



Locally Led Adaptation to Climate Change: LoGIC Results of Adaptive Infrastructures 2020-2021



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2020-2021



Local Government Initiative on Climate Change (LoGIC) Project
Local Government Division (LGD)
Government of the People's Republic of Bangladesh

FOREWORD



This publication is being released at a time when the whole world, including Bangladesh, is struggling to recover from the onslaught of new variants of Covid-19. Of course, recovery from the pandemic offers the nation a historic opportunity to empower climate-vulnerable people, especially women, youth, children, people with disability, displaced people; reduce socio-economic inequality; build capacity and increase finance at the local level; and provide local communities with greater control over their adaptation to the changing climatic conditions.

The LoGIC initiatives foster improvement of local governance processes, strengthen capacity, and institutional development by offering simpler modalities to access more predictable and long-term funding horizons, and thus enable local communities to implement adaptation actions effectively. The LoGIC project applies a comprehensive technique of mapping climate hazards that integrates scientific modeling-based data with local knowledge to support informed adaptation decision-making.

I am hopeful that this work will surely enhance the ability of adaptation at various levels in Bangladesh.

A handwritten signature in black ink, appearing to read 'Sobur Hossain', with a long, sweeping horizontal line extending to the right.

Sobur Hossain

Joint Secretary, Local Government Division
National Project Director, LoGIC

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Photographs : LoGIC Project Archive

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ACRONYMS

| | |
|--------|---|
| ATM | Automated Teller Machine |
| CRF | Climate Resilience Fund |
| EU | European Union |
| LGD | Local Government Division |
| LoGIC | Local Government Initiative on Climate Change (Project) |
| NbS | Nature-based Solution |
| PBCRG | Performance-based Climate Resilience Grant |
| RRAP | Risk Reeducation Action Plan |
| RWHS | Rainwater Harvesting System |
| UNCDF | United Nations Capital Development Fund |
| UNDP | United Nations Development Programme |
| UNICEF | United Nations International Children's Emergency Fund |
| UP | Union Parishad |
| UV | Ultra Violet (Ray) |
| WASH | Water Sanitation and Hygiene |

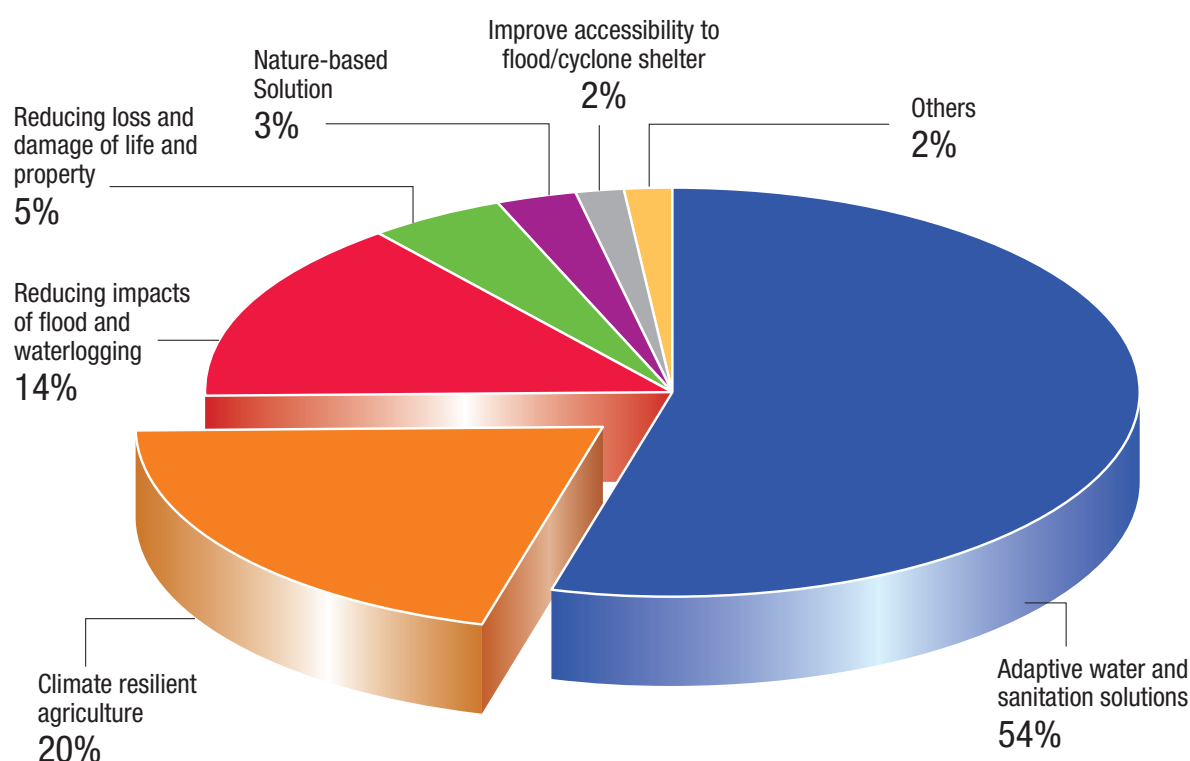
Introduction

We are now living in a time when climate change is no longer a future possibility. Impacts of climate change are now well evident in different sectors in different ways. Climate change is posing challenges to nations in achieving SDG targets. Therefore, being a least developed country with a high level of vulnerability, climate change adaptation is a major development concern for Bangladesh. The country has already made some outstanding progress in devising necessary plans and strategies, mobilizing funds from national and international sources, and developing effective adaptation solutions to climate change both in the public and private sectors. While in most cases, a top-down development approach is in practice, the government of Bangladesh also recognizes the importance and effectiveness of a locally-led approach to meet certain adaptation needs. Therefore, the Local Government Division (LGD) has taken up the ‘Local Government Initiative on Climate Change (LoGIC) project’ to support 72 Union Parishads (local government institutions) located in seven highly vulnerable districts in Bangladesh. LGD is implementing the LoGIC project with support from United Nations Capital Development Fund (UNCDF), United Nations Development Programme (UNDP), the European Union (EU), and Sweden. The project aims to mainstream climate change into local level development planning and budgeting, establish a local level climate finance mechanism, and strengthen a locally led approach to address climate change adaptation needs. Thus, the project is playing a vital role in unlocking the potential of the frontline actors in building resilience to climate change through context-specific solutions.

In 2020–21, the LoGIC project was in the third year of its implementation phase. During the year, the project supported 72 unions to implement 180 climate change adaptation schemes by providing BDT. 222,528,800 as Performance-based Climate Resilience Grants (PBCRGs). The schemes were included as priority actions in the Risk Reduction Action Plans (RRAPs) by the local level stakeholders and focused on resilient water and sanitation facilities, climate resilient agriculture, improving local communication, minimizing the effects of floods and waterlogging, reducing loss and damage of life and property from extreme weather conditions, improving adaptive and absorptive capacity, and nature-based solutions. The size and number of schemes varied from site to site depending on need and various other local-level factors. The schemes benefited around 308,595 local people. In implementing the PBCRG schemes, the project has mobilized resources from governmental and non-governmental sources worth BDT. 2,2148,904 which is about 10% of the PBCRG investment in the reporting year. The district-wise number of schemes and fund allocations, and scheme category wise PBCRG investment (in percentage) are shown in the charts below.

Chart-1: District wise number of PBCRG scheme and PBCRG allocation

| District Name | Scheme Number | PBCRG Allocation (BDT) |
|---------------|---------------|------------------------|
| Bagerhat | 19 | 36,803,567 |
| Barguna | 27 | 32,857,259 |
| Bhola | 24 | 28,342,958 |
| Khulna | 21 | 37,925,539 |
| Kurigram | 32 | 32,181,654 |
| Patuakhali | 22 | 20,771,152 |
| Sunamganj | 35 | 33,646,671 |
| Total | 180 | 222,528,800 |

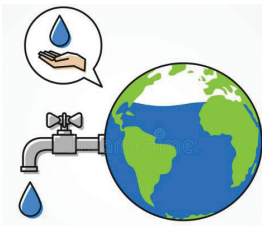
Chart-2: Scheme category wise Percentage of PBCRG investments in 2020-21

Compared to the previous years, the PBCRG investments in 2020–21 of the LoGIC project demonstrated some distinctiveness. In the reporting year, the project supported some new and innovative adaptive interventions, including some nature-based solutions, and established some new partnerships, i.e., with NGO and University, to ensure the effectiveness of some of the investments. Thus, the PBCRG investments promoted the ‘whole of society approach’. In the reporting year, PBCRG investment decisions emphasized women’s needs. Nearly half of the PBCRG beneficiaries in the reporting year were women. The project has also strengthened the synergy between the PBCRF and the Climate Resilience Fund (CRF), the other funding modality of the project to support local women-led adaptation at an individual level. More than 4,000 CRF beneficiaries were benefited by the PBCRG schemes in the year.

Major Results Achieved During 2020-21

Adaptation to Climate Change Induced Water Scarcity

Unsafe drinking water and waterborne diseases account for about 80% of illnesses in developing countries (Abedin et. al., 2019). On the other hand, the scarcity of safe drinking water is one of the major pathways through which climate change can affect human health. Due to its disadvantageous location and topography, the water sector is highly vulnerable to climate change in Bangladesh. According to UNICEF (2020), at present, 68.3 million people in Bangladesh do not have access to safe drinking water. The Haor basin in the north-eastern part of Bangladesh is prone to floods and flash floods, while the intensity



and frequency of extreme climatic events are increasing over time. Floods and flash floods contaminate sources of drinking water and reduce accessibility to water sources. In the coastal region, salinity intrusion into the sources of fresh water is increasing with sea level rise. Thus, in both regions, scarcity will become more intense. To address climate change induced water scarcity, the LoGIC project has provided PBCRG to 50 unions in six districts, excluding Bhola, to implement 84 schemes related to drinking water. The schemes are benefiting more than 88,000 vulnerable rural people who are suffering from scarcity of drinking water. In fact, during the reporting year, more than half of the PBCRG was invested in drinking water related adaptation measures.

Due to lack of safe drinking water, many people in saline-prone coastal areas are often forced



Women collecting drinking water from rainwater harvesting system in Bedkashi Union, Koyra Upazila, Khulna

to drink water from contaminated sources. Rainwater harvesting is therefore considered as a suitable solution to address the water crisis in many parts of coastal Bangladesh. Despite rainwater lacks minerals, its physical, chemical, and biological qualities meet the acceptable standards. In Khulna and Bagerhat Districts, 20 UPs established 30 community-level rainwater harvesting systems (RWHS) in locations that are highly saline-prone and where safe drinking water is a scarce resource. Most of the RWHSs have been established in the premises of local institutions, like the UP offices and local schools. Five (05) of the RWHSs in Bagerhat district are integrated with nearby pondwater treatment plans. Many of the RWHSs, solar powered UV filters and ATM water distribution technologies. The total water holding capacity of the RWHSs is nearly 1,414,400 liters and

can supply drinking water for more than three months during the dry season.

In four coastal districts, namely Bagerhat, Barguna, Khulna, and Patuakhali, 13 UPs have established 16 pondwater treatment plants. Of those, 13 are operated on solar power. Four (04) of the pondwater treatment plants in Patuakhali are constructed with a network of distribution pipes to ensure a maximum number of households have easier access to water. The ponds where the treatment plants have been installed are either in public or private ownership. Of course, all these ponds have always been used by local community members for collecting drinking water. Despite that, necessary agreements have been signed between the pond owners and UPs to make sure the ponds remain accessible to the beneficiaries after the project period. In addition, four (04) UPs in Kurigram installed five (05) solar-powered ground water treatment plants as surface water sources are not dependable in flood-prone areas. The groundwater treatment plants have been installed mostly on the premises of some selected schools, which are also used as flood shelters. Therefore, the treatment plants will benefit local people who will take refuge in the shelters during floods as well as many school students during normal situations. Different types of filtration systems have been used in the treatment plants based on the water quality.

In Kurigram and Sunamganj Districts, 19 UPs have installed 336 tube-wells in highly flood-prone locations where the scarcity of safe drinking water becomes severe during floods. To make the tube-wells flood-proof, their platforms have been elevated above the level at which floodwater may reach in the future. In addition, in both districts, seven (07) UPs have improved water and sanitation facilities in seven flood shelters. The design of the WASH facilities took into account the needs of people with disabilities. There are also separate facilities for women so that they don't have to go through anything uncomfortable to use the facilities while they are staying in shelters.



Ground Water treatment plant established at a school cum cyclone shelter in Kurigram

Promoting Climate Resilient Agriculture

Bangladesh's economy and food security are significantly dependent on the agriculture sector. In 2021, agriculture had a 11.63% share of the country's GDP (Statista, 2021). However, given that some weather factors, such as rainfall, temperature, humidity, sunshine, etc., are crucial predictors of agricultural output, Bangladesh's agriculture is highly vulnerable to climate change. Significant effects of climate change on various important food crops have already been noted in numerous studies (Hossain et al., 2018). Climate change may increase the number of rainless days and make the winter dryer. As a result, agricultural drought may intensify in certain parts of the country and can cause a severe threat to food security. To address dry season water scarcity for irrigation, 23 Union Parishads in Bagerhat, Barguna, Bhola, Kurigram, and Patuakhali implemented 39 PBCRG schemes to enhance climate resilience in agriculture.



In Barguna and Patuakhali Districts, 10 Union Parishads re-excavated 10 silted-up canals to increase their water holding capacity during the dry season. Almost 7,000 meters of canal were re-excavated to increase the depth from 1.5 meters to 3.0 meters. The re-excavation work will facilitate irrigation of nearly 161,500 decimal crop land during the winter.

Twenty (20) Union Parishads in Bagerhat, Barguna, Bhola, Kurigram, and Patuakhali Districts installed 25 solar-powered irrigation plants to provide low-cost irrigation water to nearly 215,000 decimal lands. The plants draw water from neighboring canals and thus promote the use of surface water irrigation and solar power for irrigation. Necessary drainage networks have been built to channelize water to targeted land parcels. A management group has been formed at each site with the participation of users and Union Parishad representatives to ensure the collection of user fees as well as the necessary repair and maintenance of the plant. The solar-powered surface water irrigation plants benefit 2,520 climate-vulnerable local farmers, including 224 CRF beneficiaries, by increasing the diversity and quantity of their agricultural production.



Canal Re-excavated in Barguna with PBCRG to increase supply of surface water for irrigation during the dry season



Solar powered plant to irrigate crop field using surface (canal) water in Kurigram

In addition, four Union Parishads in Rowmari Upazila of Kurigram District established four demonstration plots with a total area of 240 decimals of land that are located within sites brought under solar powered irrigation by the project. In the plots, cultivation of drought-tolerant varieties and strains of boro rice, maize, wheat, mustard, chilly, brinjal, and radish were demonstrated. In addition to the demonstrations, under the four schemes, 80 local farmers were trained on cultivation of the said crops, water-saving irrigation techniques, and the use of organic fertilizer.

flat topography. Consequently, the runoff from snowmelt and monsoon rains does not drain away smoothly. Furthermore, tidal effects in the Bay of Bengal also cause stagnation of water flow. Therefore, a large part of the country is flooded during the monsoon (Hussain, 2006). Agriculture, livelihoods, water, food and nutrition, health, education, and infrastructure are all significantly impacted by floods and waterlogging. The climatic disasters also take away rural people's ability to prosper economically. In fact, when hit by prolonged or recurrent flooding, many rural households become incapable of recovering from the loss and damage even in the long term.

Minimizing the Effects of Flooding and Waterlogging

Bangladesh is a deltaic country situated at the lower course of three great rivers-the Ganges, Brahmaputra, and Meghna. In addition, Bangladesh is a low-elevation country with comparatively



To reduce the impacts of flood and waterlogging, in Bagerhat, Bhola and Patuakhali Districts 17 Union Parishads took up 23 PBCRG funded schemes to construct and re-construct 25 culverts and 9 drains to channel out excess water during flood and heavy rainfall. The total length of the drains is 1,013 meters. The schemes will save nearly 340,840 decimal land from waterlogging and save more than 6,000 rural houses and 700 pounds from inundation.



Culvert repaired in Bhola to reduce waterlogging in crop field and human settlement resulting from erratic rainfall

Thus, the schemes will prevent the loss of a huge amount of crops and fish during the wet season. In addition, the drains in Bhola District will allow farmers to draw water from nearby canals and irrigate 1,031 decimal agricultural land during the dry season.

In Sunamganj District, to protect 'hatis' from the eroding impact of flood water and 'afal', eight (08) Union Parishads in Derai, Shalla, and Tahirpur Upazilas constructed 10 protection walls around the bases of 10 different hats. The lengths of the walls vary from 68 to 94.5 meters. The total length of the 10 walls is 888

meters, and each of the walls is 1.22 meters high. The walls will benefit 288 local families by protecting their homesteads and important infrastructure.

In addition, three Union Parishads in Bhola District constructed six guide walls next to rural roads to protect them from being damaged during floods and tidal surges. In total, 259 meters of rural roads have been protected, which are important to local people for their movement. The roads also act as barriers for flood water and thus save nearly 20,000 decimal lands and 2,420 local houses from floods.



Village protection walls constructed around the base of Hatis in the Hoar areas in Sunamganj reduce soil erosion during flood

Minimizing Loss of Life from Climate Change Related Extreme Events

Some of the impacts of climate change are beyond the ability of a community or a system to adapt. Every year, climate change-related natural disasters like floods, cyclones, and storms cause loss of life in different parts of the country. Therefore, the risk of loss of human life may increase with climate change. The Bay of Bengal is a highly cyclone-prone area and accounts for more than 80% of cyclone-related deaths (Koll, 2020). The lives of coastal fishermen remain at high risk as the cyclone season overlaps with the fishing season and they go to the bay for several days (CCDB, 2017). Moreover, with the depletion of fish resources, they now have to travel further into the sea to catch fish. Eight (08) Union Parishads in Bhola and Patuakhali Districts utilized PBCRG to provide 679 coastal local fishing boats with lifejackets and other lifesaving equipment. The schemes have increased the safety of 8,757 local fishermen.

In Bangladesh, lightning-related fatalities are a common occurrence. A report by the Department of Disaster Management says 2,164 people died because of lightning strikes between 2011 and

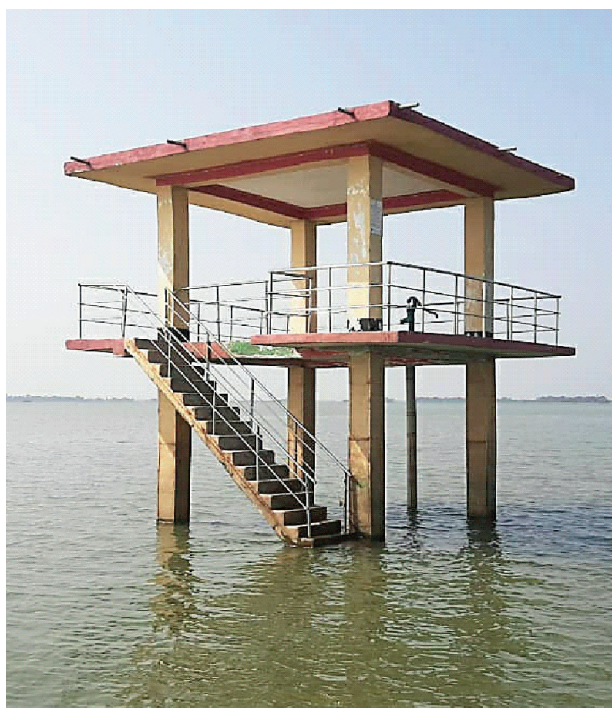


2020 (Financial Express, 2022). Due to the rising number of casualties, the government has declared lightning as a natural disaster in 2016. On the other hand, studies have also identified links between the increasing frequency of lightning and climate change. As identified by various sources, Sunamganj District is one of the most lightning prone areas in Bangladesh. Farmers and fishermen, who are under the open sky, account for most of the lightning victims. To increase the safety of farmers who work in the Haor areas, three (03) Union Parishads in Derai and Shalla Upazilas of Sunamganj have invested in constructing three concrete-built two-storied dual-purpose shelters. During April and June, when most of the lightning strikes happen, farmers can take refuge in the shelter. During the wet season, when the haors go under water, the upper story of the shelter will remain above the water level. When the weather becomes severe, boat passengers will be able to seek refuge on the upper story of the shelter.

In addition, the Union Parishad of Char Borhand Union of Dashmina Upazila in Patuakhali restored an old cyclone shelter to usable form. They made the leaked roof rainproof and improved the water and sanitation facilities. The shelter can accommodate 400 people during a cyclone.



Local Administration representatives distributing safety gears among local fishermen in Bhola



Dual purpose shed construct with PPBCRG in the Haor areas in Sunamganj to provide shelter for people during lightening and flood

Nature-based Solution to Address Climate Change Adaptation Needs

Many of the conventional adaptation approaches can often be proven to be unsustainable, even though they are costly. However, nature offers cost-effective solutions to address many of those challenges. In fact, there is strong evidence that well-designed nature-based solutions (NbS) can reduce



exposure to natural disasters and support climate change adaptation, as well as contribute to the empowerment of marginalized people, poverty reduction, local economic improvement, and biodiversity enhancement (Smith et al., 2021). In 2020–21, the LoGIC project provided PBCRG and technical support to several Union Parishads in Khulna, Kurigram, and Sunamganj Districts to take up some NbSs. These NbSs were focused on preventing or reducing soil erosion and damage to human-made rural infrastructure caused by climate change events like floods, cyclones, and storm surges.

The coastal area of Bangladesh is highly vulnerable to cyclones and storm surges. Even though the number of deaths caused by cyclones and storm surges has decreased significantly over the years, the damage to livelihoods, properties, and infrastructure is still massive. Mangrove afforestation and reforestation are nationally and internationally known as an effective nature-based adaptation measure for the coastal zone of Bangladesh. The Sundarbans mangrove forests, located in the south-western part of Bangladesh, provide efficient protection against the destructive impacts of cyclones and storm surges. Therefore, three Union Parishads (UPs) in Dacope Upazila in the coastal district of Khulna, namely Koyra, Maharajpur, and Dokkhin Bedkashi Unions, utilized PBCRGs to carry out mangrove plantations. The plantations were done next to the outer slopes of coastal embankments to reduce the impact of wind



Local women planting mangrove seedling under PBCRG scheme in Koyra Upazila, Khulna

and water on the embankments, human settlements, and infrastructure located inside the embankments. In total, 27,000 mangrove seedlings and 200 kg of mangrove seeds were sown at the three locations, covering a total area of nearly 23 ha. The seedlings and seeds were sourced locally without causing any harm to the local natural environment. The species used in the plantations include Bain (*Avicennia officinalis*), Keora (*Sonneratia apetala*), Kakra (*Bruguiera gymnorhiza*), Golpata (*Nypa fruticans*), Goran (*Ceriops decandra*), and Gewa (*Excoecaria agallocha*).

Flooding during the monsoon is a normal event in the north-eastern haor region of Bangladesh. In the Hoars, people live in congested conditions on raised mounds, known as hati. The hatis usually do not get inundated during the monsoon flood. However, hatis are constantly threatened by land erosion caused by climate change induced disasters such as flash floods and afals (high waves caused

by strong winds). Thus, many people in the Hoar become homeless. Building a protection wall around the base of the hati is a common protection measure, but it is expensive and often the protection walls are also damaged partly or fully when they are under continuous impact of strong waves. In Sunamganj District, the LoGIC Project provided PBCRGs to two Union Parishads, namely Uttar Sreepur and Dakkhin Sreepur, in the Tahirpur Upazila to carry out swamp plantation as a nature-based solution to the impacts of floods, flashfloods, and afal on hatis. Both the unions are located in Tanguar Haor which is a World Heritage Site and is affected by floods and flashfloods every year. The UPs planted approximately 11,000 Hajal (*Barringtonia acutangula*) and Karach (*Pongamia pinnata*) at a suitable location on the border of the two unions.

To carry out the mangrove and swamp plantations effectively and to ensure their long-term sustainability, with the facilitation of the



The LoGIC Project promoted the use of vetiver grass as a nature-based solution to reduce soil erosion

LoGIC project, the UPs formed a partnership with the Center for Natural Resources Studies (CNRS), a national NGO well experienced in the field of natural resources management. The UPs in Khulna have also worked with the local offices of Bangladesh's Department of Forests to get the technical help they need for the mangrove plantations.

Soil erosion is a major cause of land degradation in Bangladesh as it sits on a massive river delta. According to the Global Land Degradation Information System, the annual rate of soil erosion in Bangladesh is estimated to be 50–60 tons/ha/year (Saha et. al., 2019). Soil erosion causes reduced agricultural production, siltation of waterbodies, as well as degradation of earthen infrastructure (e.g., rural roads, embankments, etc.), which in turn has various social, economic, and ecological effects. The risk of soil erosion may increase with the increase of heavy and continuous rainfall, and the increase of frequency and intensity of floods and surges. Thus, climate change may intensify soil erosion in the future.

Maintaining a plant cover is a more cost-effective solution to soil erosion compared to constructing berms. Use of vetiver (*Chrysopogon zizanioides*) to control soil erosion is one of the best nature-based management practices. The perineal grass has certain exceptional traits that make it stand out among the diverse range of plant species used for controlling soil erosion. It can grow and survive in inhospitable conditions, e.g., poorly fertile soil, saline soil, a wide range of soil pH (3.0 to 10.5), a wide range of temperature (-140C to 550C), drought, and waterlogging conditions. It has long and dense roots with good tensile strength, which made the grass known to civil engineers as 'Living Soil Nail'. The above-ground parts of the grass also grow densely, which slows down runoff and traps sediment. Vetiver grass also aids in the reduction of pest attacks in crop fields, the improvement of soil fertility, the retention of soil moisture, and the removal of contaminants. Furthermore, vetiver grass provides a safe refuge for birds and mammals.

In 2020-21, the Local Government Initiative on Climate Change (LoGIC) Project has provided PBCRG to two Union Parishads to pilot vetiver plantations. The unions are Pankhali Union in the southern coastal district of Khulna and Thanahat Union, located in the northern riverine flood-prone Kurigram District. The project formed a partnership with the Bangladesh University of Engineering and Technology (BUET) to provide the necessary technical support to implement the intervention successfully. BUET guided the project team and Union Parishads for selecting the plantation sites, preparation of the sites, collection of seedlings, plantation of seedlings scientifically, and maintenance and monitoring the plantations. At each site, nearly 10,000 seedlings were planted on a 100-meter-long segment of the outer slope of an embankment.

In addition to providing climate change adaptation benefits, the NbSs will contribute to carbon sequestration and create important habitats for aquatic and terrestrial species. The PBCRG investments have helped local governments get access to low-cost, effective technologies based on nature and given them hands-on experience with how to use the technologies.

Improving Accessibility to Shelters During Climate Change Induced Disasters

For the vast majority of people living in rural areas, rural roads serve as virtual lifelines. In the coastal areas, the rural earthen roads are also important for

local people to reach the nearest shelter during a cyclone. However, each year, floods and storm surges do significant damage to many of the approach roads and bridges to the cyclone shelters. During a cyclone, some local people, especially women, children, the elderly, sick people, and people with disabilities, cannot go to the cyclone shelters or choose not to do so if the road conditions are too bad. To improve accessibility to cyclone shelters in the coastal





Wooden bridge built in Patuakhali to provide local people easy access to the nearest cyclone shelter

area, the project provided PBCRGs to 4 Union Parishads in Bhola and Patuakhali Districts.

Three Unions Parishads in Bhola repaired 8,038 feet of earthen roads in six different locations. During repair, the roads were raised by nearly two feet to make them flood-proof. The repaired roads will now allow local people to move easily to the nearest cyclone shelters and other places. In the Moudubi Union Parishad of Rangabali Upazila of Patuakhali District, a 100-foot-long bridge was constructed to connect an area known as Ashabari to the mainland of the Moudubi Union. The area is separated from the mainland by a tidal canal. In Ashabaria, there is no coastal embankment or cyclone shelter. Therefore, it is too risky for local people to stay in the area during a cyclone or storm surge. Conversely, when the

weather turns bad, in the absence of a bridge, it becomes difficult for local people to reach the nearest cyclone shelter on the mainland. The UP also repaired 300 feet of approach road on both sides of the bridge to make it accessible. The schemes benefit more than 13,000 local people.

Conclusion

Implementation of the PBCRG schemes have further During the reporting year, the LoGIC project has taken the necessary measures to ensure post-project sustainability of the results of the PBCRG schemes of the reporting and previous years. For each of the PBCRG schemes, the project has formed a local-level management committee with a specific ToR. A user fee mechanism has also been introduced for certain types of schemes to meet the post-implementation repair and maintenance costs. During the reporting year, the project has also engaged six site-level diploma civil engineers to support the UPs to ensure quality of design, estimate, and implementation supervision of infrastructure-related schemes. The UPs have also utilized the experience gained from planning and implementation of the previous years. One of the major challenges faced in the reporting year was to synchronize implementation of the NbSs with

the administrative implementation period, as implementation of the NbSs was associated to natural seasons. Moreover, the unexpected external administrative complexities have also impacted the implementation time of a few schemes at different sites. On the other hand, one of the major learnings of the reporting year was that PBCRG investments may be more efficient if the schemes are planned and implemented with the Upazila boundary in mind rather than the Union Boundary. It will allow the implementation of larger size schemes at appropriate locations. In particular, the selected NbSs function better when applied at a landscape level rather than in fragmented ways. Moreover, upazila level planning and implementation may offer more coordinated support from different governmental agencies and play more effective role in ensuring sustainability of the schemes.



Representatives of the local government selecting climate adaptive PBCRG schemes with the involvement of local community members in a Word Shova

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