

## From Climate Risks to Climate Resilience: Bangladesh's Path Toward Achieving SDG 13

Abida Farzana Muna<sup>1</sup>

### Introduction

Bangladesh's vulnerability to climate change stems from both its geographical features and socio-economic conditions. Geographically, the nation is predominantly low-lying, with about two-thirds of its land less than five meters above sea level, making it particularly susceptible to sea-level rise and flooding<sup>2</sup>. This topography, combined with a dense network of rivers, exacerbates the impact of monsoon floods and storm surges.

Socio-economically, a significant portion of Bangladesh's population relies on agriculture, which is highly sensitive to climate variations. The recurrence of natural disasters, such as cyclones and floods, disrupts agricultural productivity, leading to economic instability for farming communities. For instance, recent floods destroyed approximately 1.1 million metric tons of rice, severely impacting food security and livelihoods<sup>3</sup>. Coastal regions face unique challenges due to their proximity to the Bay of Bengal. These areas are prone to cyclones, which have become more

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<sup>1</sup> Abida Farzana is a Research Intern at Bangladesh Institute of Peace and Security Studies (BIPSS). She has completed her Bachelor of Social Science (BSS) in International Relations from Bangladesh University of Professionals.

<sup>2</sup> Climate Expert. 2015. 'Bangladesh'. Sector Project. Sustainable Economic Policy. Deutsche Gesellschaft für. [https://www.climate-expert.org/en/home/business-adaptation/bangladesh/?utm\\_source=chatgpt.com](https://www.climate-expert.org/en/home/business-adaptation/bangladesh/?utm_source=chatgpt.com).

<sup>3</sup> Paul, Ruma. 2024. 'Floods Destroy 1.1 Million Tons of Rice in Bangladesh'. *Reuters*, October 20, sec. Asia Pacific. <https://www.reuters.com/world/asia-pacific/floods-destroy-1-1-mln-tons-rice-bangladesh-2024-10-20/>.

frequent and intense due to climate change<sup>4</sup>. Cyclone Remal, for example, caused significant damage, including power outages affecting millions. Additionally, saltwater intrusion from rising sea levels contaminates freshwater resources, adversely affecting agriculture and drinking water supplies<sup>5</sup>.



Monsoon flood scenario in low-lying areas of Bangladesh. Source: UNICEF

In low-lying areas, heavy monsoon rains and inadequate drainage systems lead to prolonged flooding, displacing communities and disrupting daily life. In northern Bangladesh, severe floods have displaced thousands and damaged infrastructure, highlighting the region's vulnerability<sup>6</sup>. The slow recession of floodwaters also raises concerns about waterborne diseases, further endangering

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<sup>4</sup> Sarkar, Showmitra Kumar, Rhyme Rubayet Rudra, and Md Mehedi Hasan Santo. 2024. 'Cyclone Vulnerability Assessment in the Coastal Districts of Bangladesh'. *Heliyon* 10 (1). Elsevier. doi:[10.1016/j.heliyon.2023.e23555](https://doi.org/10.1016/j.heliyon.2023.e23555).

<sup>5</sup> Mohiuddin, Md, and Samshad Nowreen. 2023. 'Climate Change-Induced Livelihood Vulnerabilities in South Western Coastal Region of Bangladesh'. *Jagannath University Journal of Life and Earth Sciences* 9 (2): 163–78. doi:[10.3329/jnujles.v9i2.72922](https://doi.org/10.3329/jnujles.v9i2.72922).

<sup>6</sup> Hossain, Mohammad Ponir, Ruma Paul, and Subrata Nag Choudhury. 2024. 'Cyclone Kills 16 in India, Bangladesh and Cuts Power to Millions'. *Reuters*, May 28, sec. Asia Pacific. <https://www.reuters.com/world/asia-pacific/millions-without-power-cyclone-remal-pounds-bangladesh-india-2024-05-27/>.

public health<sup>7</sup>. These factors collectively underscore the pressing need for comprehensive climate resilience strategies in Bangladesh to mitigate the adverse effects on its population and economy.

## **Policy Frameworks and Government Initiatives**

Bangladesh's climate action strategies, including the National Adaptation Programme of Action (NAPA) and the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), are key initiatives designed to address the nation's vulnerabilities to climate change while aligning with the targets of Sustainable Development Goal (SDG) 13.

### **1. National Adaptation Programme of Action (NAPA)**

The NAPA was Bangladesh's first comprehensive climate adaptation strategy formulated in 2005. It identifies 15 priority actions to address immediate and urgent adaptation needs, particularly for agriculture, water resources, and disaster management. One notable initiative under NAPA includes promoting drought-resistant crop varieties and irrigation techniques to mitigate the effects of prolonged dry spells<sup>8</sup>. Additionally, NAPA emphasizes strengthening community resilience, particularly in flood-prone and cyclone-affected regions. For instance, constructing small-scale water reservoirs and embankments to control flooding and saline water intrusion directly supports SDG Target 13.1 (strengthening resilience and adaptive capacity to climate-related hazards). This grassroots approach makes the plan actionable and relevant to Bangladesh's rural population.

### **2. Bangladesh Climate Change Strategy and Action Plan (BCCSAP):**

The BCCSAP was launched in 2009 and built on the foundation laid by NAPA. It provides a more comprehensive framework across six thematic areas. First, it emphasizes food security, social protection, and health by promoting climate-resilient agricultural practices, such as saline-tolerant

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<sup>7</sup> Paul, Ruma. 2024. 'Floods Destroy 1.1 Million Tons of Rice in Bangladesh'. *Reuters*, October 20, sec. Asia Pacific. <https://www.reuters.com/world/asia-pacific/floods-destroy-11-mln-tons-rice-bangladesh-2024-10-20/>.

<sup>8</sup> UNFCCC. 2005. 'National Adaptation Programme of Action (NAPA)'. Bangladesh: Ministry of Environment and Forest Government of the People's Republic of Bangladesh.

crops, and providing safety nets like crop insurance and cash transfers to vulnerable communities. It also strengthens healthcare systems to tackle climate-induced diseases<sup>9</sup>.

In disaster management, the plan supports early warning systems and the construction of cyclone shelters, significantly reducing fatalities during emergencies. The focus on infrastructure includes building flood-resilient roads, bridges, and homes, particularly in vulnerable regions, while retrofitting existing structures to withstand climate shocks<sup>10</sup>. In research and knowledge management, the strategy promotes climate studies on agriculture and water resources to guide evidence-based policies and fosters knowledge-sharing platforms for collaboration. Low-carbon development is encouraged through renewable energy initiatives like the Solar Home System (SHS), along with cleaner industrial practices<sup>11</sup>.

Finally, capacity building ensures training for policymakers, communities, and institutions to integrate climate resilience into their operations, exemplified by projects like the Local Government Engineering Department's (LGED) climate-resilient infrastructure. Together, these initiatives provide a comprehensive roadmap for addressing climate vulnerabilities while aligning with global goals like SDG 13<sup>12</sup>. For example, under the BCCSAP framework, Bangladesh has built more than 4,000 cyclone shelters in coastal regions, directly saving lives during frequent cyclones like Cyclone Remal in 2024<sup>13</sup>. These shelters align with SDG Target 13.1 by providing safety during climate disasters and improving disaster preparedness.

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<sup>9</sup> Aminul, Islam., Rajib, Shaw., Fuad, Mallick. (2013). Bangladesh Climate Change Strategy and Action Plans. 107-118. doi: 10.1007/978-4-431-54249-0\_7

<sup>10</sup> Hartwig, de, Haen. (2008). Food Security Strategies: Building Resilience Against Natural Disasters  
Stratégies de sécurité alimentaire : améliorer la résistance aux catastrophes naturelles  
Strategien für die Sicherung der Ernährung: Stärkung der Widerstandsfähigkeit gegen Naturkatas. EuroChoices, 7(3), 26-33.  
doi: 10.1111/J.1746-692X.2008.00108.X

<sup>11</sup> Aminul, Islam., Rajib, Shaw., Fuad, Mallick. (2013). Bangladesh Climate Change Strategy and Action Plans. 107-118. doi: 10.1007/978-4-431-54249-0\_7

<sup>12</sup> Carmen, G., Gonzalez. (2011). Climate Change, Food Security, and Agrobiodiversity: Toward a Just, Resilient, and Sustainable Food System. Social Science Research Network,

<sup>13</sup> MoEF. 2008. 'BANGLADESH CLIMATE CHANGE STRATEGY AND ACTION PLAN 2008'. Ministry of Environment and Forests Government of the People's Republic of Bangladesh.



Climate Adaptation Campaigns. Source: SCI AM

### 3. Alignment with SDG 13:

Bangladesh's climate strategies are closely aligned with the three primary targets under SDG 13, demonstrating the country's commitment to climate action.

#### a. **Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards.**

Bangladesh's National Adaptation Programme of Action (NAPA) **and the** Bangladesh Climate Change Strategy and Action Plan (BCCSAP) prioritize disaster risk reduction and adaptation to mitigate the impacts of climate change. A key focus is on enhancing resilience in flood-prone and cyclone-affected areas. For instance, embankments and dikes have been constructed in coastal and riverine regions to protect agricultural lands and human settlements from flooding and saline water intrusion. Moreover, innovative approaches like floating agriculture have been introduced, where crops are cultivated on floating beds made of water hyacinths, allowing farming to continue during monsoon floods. These measures

not only strengthen community resilience but also safeguard livelihoods that are particularly vulnerable to climate extremes<sup>14</sup>.

**b. Target 13.2: Integrate climate change measures into national policies and planning.**

Bangladesh has effectively integrated climate considerations into its national development agenda, ensuring long-term sustainability. The Delta Plan 2100, a comprehensive strategy inspired by the BCCSAP, focuses on integrating climate resilience into water resource management, land use, and infrastructure planning. The plan aims to ensure food and water security, reduce climate risks, and support economic growth through sustainable practices. For example, initiatives under the Delta Plan include the construction of climate-resilient polders to protect coastal areas from sea-level rise and storm surges. The alignment of these policies with national development priorities reflects the institutionalization of climate resilience as a core element of governance<sup>15</sup>.

**c. Target 13.3: Improve education, awareness, and institutional capacity on climate change mitigation and adaptation:**

Bangladesh emphasizes the role of education and capacity building in addressing climate challenges, as highlighted in the BCCSAP. Programs like the Climate Resilient Ecosystems and Livelihoods (CREL) project work to educate local communities about sustainable ecosystem management and adaptation strategies. These initiatives train community members in climate-smart agriculture, water conservation, and disaster preparedness, enhancing their ability to adapt to environmental changes. Additionally, institutional capacity is strengthened through workshops, policy forums, and technical training for government agencies and NGOs, enabling them to implement and monitor climate initiatives more effectively. By fostering awareness and knowledge sharing, these

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<sup>14</sup> United Nation Bangladesh. 2024. 'Sustainable Development Goal 13: Climate Action | United Nations in Bangladesh'. Accessed January 6. [https://bangladesh.un.org/en/sdgs/13?utm\\_source=chatgpt.com](https://bangladesh.un.org/en/sdgs/13?utm_source=chatgpt.com).

<sup>15</sup> Arfanuzzaman, Md. 2024. 'Bangladesh's Pathways to Climate-Resilient Development: A Methodical Review'. *World Development Sustainability* 4 (June): 100144. doi:[10.1016/j.wds.2024.100144](https://doi.org/10.1016/j.wds.2024.100144).

efforts ensure that both policymakers and grassroots actors are equipped to tackle the impacts of climate change<sup>16</sup>.

One of the most tangible impacts of these strategies is evident in Bangladesh's cyclone preparedness. The construction of shelters, coupled with robust early warning systems, has drastically reduced cyclone-related fatalities over the past decades. For instance, during Cyclone Remal in 2024, fatalities were minimized compared to previous cyclones like Sidr in 2007, due to improved evacuation protocols and the availability of shelters<sup>17</sup>.

## **Community-Led Adaptation and Resilience Building**

Community-led adaptation and resilience-building initiatives are critical in addressing the challenges posed by climate change. Successful examples of community-based adaptation measures include floating agriculture in flood-prone areas and mangrove reforestation along coastal regions. Floating agriculture, often practiced in regions like Bangladesh, allows communities to cultivate crops on floating beds made from water hyacinths and other organic materials, providing food security during floods<sup>18</sup>. Similarly, mangrove reforestation not only acts as a natural barrier against storm surges and coastal erosion but also enhances biodiversity and supports local livelihoods by improving fishery resources<sup>19</sup>. Integrating indigenous knowledge with modern solutions is essential for ensuring the sustainability and effectiveness of these initiatives. Indigenous communities often possess deep ecological understanding and adaptive strategies honed over generations, which, when combined with scientific research and

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<sup>16</sup> Sk., Tawfique, M., Haque., Md., Yousuf. (2024). 4. Bangladesh. doi: 10.4337/9781802209204.ch78

<sup>17</sup> Reuters. 2024. 'Cyclone Remal Kills Four, Snaps Power Links to Millions in India, Bangladesh'. <https://www.arabnews.com/node/2517681/world>.

<sup>18</sup> Tareq, Mahmud, Abir., Tanwee, Das., Farzana, Ferdous. (2024). Building Community Resilience and Adaptation to Climate Change: Integrating Disaster Risk Reduction in the Coastal Regions of Bangladesh. *Journal of Coastal Research*, 40(4) doi: 10.2112/jcoastres-d-23-00043.1

<sup>19</sup> Habibur, Rahman., Arifa, Akter, Easha., Nuzhat, Fatema., Md., Jahidul, Islam., Morshed, Alam. (2024). Climate Change Adaptation Strategy of the Coastal Indigenous Community of Bangladesh. *Advances in Civil Engineering*, 2024(1) doi: 10.1155/2024/5395870

technological advancements, can lead to more robust and context-specific solutions<sup>20</sup>. This approach fosters community ownership and strengthens resilience against climate-induced vulnerabilities.



Community-based Climate Resilience. Source: NAP Global Network

### **Role of International Partnerships and Climate Financing:**

International partnerships and climate financing are indispensable for Bangladesh in addressing the multifaceted challenges posed by climate change. As one of the most vulnerable countries to climate-induced risks, including rising sea levels, cyclones, and flooding, Bangladesh heavily relies on external financial and technical support to enhance its climate resilience.

The Green Climate Fund (GCF), established under the United Nations Framework Convention on Climate Change (UNFCCC), is a pivotal instrument in mobilizing resources for climate action in developing countries. Bangladesh has secured significant funding from the GCF, such as the \$256.5 million project approved in 2020 to enhance the resilience of its agriculture and water sectors<sup>21</sup>. These funds target critical areas, including infrastructure development, disaster risk

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<sup>20</sup> Yitong, Niu., Vugar, Abdullayev., Abuzarova, Vusala, Alyar., Asgarov, Taleh, Kamran. (2023). Resilience and Adaptation to Climate Change: Community-Based Strategies in Coastal Regions. 2023, 37-44. doi: 10.70470/estidamaa/2023/005

<sup>21</sup> Green Climate Fund. "Green Climate Fund Approves \$256.5 Million for Climate Resilience in Bangladesh." Last modified 2020. <https://www.greenclimate.fund>



reduction, and ecosystem-based adaptation, providing a lifeline for millions of vulnerable communities.

In addition to multilateral funds, bilateral collaborations with countries like Germany, Japan, and the United Kingdom have further supported Bangladesh's climate efforts. For instance, the German Development Cooperation (GIZ) has been instrumental in implementing renewable energy projects, while Japan has contributed to infrastructure resilience through grants and loans<sup>22</sup>. These partnerships not only bring financial resources but also facilitate technology transfer, capacity building, and expertise sharing.

Despite these benefits, Bangladesh faces several challenges in accessing and effectively utilizing international climate funds. The application and approval processes for funds like the GCF are often complex, requiring detailed project proposals, technical justifications, and evidence of alignment with national climate policies. This demands a high level of technical and institutional capacity, which is often limited in developing countries<sup>23</sup>. Moreover, the disbursement of funds is frequently delayed due to bureaucratic hurdles, both at the international and domestic levels. For instance, ensuring compliance with fiduciary standards and monitoring frameworks set by donors can slow down project implementation<sup>24</sup>. Transparency and accountability in fund management also remain critical concerns, as inefficiencies or mismanagement can undermine the intended impact of these resources<sup>25</sup>.

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<sup>22</sup> Aleksandrova, Mariya, Laura Kuhl, and Daniele Malerba. 2024. 'Unlocking Climate Finance for Social Protection: An Analysis of the Green Climate Fund'. *Climate Policy* 24 (7). Taylor & Francis: 878–93. doi:[10.1080/14693062.2024.2338817](https://doi.org/10.1080/14693062.2024.2338817).

<sup>23</sup> iied. 2014. 'Climate Finance Governance in Bangladesh: Synergies in the Financial Landscape'. In . <https://www.iied.org/sites/default/files/pdfs/migrate/17227IIED.pdf>.

<sup>24</sup> Pindiriri, Carren, and Marko Kwaramba. 2024. 'Climate Finance in Developing Countries: Green Budget Tagging and Resource Mobilization'. *Climate Policy* 24 (7). Taylor & Francis: 894–908. doi:[10.1080/14693062.2024.2302325](https://doi.org/10.1080/14693062.2024.2302325).

<sup>25</sup> *The Financial Express*. 2024. 'Accessing Climate Finance from GCF & GEF: Hurdles and Way Forward', July 26. <https://thefinancialexpress.com.bd/views/accessing-climate-finance-from-gcf-gef-hurdles-and-way-forward-1658762832>.

## Technological Innovations in Climate Resilience

Technology plays a transformative role in mitigating climate risks, particularly for vulnerable countries like Bangladesh, which faces recurring threats from flooding, cyclones, and rising sea levels. Advanced early warning systems have significantly reduced casualties and damages from extreme weather events in the country. These systems use satellite data, real-time monitoring, and predictive models to provide accurate and timely information about impending disasters. For example, the Flood Forecasting and Warning Center (FFWC) provides alerts that allow communities to evacuate and prepare, reducing loss of life and property<sup>26</sup>. Similarly, the integration of community-based warning dissemination methods, such as mobile alerts and megaphones, has further enhanced their effectiveness<sup>27</sup>.

Renewable energy projects are another critical technological intervention in building climate resilience. Solar-powered irrigation systems, for instance, offer a sustainable solution for agriculture, especially in remote areas. Bangladesh's Solar Home Systems (SHS) initiative has installed over six million solar units, providing clean energy to rural households while reducing greenhouse gas emissions<sup>28</sup>. Moreover, these systems empower local communities by creating employment opportunities in installation and maintenance, fostering economic resilience alongside environmental benefits<sup>29</sup>.

In infrastructure, innovative designs like elevated houses, climate-resilient roads, and embankments have mitigated the impacts of floods and cyclones. Cyclone shelters, designed to

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<sup>26</sup> Markus, Reichstein., Dorothea, Frank., Vitus, Benson., Gustau, Camps-Valls., Joachim, Denzler., Kai, Kornhuber., Bernhard, Schoelkopf., Ricardo, Vinuesa., Boran, Han., Carina, J., Fearnley., Nasim, Rahaman., José, María, Tárraga., Jan, Blunk., Karen, Dall., Giulia, Martini., Naomi, Nganga., Danielle, Robinson. (2024). Early warning of complex climate risk with integrated artificial intelligence. doi: 10.21203/rs.3.rs-4248340/v1

<sup>27</sup> M, Ranjani., Perada, Devaraju., Yengalasetty, Sreeharshitha., Mekala, Viswesh., Siddhanth, Dubey. (2024). Advanced Weather Monitoring and Disaster Mitigation System with Interactive Weather Visualizations, Flood Zone Detection, Unplanned Drainage Identification, and Emergency Shelter Mapping including Optional Drought Intensity Prediction Capabilities. 10, 948-953. doi: 10.1109/iccpct61902.2024.10673251

<sup>28</sup> Aman, Ullah., Md., Naeem, Hussain., Firoj, Ahamad., Saifullah, Saifullah., Francisco, Román-Dañobeytia. (2024). An Overview of the Growth of Bangladesh's Renewable Energy Sector, Outlining Current Challenges and Future Prospects. Control Systems and Optimization Letters, 2(1), 113-119. doi: 10.59247/csol.v2i1.67

<sup>29</sup> Darlington, Eze, Ekechukwu., Peter, Simpa. (2024). A comprehensive review of renewable energy integration for climate resilience. Engineering science & technology journal, 5(6), 1884-1908. doi: 10.51594/estj.v5i6.1187

withstand high winds and storm surges, have saved thousands of lives during events such as Cyclone Amphan in 2020<sup>30</sup>. Additionally, adaptive agricultural measures, such as floating gardens and salt-tolerant crop varieties, offer practical solutions for areas prone to flooding and soil salinity<sup>31</sup>. These technologies not only address immediate risks but also provide long-term sustainability for livelihoods.



Climate resilient housing in Bangladesh. Source: BRAC US

Scaling up successful pilot projects is essential to expand their benefits. For instance, the Solar Home Systems initiative could be expanded into community-level microgrids, ensuring affordable and reliable energy access to a larger population<sup>32</sup>. Similarly, pilot programs using salt-tolerant crops can be implemented across other salinity-affected regions. Smart water management tools, such as sensors for monitoring groundwater levels, have shown promising results in improving irrigation efficiency and could be deployed more widely<sup>33</sup>. However, scaling up requires adequate

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<sup>30</sup> Dhruvi. (2021). 3. Structural and non-structural mitigation measures to combat cyclones in india. *Journal of emerging technologies and innovative research*

<sup>31</sup> Ravi, ', Chande., Aarsh, Jigish, Shah. (2022). Study on Gust Factor Method for Multi-purpose Cyclone Shelter. 1(1), 1487-1493. doi: 10.38208/acp.v1.680

<sup>32</sup> Dayasagar, Niraula., Han, Wang., Zhaoyu, Wang., Yu, Wang. (2024). Community-Based Microgrid Planning and Operation for Fostering Energy Justice. 1-5. doi: 10.1109/naps61145.2024.10741738

<sup>33</sup> Prashant, N., Karanjikar., Mamta, J, Patange., Godavari., Ningaraj, Belagalla., Vinay, Negi., Somashekar, Ks., Pooja, Bisht. (2024). Integration of Renewable Energy Solutions in Agricultural Operations. *Journal of Geography, Environment and Earth Science International*, doi: 10.9734/jgeesi/2024/v28i11835

funding, collaboration among stakeholders, and enhanced institutional capacity to ensure sustainability.

## **Progress and Challenges in meeting SDG 13 in Bangladesh**

Bangladesh has made significant strides in advancing Sustainable Development Goal (SDG) 13, which focuses on climate action, despite facing several challenges. The country has incorporated climate change considerations into its national development frameworks, notably through the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), which outlines long-term adaptation and mitigation actions<sup>34</sup>. Additionally, climate priorities are embedded in the country's Five-Year Plans, ensuring that climate change is a central aspect of development planning<sup>35</sup>.

To enhance resilience, Bangladesh has implemented various adaptive measures, including constructing cyclone shelters to protect communities from extreme weather, establishing early warning systems to provide timely alerts about natural disasters, and promoting climate-resilient agricultural practices to ensure food security and improve livelihoods for vulnerable populations. Furthermore, the country has proactively engaged with international climate finance mechanisms, such as the Green Climate Fund, to secure funding for climate-related initiatives, enabling both adaptation and mitigation projects<sup>36</sup>.

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<sup>34</sup> Md., Arfanuzzaman. (2024). Bangladesh's pathways to climate-resilient development: a methodical review. *World development sustainability*, 4, 100144-100144. doi: 10.1016/j.wds.2024.100144

<sup>35</sup> Sk., Tawfique, M., Haque., Md., Yousuf. (2024). Bangladesh. 409-412. doi: 10.4337/9781802209204.ch78

<sup>36</sup> Md., Arfanuzzaman. (2024). Bangladesh's pathways to climate-resilient development: a methodical review. *World development sustainability*, 4, 100144-100144. doi: 10.1016/j.wds.2024.100144



Climate Refugees in Coastal Areas. Source: DW

Despite these successes, Bangladesh faces significant challenges. One of the most pressing issues is resource constraints. The financial requirements for climate adaptation vastly exceed the available resources at the domestic and international level. This shortage of funding hampers the implementation of climate projects and limits the scope of interventions<sup>37</sup>. Additionally, there are gaps in implementation, such as bureaucratic inefficiencies and a lack of coordination among stakeholders, which often lead to delays in project execution<sup>38</sup>. Another critical concern is that vulnerable communities, especially those in rural and coastal areas, often face challenges in accessing the benefits of climate initiatives, exacerbating inequalities in climate resilience<sup>39</sup>.

To address these challenges, several key initiative can be considered:

1. **Strengthening Institutional Capacity:** Investing in training and technical support to enhance the capacity of government agencies, local authorities, and communities to design, implement, and monitor climate adaptation projects effectively.

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<sup>37</sup> Arif, Chowdhury., Christopher, Keim. (2022). Climate change adaptation in Bangladesh: Current practices, challenges and the way forward. *The journal of climate change and health*, 6, 100108-100108. doi: 10.1016/j.joclim.2021.100108

<sup>38</sup> Saifur, Rahman., Pradip, Kumar, Sarker., Lukas, Giessen. (2021). Super-bureaucracy in climate adaptation governance in Bangladesh. *Climate and Development*, 1-13. doi: 10.1080/17565529.2021.1937029

<sup>39</sup> J., Fernández-Güell. (2024). Envisioning the climate change resilient cities in bangladesh using foresight approach. doi: 10.5821/siu.12807

2. **Enhancing Funding Mechanisms:** Expanding access to international climate finance and developing innovative domestic financing tools, such as climate bonds, to provide additional financial resources for climate initiatives.
3. **Improving Governance:** Streamlining coordination and cooperation among government agencies, private sectors, and non-governmental organizations (NGOs) to ensure efficient, transparent, and timely implementation of climate projects.
4. **Scaling Up Successful Models:** Replicating and expanding successful pilot projects, such as salt-tolerant crops and solar-powered irrigation systems, to benefit wider regions, especially those that are most vulnerable to the effects of climate change.

## **Conclusion**

Bangladesh faces significant climate vulnerabilities due to its geographical and socio-economic conditions. However, through strategies like the National Adaptation Programme of Action (NAPA) and the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), the country has made notable progress in strengthening resilience to climate-related risks. Efforts such as improving disaster management infrastructure, promoting climate-resilient agriculture, and integrating climate considerations into national policies reflect Bangladesh's commitment to the SDG 13. Despite progress, challenges like limited resources, implementation inefficiencies, and unequal access to benefits remain. Addressing these requires enhanced institutional capacity, better funding mechanisms, improved governance, and the scaling up of successful initiatives. With continued international support and innovation, Bangladesh can further mitigate climate impacts and build a more resilient future for its population.