

KEY POINTS

- Because of its topographical characteristics, geographic location, and high population density, Bangladesh is highly at risk, and has long been exposed to various climatological, hydrometeorological, and other geophysical hazards that have affected key economic sectors such as agriculture, tourism, and industry.
- Mainstreaming climate resilience into development planning and decision-making processes has been increasingly pursued in developing countries, even emerging as a major policy agenda. Bangladesh places great importance on climate change and environmental issues, with its commitment well-articulated in overarching national plans and climate policy framework.
- To assist in development planning, climate and disaster risk screening and/or climate and disaster risk and vulnerability assessment will be important in establishing the impact of climate change and natural hazards on development projects, in estimating potential economic losses, and in identifying feasible adaptation options to address the expected climate change impacts.

Addressing Climate Risks: Mainstreaming Climate Change in Development Project Planning and Budgeting in Bangladesh

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BACKGROUND

Because of its topographical characteristics, geographic location, and high population density, Bangladesh is considered to be highly at risk to climate and weather-related and geophysical hazards. The World Climate Risk Index 2021 places Bangladesh as the seventh worst-affected country by extreme weather, although it contributes only 0.56% of global greenhouse gas emissions.¹ The topography of Bangladesh can be described as low and flat, with more than half of the land at less than 6 meters above mean sea level, and traversed by major drainage systems of the Brahmaputra, Ganges, and Meghna rivers. The Bay of Bengal in the south, the mountain ranges in the east, and the Barind Tract in the northwest contribute to the persistence of natural hazards in Bangladesh for centuries.

¹ D. Eckstein, V. Kunzel, and L. Schafer. 2021. *Global Climate Risk Index 2021: Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2019 and 2000–2019*. Bonn: Germanwatch e.V.

While present-day weather and climate have played a fundamental role, Bangladesh has long been exposed to various climatological, hydrometeorological, and other geophysical hazards that have affected key economic sectors such as agriculture, tourism, and industry. Being the largest delta in the world, a huge portion of Bangladesh's land area experiences frequent flooding, especially flash floods, along with river erosion. The eastern parts of Bangladesh, comprising Sylhet and Chattogram divisions, are prone to earthquakes, landslides, and flash floods. The coastal belt is prone to tropical cyclones and storm surges, coastal flooding, saline intrusion, and sea level rise. In 1970, cyclone Bhola caused more than 300,000 deaths and \$2.5 billion worth of damage to property.² During 1984–2017, Bangladesh experienced seven severe floods, including a devastating one in 2007 that affected nearly 10.7 million people. In 2017, a major landslide claimed 152 human lives; in 2020, super cyclone Amphan required evacuating about 2.5 million people; and during the monsoon season, floods affected around 5 million people.³ In addition, more than 100 million hectares of the country's arable lands are affected by sea level rise. Sea level has been projected to rise by 45 centimeters by 2050 and is estimated to affect 10%–15% of the land area and about 35 million people.⁴ The Standing Orders on Disaster 2020 of the Ministry of Disaster Management and Relief has identified and described all the major hazards in Bangladesh and recognized climate change as a driver for the increasing disasters from natural hazards. The major hazards in Bangladesh namely erosion, landslides, storm surges, droughts, and so forth, are detailed and mapped in the Bangladesh Climate and Disaster Risk Atlas (Hazards—Volume I).

The share of agriculture in Bangladesh's gross domestic product (GDP) has been declining for the past few decades because of the economy's structural transformation. In fiscal year 2021, agriculture's share in GDP reached 11.63% but is projected to decline to 10.6% in fiscal year 2025. However, despite its diminishing share in GDP, the agriculture sector remains as the major source of total employment at 40.6%.⁵ As the agriculture and water resources sectors are highly exposed to climate and geophysical hazards, the population dependent on these sectors are highly vulnerable. Thus, it is important that the infrastructures are made resilient. This requires understanding of climate and disaster risks scenarios and understanding how these risks pose threats or provide opportunities to different socioeconomic sectors can significantly improve resilience in Bangladesh.

MAINSTREAMING CLIMATE CHANGE IN DEVELOPMENT PLANNING IN BANGLADESH

In general, three key global agreements relating to climate change come into play in national planning for all countries: the 2015 Sustainable Development Goals (SDGs), the Sendai Framework for Disaster Risk Reduction 2015–2030, and the 2015 Paris Agreement. SDG 13 requires all countries to take urgent action to combat climate change and its impacts. The Sendai Framework emphasizes the impacts of climate change on disasters and outlines clear targets and priorities for action to prevent new risks and reduce existing disaster risks. The Paris Agreement is a landmark, legally binding international treaty on climate change that requires economic and social transformation, based on the best available science, for countries to undertake ambitious efforts to combat climate change and adapt to its effects.

Bangladesh places great importance on climate change and environmental issues, with its commitment well-articulated in overarching national plans and climate policy framework, such as the National Adaptation Programme of Action 2005 (updated 2009); Bangladesh Climate Change Strategy and Action Plan (BCCSAP 2009); Bangladesh Country Investment Plan for Environment, Forestry and Climate Change 2016–2021 (2017); Bangladesh Delta Plan (BDP) 2100 (2018); Mujib Climate Prosperity Plan Decade 2030 (2021); and National Adaptation Plan of Bangladesh 2023–2050 (NAP 2022). Bangladesh follows a 5-year planning system for development and is now implementing its 8th Five-Year Plan (July 2020–June 2025), where the long-term climate strategies of the BDP 2100 have been included. The government established the Bangladesh Climate Change Trust and the Bangladesh Climate Change Trust Fund from its own resources—a first among least developed countries—initially to finance the implementation of projects identified in the BCCSAP. In addition, the country's adoption of a Climate Fiscal Framework in 2014 (updated in 2020) provides a road map for climate finance in the public financial management systems, linking climate policies and strategies with the resource allocation process. The BDP 2100 is a comprehensive development plan focusing on economic growth, environmental conservation, and enhanced climate resilience. The Mujib Climate Prosperity Plan includes several new, ambitious, and strengthened adaptation efforts identified under six key priority areas to build resilience in populations and ecosystems, and to minimize and avert losses and damages.⁶ It also outlines the strategy of accessing and mobilizing

² World Bank Climate Change Knowledge Portal. Bangladesh (accessed 21 March 2023).

³ Government of Bangladesh, Ministry of Environment, Forest and Climate Change. 2022. *National Adaptation Plan of Bangladesh (2023–2050)*. Dhaka.

⁴ G. N. T. Hasnat, M. A. Kabir, and M. A. Hossain. 2018. Major Environmental Issues and Problems of South Asia, Particularly Bangladesh. In C. M. Hussain, ed. *Handbook of Environmental Materials Management*. Cham, Switzerland: Springer. pp. 1–40.

⁵ Government of Bangladesh, Planning Commission, General Economics Division. 2020. *8th Five-Year Plan July 2020–June 2025: Promoting Prosperity and Fostering Inclusiveness*. Dhaka. p. 522.

⁶ The six key priority areas of the Mujib Climate Prosperity Plan are (i) accelerated adaptation; (ii) just transition of labor and future-proofing industry with technology transfer; (iii) increasing public revenue to spend on the most vulnerable people; (iv) comprehensive climate and disaster risk financing and management; (v) leveraging 21st century technologies for well-being; and (vi) maximized renewable energy, energy efficiency, and power, and transportation sector resilience.

climate finance from international cooperation, regional, public, private, and other local sources to achieve resilience and prosperity in the face of climate change risks.⁷ Meanwhile, the NAP helps Bangladesh to identify country-specific adaptation needs, develop and implement strategies to address those needs, and decide on actions to protect vulnerable sectors and communities. Aligned with the global SDGs and the BDP 2100, the NAP considered 113 interventions in 11 climate-stressed regions across Bangladesh based on 14 hazards (footnote 3). All these plans and policy frameworks have adopted climate change as a crosscutting issue impacting national development.

In 2016, the Planning Commission of the Ministry of Planning began mainstreaming climate change adaptation, disaster risk reduction, poverty alleviation, and gender in all projects under the Annual Development Programme.⁸ The commission introduced climate change and future disasters as a crosscutting issue in the format of projects, known as development project pro-forma. To support the design or formulation of climate- and disaster-resilient projects, the General Economics Division of the Planning Commission published in 2014 the Development Project Pro-Forma/Proposal Manual,⁹ which incorporates an Integrated Climate Change, Disaster, and Environment Framework to strengthen the country's response to climate and disaster risks. The framework requires all public investment projects to undergo analysis of climate change and disaster impacts on project activities.

ADB SUPPORT FOR ADDRESSING CLIMATE RISKS OF DEVELOPMENT PROJECTS

Apart from assisting knowledge and capacity development related to climate change and disaster risk management, and enhancing access to climate finance, the Asian Development Bank (ADB) is also supporting green growth and climate and disaster resilience under the Bangladesh country partnership strategy.¹⁰ Through a regional technical assistance (TA),¹¹ ADB supported the project, “Establishing a Climate Risk Screening System for Mainstreaming Climate Change Adaptation into National Development Budgeting Activities,” implemented by the Programming Division of the Planning Commission of Bangladesh. The outcome was the formulation of a climate and disaster risk screening (CRS) tool and a climate and disaster risk and vulnerability assessment (CRVA) tool. The CRS and CRVA tools help in establishing the impact of climate change and

natural hazards on development projects, estimating potential economic losses, and identifying feasible adaptation options to address the expected impacts, thereby providing needed inputs in the budgeting process of development projects in Bangladesh. In early 2022, the government launched the Disaster and Climate Risk Information Platform (DRIP), an offshoot of the mentioned ADB TA activities in Bangladesh. The hazard, exposure, vulnerability, and risk maps of the Bangladesh Climate and Disaster Risk Atlas (2021)¹² have been digitally included in the DRIP, which investment projects have been required to use for the disaster impact assessment before project formulation. This platform aims to strengthen the government's institutional capacity for assessing, understanding, and communicating disaster- and climate-related risks; and for better integrating climate and disaster risk information into development planning and budgeting, policies, and programs. Disaster impact assessment using the DRIP is mandatory and has been incorporated in the Guideline for Approval, Revision of Public Sector Development Projects (published in June 2022 and known as the “green book”) and in the feasibility study format. Any project with probable cost of more than Tk500 million (Bangladesh taka) must prepare a proper feasibility study. Hence, integrating the climate issue in different government guidelines and manuals has made the mainstreaming process seamless and more effective.

In general, the CRS is conducted at the project concept stage, while the more detailed CRVA (also called climate risk and adaptation assessment) is done during project preparation (Figure 1). Selected climate change adaptation and associated disaster risk reduction and disaster resilience measures included in the project design to address significant climate and disaster risks are monitored and evaluated during project implementation. In Bangladesh, the CRVA can be used by planning officials of implementing agencies and ministries to design climate- and disaster-resilient projects in the Annual Development Programme through the development project pro-forma and in project appraisal at the Planning Commission.

For projects expected to be of *medium* or *high* climate risk, extensive, downscaled, and high-resolution climate scenarios and geophysical data and maps will enable more thorough and localized CRVAs. These risk assessments are done by analyzing both historical and projected climate- or weather-related hazards, exposures, and vulnerabilities in the project areas. As an example, the subsequent

⁷ International Centre for Climate Change and Development. 2021. *From Vulnerability to Resilience to Prosperity: Transforming the Narrative of Tackling Climate Change*. 16 June.

⁸ In November 2016, the Ministry of Planning approved an updated manual on the Preparation of Development Project, Processing, Approval and Revision in the Public Sector, which includes climate, disaster, gender, and other pertinent issues in project design formats.

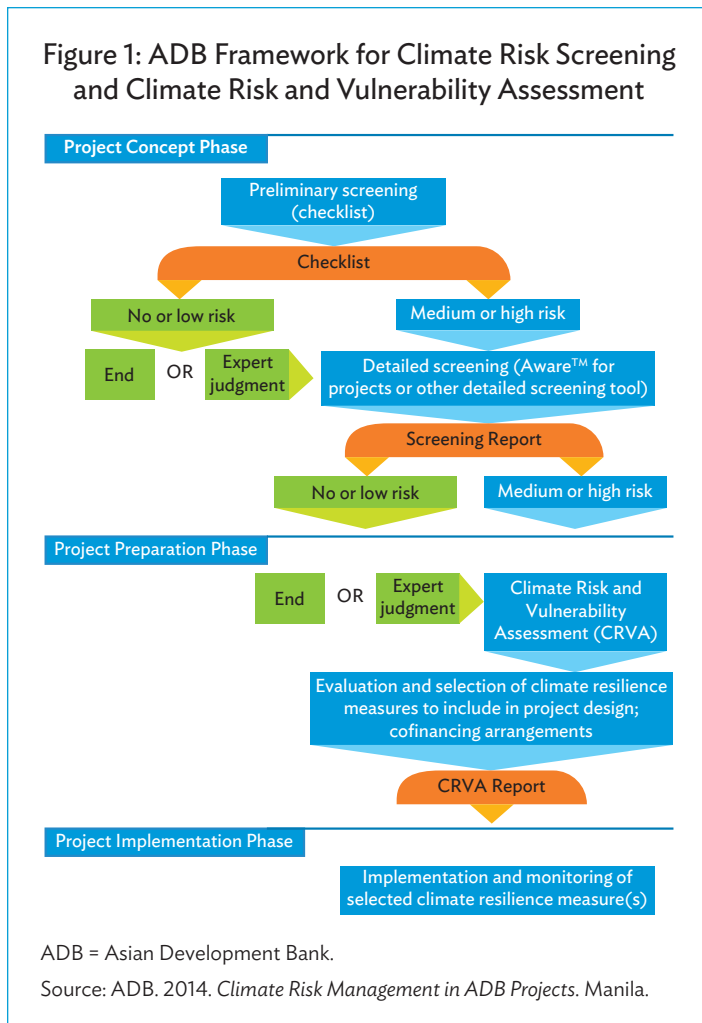
⁹ Government of Bangladesh, Ministry of Planning, Planning Commission, General Economics Division. 2014. *Development Project Proforma/Proposal (DPP) Manual (Instructions for Preparing Development Project Proposals)*. Part 1: Main Guideline and Part 2: Appendixes. Dhaka.

¹⁰ ADB. 2021. *Country Partnership Strategy: Bangladesh 2021–2025—Sustain Growth, Build Resilience, and Foster Inclusion*. Manila.

¹¹ ADB's regional technical assistance, Action on Climate Change in South Asia, aimed to further enhance the capacity of South Asia developing member countries in managing the impacts of climate change by effectively transitioning to a low-carbon and climate-resilient development path.

¹² Government of Bangladesh, Ministry of Planning, Planning Commission; and Asian Development Bank. 2021. *Bangladesh Climate and Disaster Risk Atlas. Hazards—Volume I and Exposures, Vulnerabilities, and Risks—Volume II*. Dhaka and Manila.

Figure 1: ADB Framework for Climate Risk Screening and Climate Risk and Vulnerability Assessment



box shows a summarized climate risk assessment conducted for ADB’s Bangladesh Irrigation Management Improvement Project. Initially, risk was perceived as the product of probability of occurrence and hazard impacts. But the impacts are dependent on preparedness (e.g., early warning systems, cyclone shelters) and preventive measures, because these reduce hazard-specific vulnerabilities of a community. Thus, exposure to a hazard in certain locations affect communities collectively, as expressed by

$$R = f(H, E, V)$$

where R = risk, H = hazard, E = exposure, and V = vulnerability.

In effect, the overarching goal is to assess current and projected climate risks as the confluence of these hazards, exposures, and vulnerabilities (HEVs). Such risk assessments may be in

the form of risk overlays and their side-by-side comparisons, maps thematically generated via indexing or scoring, an application of criteria-based mapping methodologies, or a combination of all these types.

MAINSTREAMING CLIMATE ACTIONS AND WAYS FORWARD

Development decisions and activities today must adequately consider climate change to avoid unnecessary costs, wasted investments, and risks to life in the future.¹³ As such, high-level screening approach for risks from climate and geophysical hazards at an early stage of project development is necessary. Screening for climate risks during the project appraisal process can enable quick identification of current and projected climate- or weather-related risks and associated geophysical risks to a project. In the absence of screening, development activities may lead to “maladaptation,” an increase in exposure and/or vulnerability to climate change, either by inadvertently overlooking climate change impacts or by undertaking inadequate adaptation actions. The following are ways forward to do mainstreaming in key levels and areas in Bangladesh.

Identifying gaps. Despite substantial progress, gaps and weaknesses remain in Bangladesh’s institutional capacity to address climate change. A complete legal framework conducive to fully incorporating climate change factors into development planning and budgeting is essential. While project feasibility studies consider relevant national regulations, technical standards, and sector requirements and include analyses of market, technical, financial, organizational, legal, economic, and social risks, climate change risk assessment must be fully mainstreamed to guide adaptation and build resilience. Resource allocation mechanisms for climate actions should be improved, and higher fund allocations in current government budgets are needed to implement adaptation measures. Enhanced access to new technologies and technological support is also needed. The resolution of these issues will make adaptation efforts more effective and help close the gap between the level of need and the actual capacity for implementation.

Instituting policy mandates. As earlier discussed, Bangladesh has already begun mainstreaming climate change adaptation into its development planning system, which is reflected through various activities and initiatives over the last decade.¹⁴ In 2009, Bangladesh released its BCCSAP, a knowledge strategy built upon the country’s National Adaptation Programme of Action (2005). The BCCSAP has six strategic areas—food security, social protection, and health; comprehensive disaster management; infrastructure; research and knowledge management; mitigation

¹³ S. Gigli and S Agrawala. 2007. *Stocktaking of Progress on Integrating Adaptation to Climate Change into Development Co-operation Activities*. Paris: Organisation for Economic Co-operation and Development.

¹⁴ A. Olhoff and C. Schaer. 2010. *Screening Tools and Guidelines to Support the Mainstreaming of Climate Change Adaptation into Development Assistance – A Stocktaking Report*. New York: United Nations Development Programme.

Box: Bangladesh Irrigation Management Improvement Project (June 2014–December 2023)

The project impact will be sustained high growth in irrigated agriculture; whereas, its outcome will be increased productivity and sustainability of three large irrigation schemes. It will focus on modernizing the Muhuri Irrigation Project (completed in 1986) in Chittagong Division. It also financed a feasibility study and developed a detailed design for modernizing the Ganges–Kobadak Irrigation Project in Khulna Division and the Teesta Irrigation Project in Rangpur Division. The project has been designed in a way that it can tackle the inadequate sustainable management, operation, and maintenance of irrigation schemes. The project has three outputs: (i) performance-based irrigation management and agriculture support services established, (ii) irrigation system infrastructure rehabilitated and modernized, and (iii) project efficiently managed with effective institutional development.

Climate risk assessment. The Climate Observations and Projections for Bangladesh by the UK Met Office Hadley Centre 2011 assessed that the A1^a emissions scenario projected (i) temperature increases over Bangladesh at 3.0°C–3.5°C by 2100, and (ii) precipitation increases of 5%–10% in the vicinity of the Muhuri project area. The projected 5%–10% increase in precipitation will be generally beneficial and provide increased river flows during the post-monsoon irrigation period. Increased runoff will increase the likelihood of flood flows and the need to improve drainage. Greater variabilities, including increased standard deviation in monsoon rainfall and greater extremes of the rainfall patterns, will increase the frequency and extent of drought, which will increase the need for access to irrigation throughout the year.

The Muhuri project is located at the apex of the Bay of Bengal, with a large tidal range and is vulnerable to storm surges.

The Institute of Water Modeling Dhaka estimated that sea level rise, together with the projected 10% increase in wind speed during cyclones, will significantly increase sea levels during cyclones from storm surge and sea level rise. The Institute of Water Modeling Dhaka estimated that these could be 1–3 meters, which would require a significant raising and strengthening of the coastal embankment.^b

Project Climate Risk Category: Medium

Climate risk management response within the project.

To address the climate risks found significant and their potential impacts, the project will (i) increase the drainage design modulus from 1:10 year return period to 1:25 year return period, in response to the likely increase in rainfall intensities; (ii) examine the potential for integrated surface and groundwater management to help ensure water supply and reduce risk of shortages from increased risk of drought or flow uncertainties; (iii) upgrade irrigation infrastructure, including the use of buried piped water distribution and excavation of drains; (iv) increase irrigation efficiency by using piped distribution and prepaid meter systems; (v) provide agricultural support and extension services and farmers' training to promote crop diversification, water-saving methods, and sustainable and climate-resilient cropping systems; (vi) support capacity development of water users in efficient land and water management practices; (vii) support institutional capacity development for the application of integrated water resources management to improve intersector management of water resources and as a frontline adaptation response; and (viii) promote the use of solar powered electricity to run the pumps for irrigation during peak season when there are shortages of electricity in rural areas.

^a The A1 scenario family describes a future world of very rapid economic growth, global population that peaks in mid-century and declines thereafter, and the rapid introduction of new and more efficient technologies. The A1B (or balanced) scenario is defined as not relying too heavily on one particular energy source (fossil or non-fossil), on the assumption that similar improvement rates apply to all energy supply and end use technologies. (Source: Intergovernmental Panel on Climate Change. 2000. IPCC Special Report: Emissions Scenarios. A Special Report of IPCC Working Group III. N. Nakicenovic and R. Swart (eds.) Cambridge University Press, UK.)

^b ADB. 2014. Irrigation Management Improvement Project. Climate Risk Assessment and Management Report (<https://www.adb.org/sites/default/files/linked-documents/45207-002-sd-02.pdf>).

Source: Asian Development Bank. 2014. Bangladesh: Irrigation Management Improvement Project.

and low-carbon development; and capacity building and institutional strengthening—with set priorities over the short, medium, and long term. It also sets out a 10-year program to build the country's capacity and resilience to meet the challenges of climate change over the next 20–25 years. The BCCSAP is currently being updated to harmonize the plans with the BDP 2100, the NAP, and other policies approved after 2009. Meanwhile, the Bangladesh Country Investment Plan for Environment, Forestry and Climate Change (2016–2021) was a cross-sector and whole-of-government investment framework for mobilizing action to minimize environmental degradation and to improve the country's ability to address the threats posed by climate change and respond to the associated urgent needs.

The country's overarching NAP, approved in 2022, requires an update of the “rules of business” of relevant ministries to integrate climate actions, as well as update of its applicable mandates. Responsibilities for implementing the NAP should be delegated, while the existing Interministerial Steering Committee on Climate Change under the Ministry of Environment, Forest, and Climate Change will steer its implementation. In January 2023, the steering committee formed the National Technical Advisory Committee on Climate Change to provide regular updates and address the gaps and challenges on the implementation of the NAP, in coordination with relevant ministries, the private sector, nongovernment organizations, civil society organizations, women's and youth associations, and community-based organizations,

among others. The high-level National Council on Environment, formed by the Ministry of Environment, Forest, and Climate Change and headed by the Prime Minister of the People’s Republic of Bangladesh, could incorporate climate change as an additional responsibility to allow important policy directives on climate change.

Expanding the use of technology in screening and mapping.

Geographical information system (GIS) is a powerful tool for geo-environmental analysis and appraisal of natural resources. It allows the user to integrate databases from various sources, including remote sensing on a single platform, and analyze them efficiently in a spatiotemporal domain. GIS technology can be used for better planning and decision-making as well as for providing services to society. For example, the earlier ADB TA project can be expanded through downscaling relevant data and information to the *upazila* (union level) and applying the CRS and/or CRVA tools to other key economic sectors, such as industry and power. Tool content and applicability can also be further improved through comprehensive research.

Advancing partnerships. Addressing climate change in Bangladesh also requires multistakeholder national coordination committees—chaired by a ministry with sufficient ability and mandate for macro-policy formulation, planning, and implementation—to facilitate managing the national adaptation strategy more effectively. An extensive capacity development program is needed to improve awareness of climate change and disaster risks and for

building or enhancing skills, such as in GIS, climate and disaster risk assessment, and designing climate- and disaster-resilient projects. The participation of all concerned stakeholder groups in policymaking related to low-carbon and climate- and disaster-resilient development in Bangladesh should also be ensured, especially of relevant groups who are often excluded or marginalized, with little or no voice and representation in national policymaking.

Pursuing climate financing. The Bangladesh government has been doing considerable work to address the overwhelming impacts and consequences of climate change. The cost of climate change response is very high, but many global sources of funding exist. However, access to these funds has to be effective (i.e., suited to the country’s capacity), and the country’s fund management capacity and system must be credible and in accordance with international standards. The climate change financing mechanism must also adhere to the principles of total transparency and accountability as well as demonstrate strong coordination regionally and among development partners. This requires robust methodology of examining climate change adaptation and mitigation activities, including capacity building, in all sectors to properly identify and cost the climate actions for greater resiliency. Lastly, it will be important for Bangladesh to develop a “national climate finance strategy” that is supported by an accountability framework, an enabling environment with proper policy signals, and a streamlined country-driven monitoring and evaluation procedure, all of which the development partners need to follow.

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