Global Water Partnership 25 YEARS

How water resources management can support climate-resilient development in Bangladesh

ABOUT THIS BRIEF

Water is a 'climate connector' – impacts of climate change on water will flow through all sectors of the economy and across national borders. This brief explains why integrated approaches to water management are essential for climate-resilient development, how Bangladesh has laid a solid foundation in that sense, and what needs to change if Bangladesh is to meet its commitments under the Paris Agreement and achieve the Sustainable Development Goals (SDGs).

SDG target 6.5, on integrated water resources management (IWRM), can make that climate connection. This brief looks at all four dimensions of IWRM, namely the enabling environment, institutions, management instruments, and financing.

RECOMMENDATIONS

Key stakeholder(s)	Recommendation
Ministry of Environment, Forests, and Climate Change (MoEFCC)	The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) was released in 2009 and is currently being updated. 1 Ensure that the second BCCSAP is coherent with other key policy statements, such as the eighth Five-Year Plan. 2 Embed climate change actions across all major sectors, rather than as a standalone issue for the MoEFCC. 3 Consider a more frequent updating of the BCCSAP (possibly to sync with the Five-Year Plans) in order to adapt to the changing climate and to new climate information and emerging technologies as they become available.
Economic Relations Division (ERD), under the Ministry of Finance MoEFCC	The climate funding landscape in Bangladesh has been developing fast and is becoming increasingly complex. Bangladesh's recent graduation to lower-middle income country (MIC) status could, however, reduce access to external funds, which could jeopardise the country's ambitious Delta Plan 2100. 4 Use the cross-sectoral annual budget reporting for climate change, overseen by the ERD, to assess potential funding synergies and co-benefits and minimise duplication of efforts.

RECOMMENDATIONS CONTINUED...

Key stakeholder(s)	Recommendation
MoEFCC ERD Ministry of Planning Ministry of Disaster Management and Relief (MoDMR) Inter-Ministerial Committee on SDG Implementation	An overall systemic perspective is required in order to ensure that cross-sectoral dynamics are characterised by positive interactions rather than by competition over mandates and over scarce resources. **5** Align efforts to achieve SDG target 6.5 and the National Adaptation Plan (NAP) as a basis to strengthen the policy and practical coherence between climate change adaptation and integrated water resources management.
General Economics Division (GED) Ministry of Planning MoEFCC	The number of climate-related databases has grown in recent years and are housed across different sectors and by multiple stakeholders. **6** Ensure that the new databases (e.g. the Delta Information Portal) avoid duplication and make the best use of existing databases, including the National Water Resources Database (NWRD), the Integrated Coastal Resources Database (ICRD), and the Disaster Management Information Portal (DMIN).
All of the above + Prime Minister's office	Bangladesh has been at the forefront of developing efforts to adapt to climate change and has much to share with the world in terms of its adaptation successes and ongoing challenges. **7** Continue to provide leadership at the global scale as a role-model for other developing countries via forums like the 'Vulnerable 20' (V20) grouping.

THE CHALLENGE

Bangladesh's vulnerability to climate change is shaped by the country's geographic and climatic characteristics and exacerbated by its socio-economic situation. There are more than 300 rivers in Bangladesh of which 57 are transboundary. Fifty-four of these are common with India and the remaining 3 with Myanmar. Equitable water sharing remains a challenge.

As a densely populated, low-lying country dominated by floodplains, Bangladesh is one of the most vulnerable countries in the world to the effects of climate change.

On the Global Climate Risk Index (which analyses the extent to which countries have been affected by the impacts of weather-related events), Bangladesh was ranked first for the period between 1990 and 2009 (Index published 2011), and seventh for the period 1998–2017 (Index published 2019).

Although recognised by the World Bank as a lower-middle income country in 2015, about 39 million people still lived below the national poverty line, as of 2020 (equivalent to 24% of the population, or one in four people), increasing their vulnerability to the impacts of climate change.

Mean annual temperatures are projected to increase by 1.8°C by the 2060s and by 2.7°C by the 2090s (compared to 2010).

Annual temperatures are further predicted to increase by as much as 4.1°C by the 2090s (compared to the longer-term average from 1970–2000).

Averaged over 2000 to 2010, the direct annual costs from natural disasters to the Bangladesh national economy have been estimated at 0.5–1% of GDP (excluding the significant loss of lives that has also occurred).

Bangladesh's extensive coastline makes it vulnerable both to sea-level rise and to tropical cyclones, which are forecast to increase in intensity:

- sea-level rise reduces agricultural land availability and crop productivity
- cyclones and associated storm surges destroy crops (for example, in 2007 Cyclone Sidr affected 900,000 hectares of agricultural land in southwest Bangladesh)
- Thousands of people flee from coastal areas to urban slums creating devastating migration problems.

Agriculture is the largest sectoral water user and is a key economic sector, accounting for around 17–20% of GDP, with around 45% of the labour force either directly or indirectly dependent on agriculture:

- gauged against the FAO's Food Insecurity Experience Scale (FIES), in 2016 around 32% of the population self-reported being 'moderately' to 'severely' food insecure
- overall agricultural GDP is expected to be 3.1% lower each year as a result of climate change.

Crops are vulnerable to floods, droughts, and crop salinity:

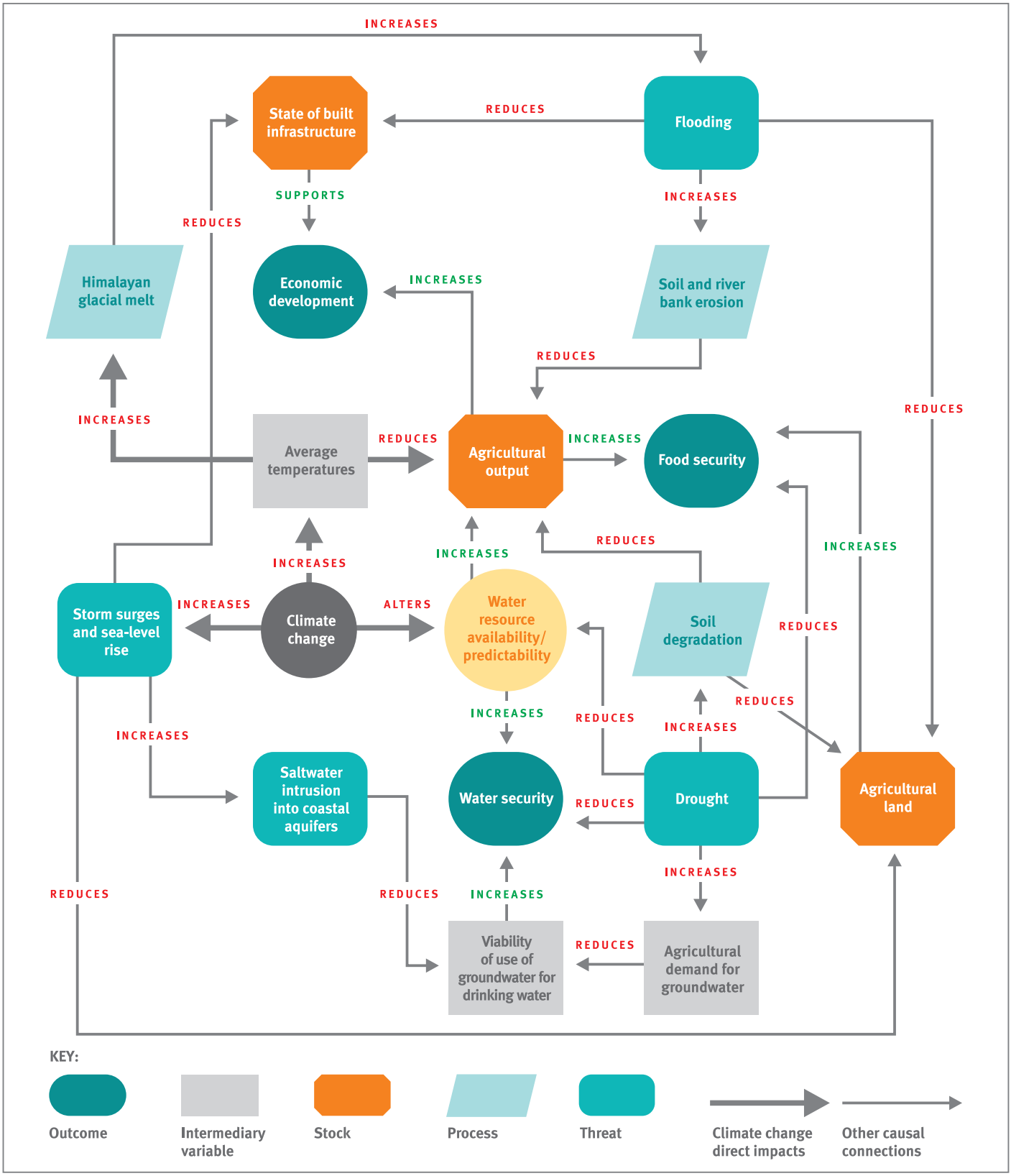
- floods inundate crop fields and drive erosion, causing extensive crop losses
- droughts reduce crop yields, increase crop failure, and drive soil degradation.
- increase in soil salinity may lead to a 15.6% yield decline of high-yielding-variety rice and reduce the income of farmers significantly in coastal areas.

Groundwater use has already increased dramatically over the last 20 years, in response to worsening drought conditions and rising agricultural demand, and is forecast to increase further in the future:

- groundwater use presents potential health risks, given that 25% of Bangladesh's 4 million wells are contaminated with naturally occurring arsenic
- sea-level rise is resulting in saltwater intrusion into coastal aquifers, which is further reducing the viability of using groundwater for drinking water.

As with the water–energy–food nexus, climate resilience and sustainable development are interconnected. The diagram below maps the relationships between some of the key climate challenges that Bangladesh faces, showing why coordinated, integrated, and cross-sectoral responses are required to adapt to the impacts of climate change.

THE INTERCONNECTED NATURE OF WATER-RELATED CLIMATE CHALLENGES IN BANGLADESH



The interconnected nature of these challenges

As with the water–energy–food nexus, climate resilience and sustainable development are interconnected. The diagram maps the relationships between some of the key climate challenges facing Bangladesh, showing why coordinated, integrated, and cross-sectoral responses are required to adapt to the impacts of climate change.

At the centre of the diagram is water resource availability/predictability, which is impacted both by climate change and by recurring droughts (as shown by the words written on the arrows between the variables). The complex relationship between climate change and water availability/predictability is not shown here for reasons of space. The word 'alters' is used to describe the fact that climate change can affect water resources via multiple vectors, including via changes in temperature and precipitation, and impact on availability in multiple ways, including via seasonality, changing frequency and intensity of rainfall events, and fluctuating water quality.

In order to facilitate the accurate reading of this diagram, the following description will describe two causal chains. Climate change alters water resource availability/predictability and, in doing so, impacts water security (under the logic that water resource availability/predictability increasing will lead to an increase in water security, and vice versa). Decreasing water resource availability/predictability is expected to negatively impact on agricultural output, with knock-on effects on both economic development and food security. Climate change is also driving Himalayan glacial melt, via an increase in average temperatures. This increased glacial melt is increasing flooding, which is reducing the state of build infrastructure and therefore impacting on economic development. Flooding also reduces the available agricultural land, with an associated decrease in food security. The remainder of the diagram can be read in the same way.

ENABLING ENVIRONMENT

What do key policy statements say about integration of water, climate, and other Sustainable Development Goal agendas?

INTEGRATED WATER RESOURCES MANAGEMENT

Policy integration is progressing fast although there are several agendas running concurrently. Programmes and projects relating to water dominate climate change policy and implementation while within water policy there have been increasing moves toward integrated water resources management. National planning is also driving a more integrated approach to climate change with screening tools integrated into the heart of development planning. Reporting on the SDGs is being promoted at the highest level and driving its integration. A major new initiative has been launched which aims to implement integrated targeted strategies for the different parts of the country, namely the Bangladesh Delta Plan 2100.

The Bangladesh water policy arena has been dealing with enormous climate variability since the founding of the country in the early 1970s. The early years were characterised by hard engineering solutions, primarily to control floods. These experiences demonstrated that managing water resources can offer practical pathways to tackling complex challenges.

The seventh Five-Year Plan (2016–2020) has strategies proposed for improving water resources management for supporting agricultural growth. It also emphasises the sustained and balanced use of water resources for irrigation, drinking water, and water transport while reducing vulnerabilities from flooding, water logging, salinity, and river siltation. However, the extent to which long-term climate change issues have been embedded throughout all levels and operations of water policy is not yet clear (see **Recommendation 1**).

Bangladesh's extensive coastline makes it vulnerable to cyclones and associated storm surges, which are expected to increase in number and severity in the future. Coastal development therefore needs to be carefully managed. The Coastal Zone Policy (2005) was one of the first national polices to clearly incorporate climate change issues and associated adaptation measures. The Coastal Zone Policy provides general guidance that was elaborated in the Coastal Development Strategy (2006) within a framework of integrated coastal zone management (ICZM).

Food self-sufficiency and, more broadly, food security have been key development priorities with the agricultural sector at the centre of them. Guiding documents for the development of the agricultural sector include the National Agricultural Policy, the National Food Policy (2006), and the Country Investment Plan for Agriculture, Food Security and Nutrition (2015).

POLICY STATEMENTS

SECTOR	KEY POLICY STATEMENTS (INCLUDING LAWS, STRATEGIES, AND PLANS)
Cross-sectoral	■ Seventh Five-Year Plan (2016–2020) ■ National Sustainable Development Strategy (2020–2021) ■ The Bangladesh Delta Plan (2100) ■ Vision 2041: Perspective Plan of Bangladesh (2021–2041)
Climate change	■ Bangladesh Climate Change Strategy and Action Plan (2009) (currently under revision) ■ National Adaptation Programme of Action (2005, 2009) ■ Intended Nationally Determined Contribution (2015)
Water	■ National Water Policy (1999) ■ The National Water Management Plan (2001) ■ Bangladesh Water Act (2013) ■ Bangladesh Water Rules (2018) ■ National Strategy for Water and Sanitation in the Hard-to-Reach Areas of Bangladesh (2012)
Coastal	■ Coastal Zone Policy (2005) ■ Coastal Development Strategy (2006)
Agriculture (including food security)	■ National Agricultural Policy ■ National Food Policy ■ Country Investment Plan for Agriculture, Food Security, and Nutrition (2015)
Disaster risk management	■ National Plan for Disaster Management (2016–2020)

Water in support of climate and development strategy

Water sector projects were prioritised in the first National Adaptation Programme of Action (NAPA) (2005) and in the 2009 update. The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) was approved in 2009 (and is now being revised). It sets forward six pillars (see textbox) and 44 priority programmes, most of which depend in some way on sound water management, including in the areas of drought management, disaster management, infrastructure, and knowledge management (see **Recommendations 1 and 3**). Ten key areas of action were identified in the Intended Nationally Determined Contribution of Bangladesh (INDC) (2015), eight of which relate to water management. These key areas of action include: food security, disaster management, coastal zone management, and community- based conservation of wetlands and coastal areas.

The Third National Communication recognised that climate change issues have not been sufficiently highlighted in national policy as a whole, but measures are now being put in place. National planners in Bangladesh recognise that climate change and water constraints are threatening economic growth. Climate change adaptation is included in the seventh Five-Year Plan and, under the related Annual Development Plans (ADP), climate change screening tools have been integrated into development project proposals. The eighth Five-Year Plan provides an opportunity to further mainstream the role of water in climate change adaptation (see **Recommendations 1 and 2**).

The National Water Policy (1999) acknowledges that it will take time and considerable effort for Bangladesh to work out joint plans for different river basins with other co-riparian countries. The long-term policy of the government is therefore to undertake essential steps for realising basin-wide planning for development of the resources of the rivers entering its borders. Grounds for further cooperation to build upon include the Indo-Bangladesh Joint Rivers Commission (JRC) and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), which incorporates climate change dimensions and involves seven member states (Bangladesh, India, Myanmar, Sri Lanka, Thailand, Nepal, and Bhutan).

The new comprehensive long-term water resources management plan for the management of the Delta to 2100 (BDP 2100) takes an all-embracing approach to integration. This ambitious plan recognises the long-term challenges from climate change for development outcomes (see **Recommendation 4**). The national level strategy identifies six hotspots and is cross-sectoral and underpinned by principles of adaptive management. Transboundary water management is one of the cross-cutting issues for detailed attention, with river basin management plans, multi-track water diplomacy, and third-party involvement.

SIX PILLARS OF BANGLADESH CLIMATE CHANGE STRATEGY AND ACTION PLAN

1. Food security, social protection, and health
2. Comprehensive disaster management
3. Infrastructure
4. Research and knowledge management
5. Mitigation and low carbon development
6. Capacity building and institutional strengthening

INSTITUTIONS

Are Bangladesh's institutions ready to manage the impacts of climate change on water resources and on other water-related sectors in an integrated way?

BANGLADESH'S INSTITUTIONAL ARCHITECTURE

There are a variety of institutional coordination mechanisms across the climate change, sustainable development, and integrated water resources management agendas, which are constantly evolving with new policies and plans. The increasing significance of the SDG reporting process and climate change in national development policy has meant that the General Economics Division (GED) of the Government of Bangladesh is increasingly supporting cross-sectoral collaboration. It is the GED that is now leading the implementation of the Delta Plan.

Leadership and coordination on climate, disasters, and water resources

Bangladesh has a comprehensive, yet complicated institutional architecture for managing climate change adaptation, water, and disaster risk management (see figure below). A UNDP-sponsored study found that in 2013 at least 37 ministries, plus their departments and semi-autonomous bodies, have at least one "climate sensitive programme." The number of climate-related programmes has grown significantly since 2013, showing why coordinated and integrated responses to climate change and development challenges are needed. Climate change became a new division within the re-named Ministry of Environment, Forests, and Climate Change (MoEFCC) in 2019, however, it is constrained by a weak legal framework and has, to date, not been a significantly well-funded ministry (see **Recommendation 4**).

In order to support coordination of climate change activities, the Government of Bangladesh established an Inter-Ministerial Committee on Climate Change, which is headed by MoEFCC with representation from relevant ministries as well as key NGOs. Other inter-ministerial committees (IMC) include the IMC on disaster management coordination and the IMC on SDG implementation. There is an All-Party Parliamentary Group on climate change headed by the Prime Minister and a parliamentary committee of coastal MPs has also been formed. Not all coordinating committees are operating successfully, however (see **Recommendation 5**).

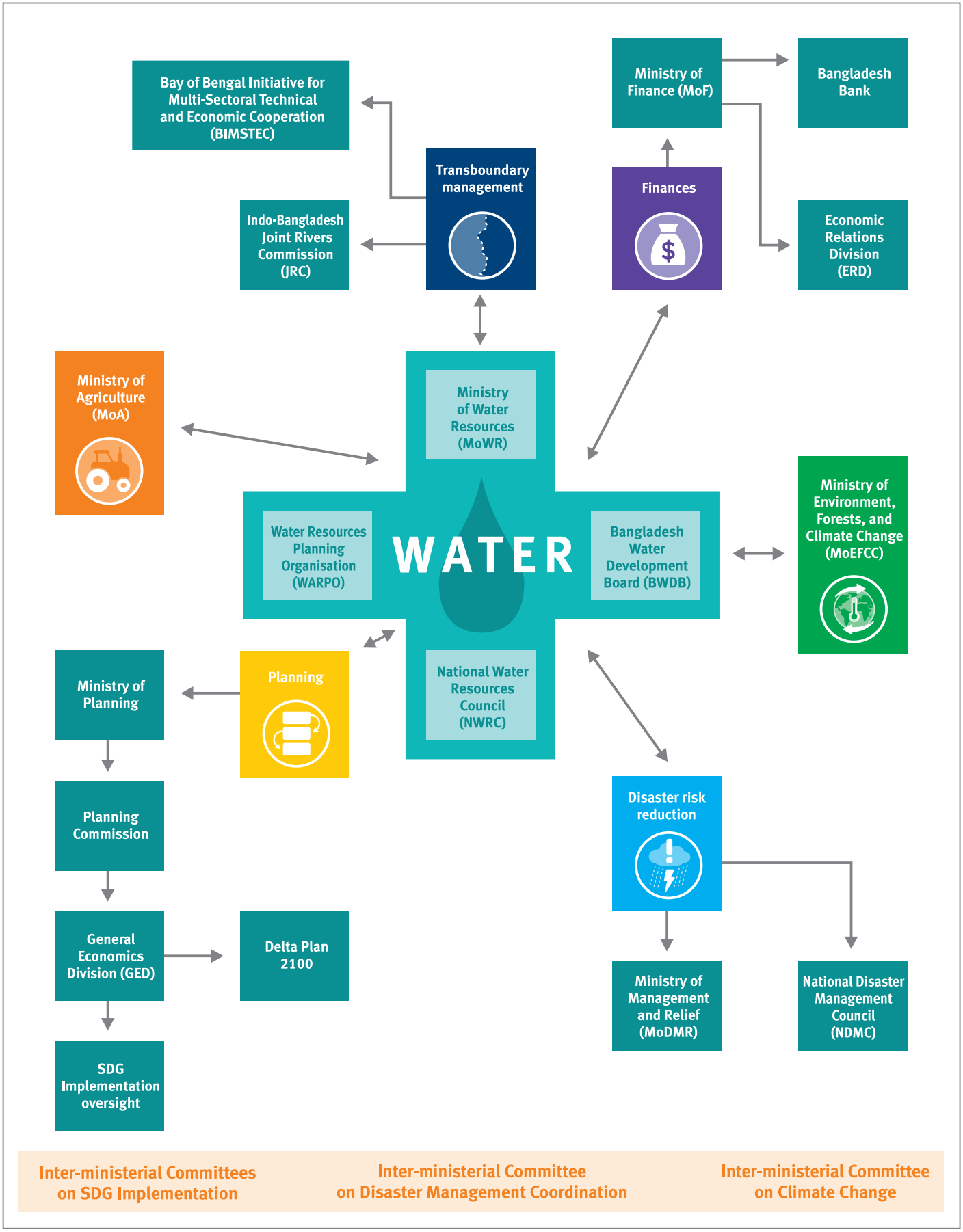
Turning to water, the Ministry of Water Resources, and its associated agencies (estimated 35 in number) is long established and is a powerful entity with significant budget powers. Its role has developed to take on integrated water resources management, and its agency, the Water Resources Planning Organisation (WARPO), is mandated to handle IWRM and is now coordinating integrated coastal zone management. Key documents in the water sector have been developed with very extensive public consultation. The need to annually report on SDG 6.5.1 (integrated water resources management) is also helping to drive progress in this area. Another central water organisation is the Bangladesh Water Development Board (BWDB), which has been criticised in the past for having weak or non-existent relationships with other government ministries. Internal reforms in the BWDB have reportedly led to some improvements in efficiency, but the following key challenges remain:

- meaningful involvement of stakeholders
- developing mechanisms to work with non-governmental organisations
- providing effective operation and maintenance of infrastructures for the benefit of local stakeholders.

Finally, the National Water Resources Council (NWRC) provides higher-level governance and oversight. It is unclear how the NWRC interfaces with other inter-ministerial committees and other cross-sectoral interests.

Disaster management is overseen by the Ministry of Disaster Management and Relief (MoDMR) and the National Disaster Management Council, working in tandem with the inter-ministerial Disaster Management Coordination Committee.

BANGLADESH'S INSTITUTIONS



Emerging mega-coordination mechanisms for sustainable development

There are two emerging mega-coordination mechanisms: SDG implementation and the Delta Plan 2100. Bangladesh has been widely acclaimed as one of the front runners of the implementation of the Millennium Development Goals. It made outstanding progress on the social goals and many targets were achieved ahead of time. Following from this, the dynamic leadership of the Bangladeshi Prime Minster led to her nomination as one of the Asian members on the High-Level Panel on Water (see **Recommendation 7**). This leadership provided momentum to the establishment of an Inter-Ministerial Committee on SDG Implementation and a mapping of ministries by targets for the implementation of the SDGs. These innovations coincided with the start of the seventh Five-Year Plan. This mapping exercise resulted in a tabular Action Plan where, for each SDG, actions were mapped in relation to goals, relevant policy instruments, lead and associated ministries, performance indicators, and costs. This process is led by a Principal Coordinator in the PM's office who heads the committee in the GED of the Planning Commission. The action plans are undertaken by each ministry. In addition, each lead ministry works with two others, supporting cross-sectoral planning and implementation (see **Recommendation 5**).

The Delta Plan has acknowledged that many of the recommendations of the National Water Policy (1999) were not implemented, including participatory water management. As implementation of the new "Mega Plan" demands challenging inter-sectoral coordination and financing, overall responsibility has been given to the GED, and a new "Delta Wing" will be established. There will also be a small, high-level ministerial forum chaired by the Prime Minister (Delta Governance Council) acting as a supervisory, coordinating, and guiding authority.

MANAGEMENT INSTRUMENTS

Are management decisions in water and other Sustainable Development Goals being guided by evidence on climate change?

INFORMATION MANAGEMENT

There is a broad understanding of the impacts that climate change will increasingly cause from climate change policy documents published in the last twenty years and growing efforts are being made to make information accessible on climate change. Many project proposals seek to build more capacity on these issues. Outside of the climate financed project portfolio it is difficult to determine to what extent management decisions and plans are changed according to evidence of the impact of climate change, as the information is not always available in usable formats.

Climate change projections and research

Early support was given to the development of climate projections in Bangladesh together with training for their dissemination across the institutions and policies for water and disaster management. There has been a range of related capacity building efforts, for example in the civil service training college.

Many research programmes on climate change issues in the country have been conducted by national and international organisations in recent years. *Gobeshona* is a knowledge sharing platform for this climate change research featuring some 1,360 publications published on the portal as of October 2016, since the 1970s. Recently, the Government's Trust Fund (which is introduced in the

following section) has sponsored the MoEFCC to set up a climate change research centre within the ministry.

Given the abundance of information and decision-making tools available, there have been some recent efforts to take stock of how they could be used more effectively to guide decision-making. For example, in late 2019 the Bangladesh Meteorological Department, with the Enhancing National Climate Services (ENACTS) initiative, engaged a group of government and non-governmental stakeholders in order to understand the potential uses of the new climate tools in decision-making in agriculture, aquaculture, insurance, and other sectors critical to Bangladesh's food security.

As in the case of climate change, there does not appear to be a problem with availability of information for the water sector. However, it is again less clear how widely and effectively this information is used and, where appropriate, integrated.

Relevant information portals and databases include:

- the Disaster Management Information Portal (DMIN)
- the National Water Resources Database (NWRD), developed and managed by the Water Resources Planning Organization (WARPO) to meet the demand for data on the water sector
- the Integrated Coastal Resources Database (ICRD), also hosted by WARPO, provides coastal-related data to relevant stakeholders and already includes 500 layers of data
- the Delta Information Portal, held between GED, WARPO, and BWDB in order to manage data pertaining to the Delta Plan 2100 as an information portal between databases and Delta tools.

Ensuring that these databases avoid duplication and make the best use of each database's strengths will require continual effort (see **Recommendation 6)**.

FINANCES

How ready is Bangladesh to finance water-related climate action?

CLIMATE FUNDING

Climate finance has been focused on water and coastal-related problems. Bangladesh made an early start in providing finance for climate change from domestic budget sources. In addition, it created a special Trust Fund in 2007 for climate change projects. It has been well funded by Official Development Assistance (ODA), but the Green Climate Fund (GCF) project pipeline has been slow to develop and secure funds. There is now a working relationship and a fully developed country programme. Donor funds are being sought for the ambitious cross-cutting Delta Plan.

Bangladesh has been a global policy leader on providing domestic funds for climate change and has also benefitted from global funding sources, partly due to its vulnerability and least-developed country status. In the wake of catastrophic Cyclone Sidr in 2007, the government and donors established two funds to implement the Bangladesh Climate Change Strategy and Action Plan (BCSSAP), as detailed in the table below.

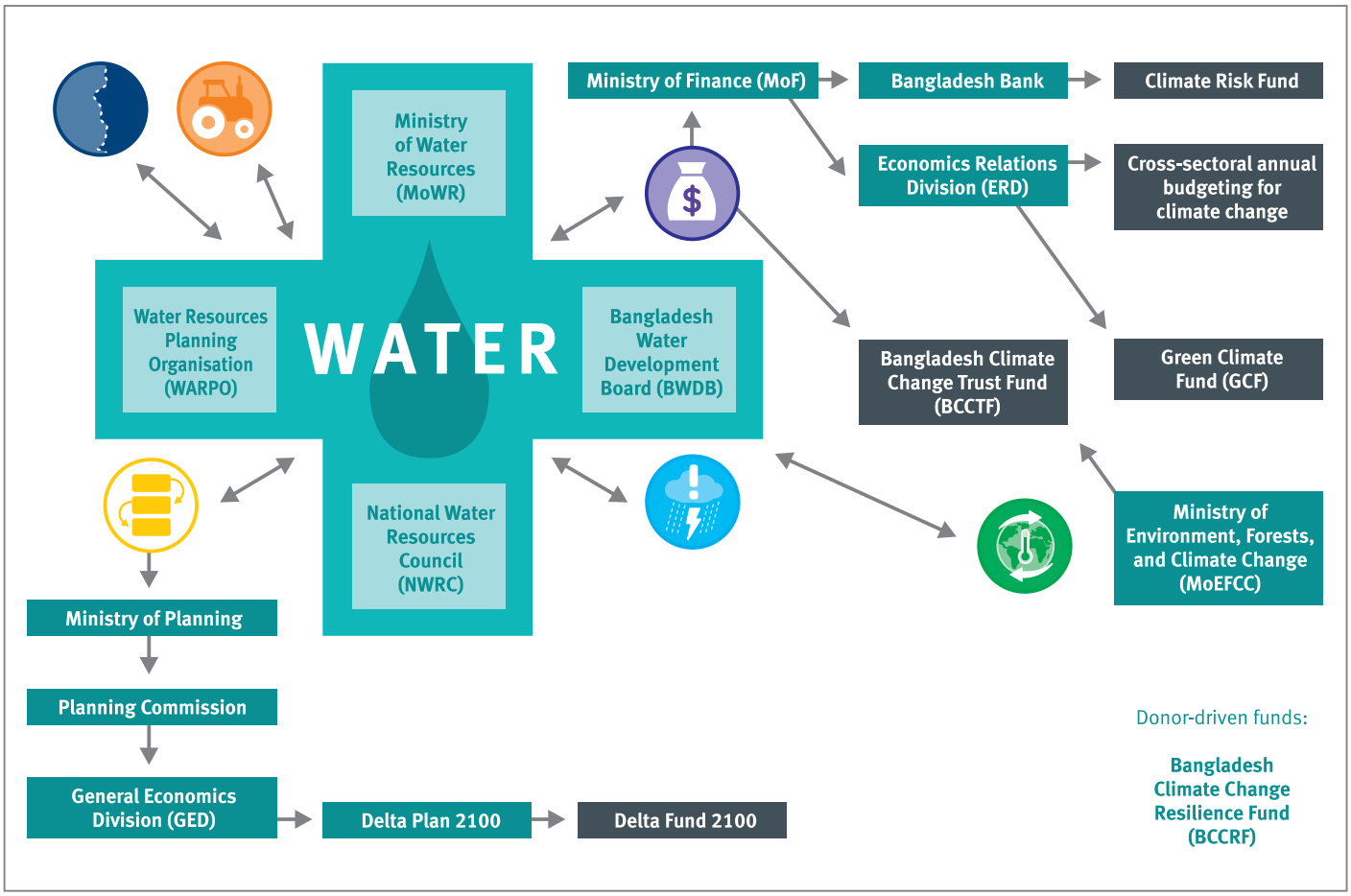
The Bangladesh Climate Change Trust Fund (BCCTF) and the Bangladesh Climate Change Resilience Fund (BCCRF) are not the only two climate finance funds in Bangladesh. There are a number of other funds, including:

- The Delta Fund – overseen by the General Economics Division (GED) in order to finance Delta Plan 2100, which ambitiously aims for minimum financing of 2.5% of GDP per year
- The Climate Risk Fund – managed by Bangladesh Bank (the country's central bank), which was established from the bank's Corporate Social Responsibility fund (10% of the total fund) to combat climate change and to address disaster management.

FUNDS TO IMPLEMENT THE BCSSAP

Fund 1 (Government-funded)	The Bangladesh Climate Change Trust Fund (BCCTF)	■ The Government of Bangladesh has invested an impressive equivalent of US$100 million (as of September 2019) ■ Up to June 2016, 440 projects have been implemented, of which 377 were through the government, semi-government, and autonomous agencies ■ Water sector projects have dominated, particularly flood control measures (embankment protection, water control infrastructure, water supply measures, and agriculture projects such as stress-tolerant seeds).
Fund 2 (Donor-funded)	The Bangladesh Climate Change Resilience Fund (BCCRF)	■ Established in 2010 with an MoU between the Government of Bangladesh, development partners and the World Bank ■ Focussed on larger coastal zone projects including cyclone shelters, coastal embankment improvements, and afforestation ■ As of September 2016, 13 projects have been funded representing a worth of US$146.4 million ■ One assessment, however, has pointed out that while food security is a central theme of the BCCSAP, very little international climate finance targets this sector.

BANGLADESH'S CLIMATE FINANCE LANDSCAPE



The Economic Relations Division (ERD) – which along with Bangladesh Bank is within the Ministry of Finance – is Bangladesh's National Designated Authority (NDA) for administering the country's grants under the GCF. The ERD has a reportedly strong working relationship with the GCF, with a large country programme of projects being developed through a comprehensive stakeholder process. Other recently approved climate-related projects involving multilateral agencies and mediating entities are listed in the table below.

Institutional developments

As the government has been spending significant domestic resources on climate change, as well as receiving ODA, the ERD of the Finance Ministry has become active on the issue and provides a cross-government perspective which feeds into the national planning process. Selected ministries (increasing every year, now 25) are required to submit an annual budget for climate change. The UNDP has also been supporting the development of a system for Inclusive Budgeting and Financing for Climate Resilience (see **Recommendation 4**).

Future challenges

Organising adequate funding for the future remains a challenge for the country. Although Bangladesh has made significant economic and social progress in recent years, continued investment is required for poverty alleviation and economic development. Climate change is a significant additional parameter that is integral to water resources management for development, but is not always treated as such when it comes to project preparation and budgeting.

OTHER CLIMATE-RELATED PROJECTS

Project	Value	Multilateral agencies
Building climate-resilient infrastructure (with the Local Government Engineering Department (LGED))	US$40 million	KFW (German development bank)
Providing fresh drinking water to pregnant women, and others, in low-lying coastal districts already suffering from salinity in drinking water (with the Minister of Women and Children's Affairs)	~ US$25 million	United Nations Development Programme (UNDP)
Livestock and Dairy Development Project (in parallel with the World Bank's broader Climate Smart Agriculture Investment Programme)	US$500 million	World Bank

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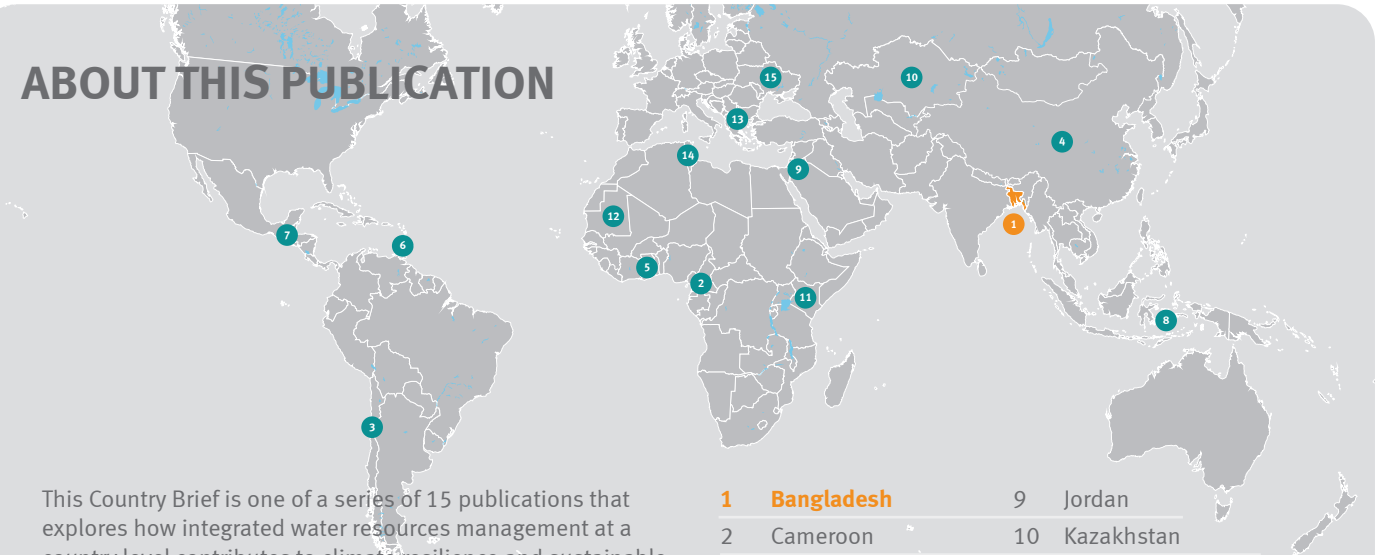
ABOUT THIS PUBLICATION



This Country Brief is one of a series of 15 publications that explores how integrated water resources management at a country level contributes to climate resilience and sustainable development, as well as meeting the commitments under the Paris Agreement and achieving the Sustainable Development Goals (SDGs).

The full synthesis report, The Untold Story of Water in Climate Adaptation. Part II. 15 Countries Speak, of the work undertaken in all 15 countries is available at www.gwp.org.

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