 is one of the detailed plans for the future generation by the Government of Bangladesh, the young generation should be involved in different activities of the BDP-2100. The Youth Action Track (YAT) is the first step to including youth in action and nourishing new ideas for the betterment. Like me, many young Bangladeshi researchers work on the Bangladesh delta in different fields worldwide. They would be more than happy to do something for beloved Bangladesh based on their expertise. I hope our policymakers and high officials will create more opportunities for youth to involve and contribute to different projects, including the BDP-2100.

Nahin Rezwan
Intern,
French National Centre for Scientific Research (CNRS)

Ganges-Brahmaputra-Meghna The Delta is an incredibly dynamic region for its tectonic and geographic location. Subsidence is making this region more vulnerable and exposed to many natural disasters. It is found in previous studies that excessive ground-water extraction results in significant land subsidence in the megacities of Bangladesh. We must formulate a sustainable plan and execute it to reduce the anthropogenic impacts on land subsidence. BDP2100 is a revolutionary step taken by the government of Bangladesh with the collaboration of international (research) organizations. As stakeholders, we should each play our role individually to accomplish all the goals of BDP2100. ■

THE UNTOLD ENVIRONMENTAL CATASTROPHE THAT IS BEING CAUSED BY CONTINUOUS SAND MINING

SAND MINING - THE SILENT KILLER OF ENVIRONMENT



Fatema Akhter and Dr Mizan R Khan

Sand mining can be regarded as a silent threat to the global ecosystem, having a significant impact on climate change, if it is not done appropriately. Unsustainable sand mining could result in riverbank collapse, deepening of river beds, sinking deltas, and coastal erosion as well as biodiversity loss, especially when coupled with the impacts of dams and climate change. Illegal, indiscriminate, and unscientific sand mining wreaks havoc on Bangladesh's ecosystems. Rapid urbanization in Bangladesh increases the demand for sand in the construction and ceramics industries. Thus, sand mining is a lucrative business, which if not done in a regulated manner, can encourage illegal extraction. The entire sand mining is supposed to be regulated by law. Illegal sand mining is an offence under the Sand Quarry and Soil Management Act, 2010.

As per the law, the govt. prohibited sand quarrying within a kilometer of bridges, culverts, dams, barrages, embankments, highways, rail tracks, residential areas, and other important structures. A particular miner is given a certain part of the river for sand mining purposes. But what happens is in most cases they are going much beyond the leased-out area and extracting sand from parts of the river that have not been leased out. Sand lifting without permission from the authority is also prohibited by this law. This is astonishing to see there's hardly any monitoring at the local level. As a result, the entire river ecosystem is bearing

the brunt of unregulated sand mining. This law has failed to regulate illegal and excessive sand mining, which has a negative impact on the environment and human lives.

River sand is preferred for construction because it requires less processing and has better quality than other sources. However, it comes at a massive cost to the river and those living around it. There is hardly a single house, road, bridge, or port in South Asia whose builders can claim to have constructed it entirely from lawfully procured sand.

A recent visit to the district of Netrokona revealed the horrible condition of the Someshwari river. Compared with the past conditions, the place now appears deserted. The Someshwari River is close to extinction as it is possible to physically walk over the river, which once had a sufficient flow of water all year round. The river was shallow during winter but full to the brim in monsoon. None of this exists anymore. Sand mining impacts tend to be felt quite locally. Then the question is globally, why does this matter? As you scale from that and think about it more collectively, concrete uses cement, cement production uses vast quantities of CO2. So, this whole industry is exacerbating climate change.

The Someswari River originates from the Garo Hills of Meghalaya, situated at the Indo-Bangladesh border. The river eventually flows into Bangladesh through the Durgapur Upazila of the Netrokona district. This location is well-known for several historically significant events. This Upazila witnessed several notable uprisings, including the Garo uprising, the Hati Khedauprising insurrection, the Tangka uprising, and the Tevaga rebellion. Indigenous peoples and other marginalized groups led these historical uprisings in protest against the oppression and exploitation of the elites.

This Upazila is home to numerous indigenous Garo, Hajong, Hodi, and Barman peoples, whose approximate population remains unknown due to the unavailability of segregated data for indigenous peoples. Traditionally, people in the area have made their living from agriculture, weaving, fishing, and running small businesses.

The introduction of sand mining has resulted in employment among the local communities. However, the adversities significantly outweigh the positives. Sand mining disrupts and eventually eliminates habitat in mined zones. It changes the channel shape, physical habitats, and food webs - in other words, the entire ecosystem. Additionally, it raises the flow velocity, disrupting the flow regime and eventually eroding the river banks.

The ultimate manifestation of the impact of sand mining on the ecosystem can result in:

1. Channel widening causes streambed shallowing, resulting in braided flow or subsurface inter-gravel flow in riffle places, impeding fish passage between pools. As a result, fishing has become a non-feasible means of living in the community.
2. As a result of solar radiation exposure, the riverbed becomes dry, depleting the surface and groundwater. As a result, the river has gradually stopped becoming a source of fresh water for the local communities.
3. Sand depletion in streambeds results in the deepening of rivers and estuaries and the expansion of river mouths and coastal inlets. In addition, it results in the infiltration of saline water.
4. Vegetation removal and soil profile degradation worsen the habitat above and below ground, resulting in a decline in faunal populations.

“The introduction of sand mining has resulted in employment among the local communities”

The sand mining in Netrokona has resulted in ecological disaster, jeopardizing the livelihoods of Hajong, Mandi, and other ethnic groups, destroying hills, forests, and wildlife, polluting water and air, and threatening food security. The roads are deteriorating, and the extraction causes increased noise and air pollution. This area has deteriorated to the point of being uninhabitable. The indiscriminate extraction has produced a deep gorge, resulting in landslides in the area, occasionally killing community people. According to

residents, illicit sand mining from rivers and wetlands is carried out with the cooperation of elected public leaders. Construction companies use heavy machinery to collect sand from rivers, causing damage to the riverbed and the farms that line the banks. Illegal sand extraction intensifies riverbank erosion throughout the year. The sand is not only taken for construction purposes but is utilized to fill in wetlands as a precursor to land-grabbing. Sand lifters fondly refer to the collection from sand mining as raw gold as it is inexpensive to extract but fetches a high price.

> “A worldwide framework could include international rules and enforcement measures, such as a licensing system that discourages sand, monitoring systems, and environmentally friendly technologies”

Policymakers continue to disregard the adverse impacts of sand mining while the general public is unaware of the operations' large-scale environmental impact. Establishing a global mechanism to monitor sand mining and its consequences cannot be overstated. Before authorizing sand mining, rigorous scientific and environmental impact evaluations should be conducted. Additionally, increased efforts are needed to push governments to improve existing laws and adopt new regulations when necessary. These strategies should consider how to avoid prioritizing short-term gains over long-term gains and how to incorporate environmental considerations into decision-making. Finally, it is necessary to establish an international framework for sustainable sand mining. A worldwide framework could include international rules and enforcement measures, such as a licensing system that discourages sand, monitoring systems, and environmentally friendly technologies. Such a strategy will likely require significant funding from the governments and businesses most involved in sand development to realize the anticipated benefits. Finally, active steps should be focused on four areas to mitigate the negative environmental impacts of sand mining activities:

1. Educating the public about the harmful effects of sand mining to increase awareness of associated environmental issues
2. Involving governments, agencies, and community members in monitoring and surveillance activities to identify potential threats to the environment caused by sand mining activities
3. Establishing an efficient legal framework for regulating sand mining activities and reducing or preventing illicit mining activities
4. Reducing sand mining and finding environment-friendly alternatives to sand. ■

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Fatema Akhter is working at the International Centre for Climate Change and Development (ICCCAD) as a Junior Research Officer. Her research interest lies in Child-centric adaptation, indigenous knowledge & climate change, and gender-based development. She can be reached at fatema.akhter@icccad.org

Dr Mizan R Khan is the Deputy Director of International Centre for Climate Change & Development (ICCCAD), and Programme Director of LDC Universities' Consortium on Climate Change (LUCCC). He can be reached at mizan.khan@icccad.org

THE URBAN CLIMATE CHANGE CONUNDRUM

DHAKA TRIBUNE

Kazi Taiba Bari Nowsheen

One of the fundamental cornerstones of progress of a country is urbanization. The term "urbanization" is closely linked to the term "development". Bangladesh has a high urbanization rate (Ahmed and Ahmed, 2017), and it is visible that the country is rapidly developing. The transition from an under-developed to a developing country was not easy. However, these advancements came at a price. Change in temperature is one of the outcomes of that price.

The climate of Bangladesh was not the same half a century ago. In recent years, there have been considerable temperature fluctuations. During the last few years, Bangladesh's weather has been rapidly altering, reaching a critical point. Between the years of 1976 to now, Bangladesh has had an average temperature increase of 0.5°C. The rise in maximum temperature has not been consistent throughout the country. For example, maximum temperatures in the eastern portions (Chattogram and Sylhet divisions) of Bangladesh rose by 0.9°C, compared to a 0.5°C rise in the central parts spanning Dhaka and nearby districts. As a result summers are elongated, winters are warmer, and the monsoon is becoming increasingly unpredictable.

Rapid urbanization creates a significant impact on urban land use and land cover , increasing the land surface temperature. Land use and land cover fluctuations are intimately linked to variations in land surface temperature and the intensity of Urban Heat Islands (UHI). The UHI phenomenon is caused by the fact that urban regions have greater air and surface temperatures than rural and suburban locations. The UHI effect arises as buildings, roads, and infrastructure absorb heat, causing temperatures in urban areas to be 1 to 7 degrees Fahrenheit hotter than in outlying areas. Although the impact is greater during the day, the slow release of heat from infrastructure overnight can keep cities substantially hotter than surrounding locations.

Heat waves work as one of the indications of climate change in urban settings. When the daily maximum temperature in a large area exceeds 36 degrees Celsius, a heat wave occurs.

Considering Bangladesh's major districts have growing populations and often lack the capacity to control the effects of rapid urbanization, an increase in urban temperature has both direct and indirect effects on the people. The heat wave has covered the entire divisions of Dhaka, Rajshahi, and Khulna. The maximum temperature was recorded at 41 degrees Celsius this year in the country.

Urban areas are already warmer than surrounding non-urban areas due to the heat island effect, people living in cities are at a higher risk of being affected by heat waves. Heat waves and heat exposures both have their negative consequences on human health. Heat waves can be lethal, especially for those who engage in outdoor activities in direct sunlight without properly hydrating. Due to a lack of water availability throughout the summer days, pollutants in the water become concentrated, and as people consume more water during this period, many water-borne diarrheal diseases emerge. In addition to that the body's cooling function is also hampered by humid air, which slows perspiration.

"Urban areas are already warmer than surrounding non-urban areas due to the heat island effect, people living in cities are at a higher risk of being affected by heat waves"

Increased urban population is another element that contributes to rising urban temperatures. People are migrating from rural areas to urban areas in search of a better future and like any other developing country Bangladesh's urban populations are seeing a significant increase in the number of migrant dwellers. The growth of the urban population is primarily due to rural-to-urban migration and the majority of migrants are rural poor who seek refuge in slums, squatter camps, footpaths, train stations, and other dispersed locations. The urban environment is being impacted by this rural-urban shift.

A livable city should contain at least 25% greenery of its total area but in the case of Dhaka, it barely has 5% due to not only lack of regular plantation and care of existing ones but also to accommodate the city's growing population. It is undeniable that rural climate adaptation is required, as the effects of climate change in rural areas are considerably more obvious than those in urban areas. However, adaptation measures in urban areas are also necessary since the impact of climate change may not be instantly evident but it is progressively impacting the urban environment. The rising temperatures in recent years have demonstrated that if we do not take the essential steps now, it will be impossible to live in these areas in upcoming years. People, ecosystems, and the economy are all at risk as a result of rising temperatures across the country.

Urban areas are already warmer than surrounding non-urban areas due to the heat island effect, people living in cities are at a higher risk of being affected by heat waves. Heat islands will become more pronounced in upcoming years as urban population densities rise and natural land areas decrease. For heat stress management, Nature-based solutions (NbS) can play a pivotal role in the country's heat action strategy. NbS solutions like "Blue and Green Infrastructure" offer cost-effective solutions to reduce the impact of heat waves and urban heat island effect. Blue-green infrastructure refers to the use of blue features in urban and land-use design, such as rivers, canals, ponds, wetlands, floodplains, and water treatment facilities. And as green elements, trees, forests, fields, and parks are included. Communities may address and respond to some actions, for example green infrastructures like green roof, vertical greenery which can minimize heat island temperatures and lessen city people's exposure and vulnerability to climate change impacts. Planting trees like Eucalyptus, Sissoo, and Akashmoni throughout the country's periphery was proven to be a wrong decision in the past, as these trees were planted as fast-growing, shady trees with commercial value, but the thirst of their roots and their ability to cause a decline in the underground water level was overlooked. So, it is also essential to plant adequate trees that have the intended effect of decreasing heat in the atmosphere and providing environmental benefits.

For instance, Debdaru tree, also known as False Ashoka , is an excellent source of air purification. The heat exposure in the atmosphere can be reduced by planting more of these trees along the roadside. As blue infrastructure, it is also necessary to preserve the remaining water bodies like lakes and wetlands etc in the urban area. Water bodies in an area are responsible for potential cooling by evaporation, which reduces the heating effect. As the frequency, severity, and duration of heat waves are expected to grow as a result of climate change, it is essential to implement adaptation measures as soon as possible; otherwise, focusing solely on development may jeopardize the survival of humanity. ■

Kazi Taiba Bari Nowsheen is working in the International Centre for Climate Change and Development (ICCCAD) as a research intern, her research interest lies in Climate Change and DRR. Can be reached at nowsheenbari@gmail.com

ENSURING EQUITY AND JUSTICE TO MAKE THE INDIGENOUS COMMUNITIES CLIMATE RESILIENT

A REFLECTION: THE LIFE AND LIVELIHOOD OF THE GARO AND HAJONG COMMUNITIES RESIDING IN BANGLADESH

DHAKA TRIBUNE

Savio Rousseau Rozario, Afsara Binte Mirza and Fatema Akhter

Climate change is a global concern in today's time, and its impact on the vulnerable population such as women, children, indigenous people, and people with disabilities (PwD) exacerbates their existing social and economic challenges. For instance, the indigenous communities are more susceptible to extreme weather events compared to the non-indigenous groups as many of them live in climate-sensitive areas, and depend much more on natural resources for their survival.

In Bangladesh, around fifty-four different indigenous communities are living across the country. These communities make up 1.8% of the total population of the country, with a higher concentration in the remote areas of Chittagong Hill Tract (CHT).

"Our study finds both these two regions are experiencing extensive heat and arid drought-like conditions, and erratic rainfall, leading to extreme groundwater depletion. The scarcity of groundwater impacts the agriculture and crop production of these regions; undermines animal and livestock productivity; disrupts water sanitation and hygiene (WASH) facilities and women and girls' menstrual hygiene management, and minimizes fisheries' yield"

Our recent study with Cambridge Global Challenges (CGC) in the greater Modhupur and Netrokona region focused on the livelihood and climate resilient practices of Garo and Hajong indigenous communities. The Garo and Hajong communities are two major indigenous communities of Bangladesh, residing in the Central North, and North Eastern territories of Mymensingh, Sherpur, Tangail, and Netrokona region. Agriculture is the prime livelihood for both these indigenous communities, where the Garo community are mostly involved in pineapple, and banana cultivation. On the other hand, the Hajongs cultivate paddy and work as day laborers to earn their living.

Our study finds both these two regions are experiencing extensive heat and arid drought-like conditions, and erratic rainfall, leading to extreme groundwater depletion. The scarcity of groundwater impacts the agriculture and crop production of these regions; undermines animal and livestock productivity; disrupts water sanitation and hygiene (WASH) facilities and women and girls' menstrual hygiene management, and minimizes fisheries' yield. Additionally, Garo and Hajong communities' health and well-being are being impacted by rising infectious diseases, illegal sand extraction, and heat stress conditions. They are also potential victims of systematic discrimination and social, political, and economic exclusion. As a result, it becomes difficult for the Garo and Hajong indigenous communities to receive benefits from public investments, access justice, and participate in the decision-making processes. Therefore, the legacy of inequality and overall exclusion makes the communities more susceptible to the natural disasters and impacts of climate change.

As the formal ownership of the land of the indigenous communities in Bangladesh is yet to be recognized (IWGIA, 2022), many Garos and Hajongs cannot claim the ownership of the land in which they have been living for centuries. Moreover, land acquisition in the name of development and promoting tourism jeopardizes the situation from bad to worse. All these factors limit their agricultural practices, and oftentimes they end up working as day laborers and earning little to ensure their livelihood. However, it is found that indigenous agricultural practices tend to be more sustainable and beneficial for the ecosystem. One of the Garo leaders opines, 'For centuries our ancestors maintained a bond with nature. As nature takes care of us, we also take care of Her too. But everything is changing now...'

The Shal Forest of Modhupur, which is a vital carbon sink for the area and once the survival toolkit for the Garo communities, is being exploited. Invasion of alien tree species such as Acacia tree (Acacia auriculiformis) is being introduced to replace the Shal (Shorea robusta) trees for earning more profit out of timber as it grows faster. Such a measure is unbalancing the whole natural ecosystem,

as the Acacia tree is turning out to be unsuitable for the local topography; being poisonous for birds and insects; impacting the overall ecosystem, and leading to health issues such as itchiness for the skin.

However, Garo and Hajong communities' indigenous and traditional knowledge helps them to safeguard nature and benefit their own wellbeing through practicing ethnomedicine; developing early warning techniques; practicing crop rotation, and homestead gardening. Their wisdom maintains balance and promotes respect and harmony between humans and the natural world, especially regarding resource utilization. These traditional techniques strive to have a little environmental impact and promote self-sustaining ecosystems and biodiversity.

Since, the majority of the Garo and Hajong communities reside in remote areas, without proper access to smooth internet services, well-built roads, and easy transportation services, modernized educational institutions are at a higher risk to be eliminated from the labor force participation and have minimal contribution to the country's GDP. Hence, their basic rights and participation in decision-making activities should be ensured, through proper investment and capacity building.

As the intensity and frequency of extreme weather events are anticipated to rise in the future, it is also crucial to establish a repository that will capture the cultural and indigenous values of Garo and Hajong communities, so that they can help their future generations to adapt to the impacts of climate change. Their traditional knowledge relies on nature-based solutions (NbS) which are passed down through generations, and it can effectively contribute to local, national, and global adaptation methods. Their time-tested techniques should drive policy decisions and be incorporated into adaptation frameworks alongside indigenous peoples' rights mandates.

In this regard, the eight criteria of nature-based solutions could be used to increase the accountability and participation of the Garo and Hajong communities. For instance, criteria five, six, and eight specifically mention upholding the rights of Indigenous Peoples to Free Prior and Informed Consent (FPIC); respecting their rights and access to resources, and ensuring full participation in the governance process. While, the eight principles of Locally-led Adaptation can be utilized for making the indigenous communities better decision makers by investing in local institutions for their capacity building; disseminating information about climate risks in local languages; collaboratively working with donors, INGOs, NGOs, private sectors, academicians, schools and colleges. Besides, recognizing the urgency of incorporating traditional and indigenous knowledge with the scientific tools and technologies will also be an important step to increasing the participation of indigenous communities to become future climate champions. All these measures can certainly and eventually help the indigenous communities to raise their voices, create an exposure, and ensure their rights, justice, and equity.■

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Savio Rousseau Rozario is currently working at the International Centre for Climate Change and Development (ICCCAD) as a Junior Research Officer. He can `be reached at savio.rozario@icccad.org

Afsara Binte Mirza is working as a Junior Research Officer at ICCCAD. She can be reached at afsara.mirza@icccad.org

Fatema Akhter is working as a Junior Research Officer at ICCCAD. She can be reached at fatema.akhter@icccad.org

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