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Centre for Policy Dialogue (CPD)

Independent Review of IRBD Bangladesh's Development

Promoting informed policy choices

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The Independent Review of Bangladesh's Development (IRBD), Centre for Policy Dialogue's flagship programme, is a comprehensive assessment of the country's economic development agenda prepared by a group of Bangladeshi experts. Launched in 1995, it is Bangladesh's first civil society initiative to analyse the trends in the economy linking economic policies to development efforts. IRBD attempts to provide voice to marginalised stakeholders.

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Eastern Bangladesh Floods in 2024

Analysis of Immediate Damages and Recovery Efforts

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Key findings

1. The floods in the eastern parts of Bangladesh, from late August to early September 2024, resulted in a total damage of BDT 14,421.5 crore. This was equivalent to 1.8 per cent of the National Budget for FY2025.
2. Noakhali, Cumilla, and Feni were the districts that sustained the highest damage in monetary terms. Specifically, they accounted for 29.1 per cent, 23.5 per cent, and 18.6 per cent of the total damage, respectively.
3. Cumilla suffered the most damage in agriculture and fisheries, housing, and industry (23.5 per cent, 45.0 per cent, and 29.2 per cent respectively). Noakhali suffered the most in infrastructure and healthcare (37.6 per cent and 39.4 per cent respectively),

Key Recommendations

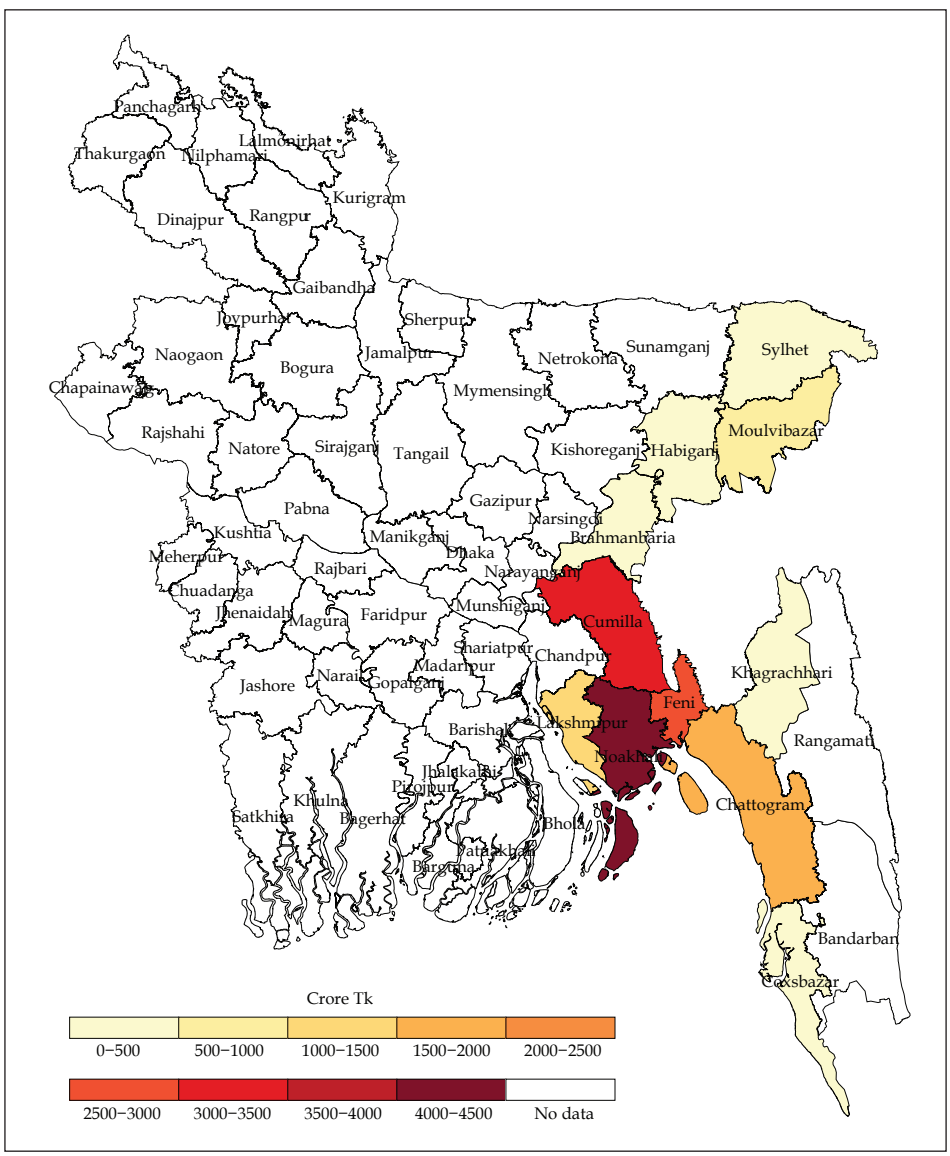
1. The government should increase the budget allocation earmarked for relief distribution, especially considering the projected increase in the frequency and intensity of floods and cyclones.
2. Improving the emergency response systems is necessary; in particular, radio communication systems between administrative offices in Bangladesh should be set up for situations when mobile networks are disrupted.
3. In the long run, the government should conduct nationwide hazard assessments, particularly for development planning. A hydro-morphological study is urgently needed to assess the sufficiency of waterways, culverts and drainage systems, and necessary repairs to

1. Introduction

Bangladesh has experienced a 46 per cent increase in extreme weather events from 2017 to 2021 (Letsch, Dasgupta, & Robinson, 2023). Since May 2023, Bangladesh has faced 15 extreme weather events, including cyclones, floods, heavy rain, heatwaves and cold waves (Roy & Palma, 2024). These extreme weather events caused severe loss and damage to lives and livelihoods and have had short-and long-term effects on the economy, climate resilience, and community adaptation strategies (Food and Agricultural Organization of the United Nations [FAO], 2024).

For instance, Cyclone Remal made landfall near Bangladesh on 27 May 2024 with strong winds and storm surges, causing severe damage. The cyclone affected 4.6 million people across 8 coastal districts, including Satkhira, Khulna, Bagerhat, Barguna, Patuakhali, Barisal, and Bhola, resulting in a loss of USD 600 million (United Nations International Children's Emergency Fund [UNICEF], 2024; United News of Bangladesh [UNB], 2024).

Figure 1: Damages caused due to floods in eastern parts of Bangladesh



Source: Authors' illustration based on MoDMR (2024a), Department of Livestock Services [DLS] (2024), and Ministry of Railways [MoR] (2024).

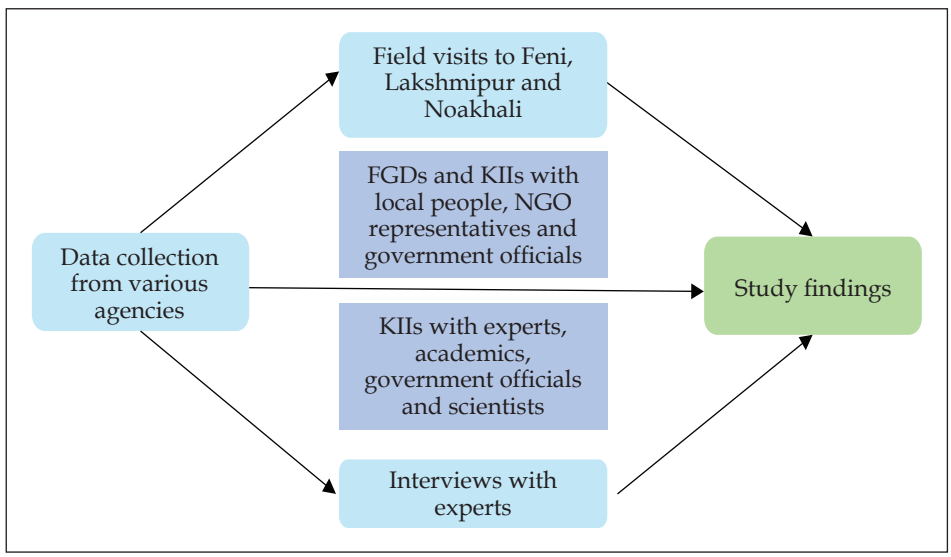
Later, heavy rain triggered floods from mid-June 2024, affecting communities in Sylhet, Dhaka, Mymensingh, Rangpur, and Chattogram Divisions (United Nations High Commissioner for Refugees [UNHCR], 2024). From 19 August 2024, flash floods triggered by continuous heavy rainfall and upstream water flows affected 11 districts (Figure 1) in the eastern part of the country. These districts include Sylhet, Moulvibazar, Habiganj Feni, Khagrachhari, Cox's Bazar, Cumilla, Noakhali, Chattogram, Lakshmipur, and Brahmanbaria (NASA Earth Science Applied Sciences, 2024). The flood in the eastern parts of the country had a devastating impact on agriculture, infrastructure, health, and overall economic activities (Ministry of Disaster Management and Relief [MoDMR], 2024a).

Against this backdrop, this study aims to evaluate the impact of the floods in the eastern part of Bangladesh by assessing the loss and damage incurred. To this end, the considered time period was 19 August 2024 to 5 September 2024. Furthermore, the study provides a set of recommendations for improved flood management and disaster preparedness in the future.

2. Methodology

To assess the damage, the study considered 11 flood affected districts of eastern Bangladesh—Noakhali, Cumilla, Feni, Chattogram, Lakhsmipur, Moulvibazar, Brahmanbaria, Habiganj, Khagracchari, Cox's Bazar and Sylhet. Initially, data was collected from various agencies, followed by field visits to selected districts—Noakhali, Lakshmipur, and Feni—where 33 Key Informant Interviews (KIIs) and 3 Focus Group Discussions (FGDs) were conducted. In addition, interviews with experts were conducted to elicit their opinion, and technical insights that contribute to a deeper understanding of the issues. Finally, the culmination of data from various agencies, field visits, FGDs, KIIs, and expert interviews led to the final study findings. An overview of the methodology is shown in Figure 2.

Figure 2: An overview of the methodology used to conduct the study



Source: Author's illustration.

Data collection process

To assess the flood damage, data was collected under 6 broad sectors: (i) agriculture and forestry, (ii) infrastructure, (iii) housing, (iv) industry, (v) healthcare, and (vi) education. Within these broad sectors, 17 subsectors were considered including crops, fisheries, livestock, poultry, housing, roads, bridges and culverts, embankments, railways, electric lines, religious structures, mobile towers, forestry, industry, healthcare centres, WASH infrastructure (tube-wells, sanitary latrines and waterbodies), and educational institutions (primary, secondary, madrasahs and community schools).

To collect the data, 19 different agencies were approached. These include Bangladesh Garment Manufacturers and Exporters Association (BGMEA), Bangladesh Textile Mills Association (BTMA), Bangladesh Water Development Board (BWDB), Bridges Division, Department of Agricultural Extension (DAE), Department of Fisheries (DoF), Department of Livestock Services (DLS), Export Promotion Bureau (EPB), Health Services Division (HSD), Local Government Engineering Department (LGED), Ministry of Agriculture (MoA), Ministry of Disaster Management and Relief (MoDMR), Ministries of Fisheries and Livestock (MoFL), Ministry of Industries (MoI), Ministry of Primary and Mass Education (MoPME), Ministry of Railways (MoR), Road Transport and Highways Division (RTHD), Secondary and Higher Education Division (SHED), and the Technical and Madrasah Education Division (TMED). However, data was received from 15 agencies with MoDMR being the main source.

Study limitations

First, the study was unable to assess the full extent of the damage as the data were only available up to 5 September 2024. However, floodwater did not fully recede in some areas until mid-to late September. Second, full sectoral coverage could not be ensured in all the considered districts due to unavailability of data. For instance, there was no district-wise data on damage to railway lines. Third, in terms of education and healthcare, this study only considers the damage to infrastructure, which does not provide a complete picture of the damage to these sectors. Fourth, damage assessment of floods in Northern Bangladesh, that occurred in late September and early October of 2024, was not considered in this study due to unavailability of data. Fifth, three districts (Noakhali, Feni and Lakshmipur) were selected for field visits by the study team. However, the situation experienced in other districts may differ.

3. Main Findings

Considering the data up to 5 September 2024, the total damage caused by recent floods in the eastern parts of Bangladesh was estimated to be BDT 14,421.5 crore (approximately USD 1.20 billion) (MoDMR, 2024a, DLS, 2024, Ministry of Railways [MoR], 2024). The estimated damage amounts to 1.8 per cent of the National Budget of FY2025, 0.3 per cent of the provisional GDP of FY2024, and 0.3 per cent of the projected GDP of FY2025.

Table 1 illustrates that the most affected districts in terms of monetary value were Noakhali, Cumilla, Feni, and Chattogram with a share of 29.1 per cent, 23.5 per cent, 18.6 per cent, and 11.6 per cent of the total damage, respectively. Cumilla suffered the most in agriculture and fisheries, housing, and industry sectors (23.5 per cent, 45.0 per cent, and 29.2 per cent of total sectoral damage respectively). Noakhali experienced significant losses in infrastructure and healthcare accounting for 37.6 and 39.4 per cent of the damage in those sectors, respectively. Meanwhile, Feni recorded the highest losses in the education sector, at 43.5 per cent.

Considering damage across broad sectors, the agriculture and forestry sector suffered the highest damage, amounting to BDT 5,169.7 crore, which constitutes 35.9 per cent of the total damage. The infrastructure sector ranks second, with damage amounting to BDT 4,653.9 crore, accounting for 32.3 per cent of the total damage, followed by the housing sector, which faced losses worth BDT 2,407.3 crore, accounting for 16.7 per cent of the total damage. The overall damage across broad sectors and districts is presented in Table 1.

Table 1: Damage by broad sector and district

(In BDT crore)

District	Sectors						Total damages in each district
	Agriculture and forestry	Infrastructure	Housing	Healthcare	Education	Industry	
Noakhali	1133.5 (21.9)	1750.6 (37.6)	478.4 (19.9)	813.6 (39.4)	15.5 (17.3)	0.05 (0.1)	4191.7 (29.1)
Cumilla	1215.4 (23.5)	652.2 (14.0)	1084.1 (45.0)	379.8 (18.4)	29.6 (33.0)	29.2 (76.9)	3390.3 (23.5)
Feni	1096.4 (21.2)	630.0 (13.5)	533.9 (22.2)	380.5 (18.4)	39.0 (43.5)	3.4 (8.8)	2683.1 (18.6)
Chattogram	704.5 (13.6)	765.3 (16.4)	90.8 (3.8)	108.1 (5.2)	3.2 (3.6)	5.0 (13.1)	1676.9 (11.6)
Lakhsmipur	661.5 (12.8)	316.9 (6.8)	126.1 (5.2)	298.3 (14.5)	1.0 (1.2)	0.0 (0.0)	1403.9 (9.7)
Moulvibazar	139.8 (2.7)	293.0 (6.3)	42.4 (1.8)	30.3 (1.5)	0.5 (0.6)	0.0 (0.0)	506.1 (3.5)
Brahmanbaria	55.7 (1.1)	55.2 (1.2)	12.1 (0.5)	20.8 (1.0)	0.2 (0.2)	0.0 (0.0)	144.0 (1.0)
Habiganj	44.2 (0.9)	75.9 (1.6)	19.6 (0.8)	3.8 (0.2)	0.0 (0.0)	0.0 (0.0)	143.6 (1.0)
Khagracchari	56.7 (1.1)	38.3 (0.8)	12.4 (0.5)	19.0 (0.9)	0.5 (0.6)	0.4 (1.1)	127.2 (0.9)
Cox's Bazar	46.9 (0.9)	41.3 (0.9)	6.6 (0.3)	5.6 (0.3)	0.0 (0.0)	0.0 (0.0)	100.5 (0.7)
Sylhet	15.0 (0.3)	1.7 (0.0)	0.7 (0.0)	3.1 (0.2)	0.0 (0.0)	0.0 (0.0)	20.5 (0.1)
Total Sectoral damage	5169.7	4653.9	2407.3	2062.9	89.5	38.0	14421.5
Total Sectoral damage as a share of total damage	35.9	32.3	16.7	14.3	0.6	0.2	100.0

Source: Authors' compilation based on MoDMR (2024a), DLS (2024), and Ministry of Railways (MoR) (2024).
***Note:** Numbers in parentheses indicate the share in total sectoral damage.

Table 2: Relief distribution

District	Total relief (in crore BDT)	Total flood damage (in crore BDT)	Affected people (in number)	Relief per affected people (in BDT)	Relief: damage
Sylhet	14.6	20.5	9,535	15,320.4	0.712
Habiganj	13.4	143.6	20,840	6,450.1	0.094
Brahmanbaria	8.7	143.5	80,000	1,084.8	0.060
Coxsbazar	3.1	100.5	148,450	206.5	0.031
Moulvibazar	13	505.5	257,993	504.9	0.026
Khagrachhari	3.1	127.2	123,992	247.2	0.024
Chattogram	11.8	1,670.6	30,000	3,947.7	0.007
Feni	16.6	2,607.5	1,000,000	165.8	0.006
Cumilla	14.9	3,362.1	1,090,592	136.7	0.004
Noakhali	14.9	4,186.3	1,604,300	92.9	0.004
Lakshmipur	3.3	1,402.3	525,500	62.1	0.002

Source: Authors' compilation and calculation based on Daily Disaster Situation Reports by MoDMR (2024b).

The study finds an uneven distribution of relief in the flood-affected districts regardless of the actual damage observed in these districts. The data show that Sylhet, Habiganj, and Brahmanbaria received the highest per capita relief of BDT 15,320.4, BDT 6,450.1, and BDT 1,084.8 respectively (Table 2). Per capita relief for Cumilla, Noakhali and Lakshmipur, the three most affected districts, was BDT 136.7, BDT 92.9 and BDT 62.1 respectively. There was a higher relief-to-damage ratio for Sylhet, Habiganj and Brahmanbaria. These districts received BDT 0.712, 0.094 and 0.06 respectively against per taka of damage. In contrast, Cumilla, Noakhali and Lakshmipur received the lowest relief of BDT 0.004, 0.004 and 0.002 respectively against per taka of damage. Whether this phenomenon is a data reporting issue remains a concern.

4. Observations from field visits

Damages observed

Severe damage was observed in the agricultural sector. There was an extensive loss of rice crops, particularly Aman rice in three districts—Feni, Noakhali, and Lakshmipur. The fisheries sector was severely affected, with locals in Feni reporting a significant number of fish lost. People in Noakhali also reported significant loss of fish due to both displacement and death following the flood. According to locals in Feni, Noakhali, and Lakshmipur, the affected waterbodies will require considerable reinvestment before becoming functional for agricultural activities again. In addition, the poultry sector, particularly the chicken farming businesses, suffered significant losses in Noakhali. Entrepreneurs in all three visited districts lost nearly all their investments in fisheries and agriculture. Furthermore, small businesses in these districts were heavily affected, especially grocery shops, as they had to close for extended periods and incur losses.

Local people reported that communications systems had completely broken down for the first few days of the flood, particularly in Feni, where the mobile network towers suffered damage. In all three districts, electricity and internet access were heavily disrupted. While water levels receded by the beginning of September 2024, waterlogging persisted in parts of Noakhali and Lakshmipur towards the end of the month. In terms of infrastructure, roads, especially unpaved ones, were severely damaged, and bridges and culverts were considerably damaged as well.

Damage to educational institutions was reported in Feni. In particular, schools and colleges with offices and laboratories on the ground floor had their equipment destroyed. In all three districts, educational institutions were used as shelters, which disrupted regular teaching activities. Furthermore, many children could not return to education as their homes had been destroyed. All kinds of houses were severely impacted, and mud houses, in particular, were completely destroyed. A significant number of tube wells and sanitary latrines were damaged as well, which had an impact on access to clean water and sanitation.

Coping mechanisms

In terms of relief distribution, there was a lack of coordination among stakeholders, leading to some individuals receiving aid multiple times while others received none at all. The absence of

any type of radio communication system created a significant coordination problem among the local administrative offices. Furthermore, the administrative restructuring following the formation of a new government might have led to miscoordination. Some locals mentioned the lack of elected representatives as a cause of miscoordination, while others believed that the relief distribution was fairer because of this reason. Inadequate government personnel were also cited as a problematic factor for relief distribution in Noakhali and Lakshmipur. In Noakhali, locals stated that NGOs and locally affluent people were the main sources of relief.

Educational institutions were a common source of shelter for those affected in all three districts as part of the coping mechanism. Representatives of local administration in Feni and Noakhali mentioned that some remote areas were inaccessible due to a lack of flat-bottomed boats and ambulatory boats. Some areas received cash relief, but it was not useful as the necessary goods were unavailable, or in the case of Feni, not sold at all since the shops were closed.

As part of their emergency response, LGED Feni constructed bamboo and diversion bridges where existing bridges and culverts had been destroyed. For the rescue operations, medical and flood response teams were formed in coordination with government, NGO, and development partners' representatives in Noakhali and Lakshmipur. To ensure access to clean water, the government, NGOs, private entities, and development partners distributed water purification tablets and systems in all three districts.

Health impacts

Skin diseases and diarrhoea were prevalent in all three districts according to locals and government healthcare workers. A shortage of emergency medicine was prevalent during the early phases of the flood and hospitals in Lakshmipur experienced a shortage of IV fluids. A spike in the number of snake-bite patients was observed in hospitals of Lakshmipur during the early phases of the flood. In Feni, many hospitals were closed due to water intrusion in the hospital premises.

5. Recommendations

The study provides a set of recommendations based on the aforementioned findings. Besides, a table was provided in the annex by listing measures required for flood response with responsible ministries and agencies with timeline.

Increasing budgetary allocation

- The government should increase the budget allocation earmarked for relief distribution, especially considering that the frequency and intensity of floods and cyclones are projected to increase.
- Social safety net allocations, particularly those for elderly citizens, widows and destitute women, can be increased after careful assessment to subside the impact of flooding in affected areas.

Ensuring easy access to finance and providing debt relief

- The government needs to ensure easy access to agricultural loans for farmers.
- In case of devastating floods affecting a significant number of small businesses, such as the one that occurred in eastern Bangladesh, a moratorium on loan repayment and an expansion of the repayment period could be considered.

Ensuring an adequate supply of seeds

- Seed beds tend to suffer considerable damage owing to devastating floods. So, an adequate supply of seeds must be ensured, so that following season's Aman cultivation is not hampered.

Curtailing the impact on food security

- Devastating floods causing extensive damage to the agricultural sector are likely to impact food security; thus, keeping inflation in control will be a significant challenge. In such cases, the government should make immediate preparations towards rice import and reduce the import duties on agricultural inputs and commodities.

Improving the emergency response systems

- Radio communication systems between administrative offices in Bangladesh should be set up for situations where mobile networks are disrupted.
- Sufficient ambulatory and flat-bottomed boats for emergencies in all districts needs to be ensured.
- Effective coordination among various stakeholders is required for rapid emergency response before and during the flood period.

- Focus should be placed on updating disaster response strategy and enhance the coordination among the Meteorological Department, Flood Forecasting and Warning Centre, MoDMR and local government units.

Improving the data collection and sharing system

- There should be real-time data sharing to increase coordination between different government offices.
- Enhancing weather data sharing with neighbouring countries is crucial.
- Electronic records need to be kept and made accessible by all government offices throughout Bangladesh.

Enhancing the capacity of government relief offices

- Ensuring adequate personnel in these offices is crucial.
- Adequate training of the relief officers is necessary.
- Coordination among relevant government agencies to ensure efficiency and accountability in relief distribution is required.

Repairing and strengthening of embankments

- A hydro-morphological study is urgently needed to assess the sufficiency of waterways, culverts and drainage systems, and necessary repairs to embankments must be made.
- Mud embankments should be replaced with higher-quality materials to improve their durability and effectiveness. Also, the height of the embankments needs to be increased. Currently, embankments in coastal areas are 15 feet high, experts have suggested that the height be increased to 21 feet. The government must increase budget allocations to this end.

Improving forecasting and early warning systems

- Upgrading flood forecasting systems, especially to be better able to predict flash floods, is critical. As part of this, real-time satellite data should be integrated into forecasting models for better accuracy.
- The local-level offices, e.g., UNO, and local MoDMR, need to check forecasts every day and prepare for any emergencies.
- The government should assign adequate human resources to the Flood Forecasting and Warning Centre.

Maximising the reach of issued warnings

- The local government officials need to translate complex danger signals (e.g., '10 cm above danger level') into simple, actionable terms that the public can understand.
- The government needs to provide emergency alerts through SMS to all people in areas where a flood or extreme rainfall has been predicted.
- All TV channels should provide weather forecasts.

Raising awareness of local citizens

- Local government along with local communities should take some initiatives to make local citizens more aware of measures that can reduce flood damage. For instance, awareness campaigns can be conducted on cost-effective measures that can be taken to reduce damage and which hotline numbers to call in case of emergencies.

Integrate Climate-adaptive measures in development planning and execution

- Implementation of proper planning and construction of infrastructures like roads, culverts and bridges to ensure that floodwater can flow naturally, reducing the chances of waterlogging and severe flooding.
- Developing a comprehensive land-use plan, designating areas for urban development, agriculture, and other uses to mitigate flood risks.
- Recovery of occupied canals and rivers to restore natural drainage systems and prevent blockages during excessive rainfall.
- Ensuring that future development projects are prepared for increased rainfall and more frequent flooding due to climate change.
- Improving water infiltration methods in urban areas by creating more open spaces and reducing reliance on costly water pumping systems.

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Annex

Table A1: Suggested actions for flood response with responsible ministries/agencies

Actions required	Responsible ministries/agencies	Timeline
Increasing budgetary allocation		
Increase the budget allocation earmarked for relief distribution	Ministry of Finance, Ministry of Disaster Management and Relief	Medium to long-term
Increase social safety net allocations for elderly citizens, widows and destitute women, can be increased	Ministry of Finance, Ministry of Social Welfare	Medium to long-term
Ensuring easy access to finance and providing debt relief		
Ensure easy access to agricultural loans for farmers	Ministry of Finance, Ministry of Agriculture, Banks, Financial Institutions, Microfinance Institutions	Short to medium-term
Consider a moratorium on loan repayment and an expansion of the repayment period	Ministry of Finance, Ministry of Agriculture, Banks, Financial Institutions, Microfinance Institutions	Short-term
Ensuring an adequate supply of seeds		
Ensure an adequate supply of seeds	Ministry of Agriculture	Short-term
Curtailing the impact on food security		
Import and reduce the import duties on agricultural inputs and commodities.	Ministry of Food, Ministry of Commerce	Shor- term
Improving the emergency response systems		
Strengthen radio communication systems between administrative offices in Bangladesh should be set up for situations where mobile networks are disrupted.	Ministry of Posts, Telecommunication and Information Technology	Short to medium-term
Ensure sufficient ambulatory and flat-bottomed boats for emergencies in all districts	Ministry of Disaster Management and Relief, Ministry of Water Resources, Ministry of Local Government, Rural Development and Cooperatives	Short to medium-term
Ensure effective coordination among various stakeholders for rapid emergency response before and during the flood period.	Ministry of Finance, Ministry of Disaster Management and Relief, Ministry of Road Transport and Bridges Ministry of Food, Ministry of Health and Family Welfare, Ministry of Information, Ministry of Local Government, Rural Development and Cooperatives, Ministry of Social Welfare, Ministry of Women and Children's Affairs	Medium to long-term
Update and enhance disaster response strategy among the Meteorological Department, Flood Forecasting and Warning Centre, MoDMR and local government	Meteorological Department, Flood Forecasting and Warning Centre, Ministry of Disaster Management and Relief and local government units.	Medium to long-term

(Table A1 contd.)

(Table A1 contd.)

Actions required	Responsible ministries/agencies	Timeline
Improving the data collection and sharing system		
Ensure real-time data sharing to increase coordination between different government offices.	Ministry of Finance, Ministry of Disaster Management and Relief, Ministry of Road Transport and Bridges, Ministry of Food, Ministry of Health and Family Welfare, Ministry of Information, Ministry of Local Government, Rural Development and Cooperatives, Ministry of Social Welfare, Ministry of Women and Children's Affairs	Medium to long-term
Enhance weather data sharing with neighbouring countries.	Meteorological Department, Ministry of Foreign Affairs	Short to medium-term
Keep electronic records and make accessible by all government offices throughout Bangladesh.	All government bodies	Medium to long-term
Enhancing the capacity of government relief offices		
Ensure adequate personnel for disaster response.	Ministry of Disaster Management and Relief	Medium to long-term
Facilitate adequate training to the relief officers.	Ministry of Disaster Management and Relief	Medium to long-term
Enhance coordination among relevant government agencies to ensure efficiency and accountability.	Ministry of Finance, Ministry of Disaster Management and Relief, Ministry of Road Transport and Bridges, Ministry of Food, Ministry of Health and Family Welfare, Ministry of Information, Ministry of Local Government, Rural Development and Cooperatives, Ministry of Social Welfare, Ministry of Women and Children's Affairs	Medium to long-term
Repairing and strengthening of embankments		
Conduct a hydromorphological study immediately to assess the sufficiency of waterways, culverts and drainage systems, and necessary repairs to embankments.	Bangladesh Water Development Board, Ministry of Local Government, Rural Development and Cooperatives	Medium to long-term
Develop the embankments with higher-quality materials to improve their durability and effectiveness.	Bangladesh Water Development Board, Ministry of Finance	Long-term
Improving forecasting and early warning systems		
Upgrade flood forecasting systems and integrate real-time satellite data to predict flash floods.	Flood Forecasting & Warning Centre	Long-term
Prepare local-level authorities for any disaster emergencies	Upazila Nirbahi Officer, Ministry of Disaster Management and Relief	Short-term
Assign adequate human resources to the Flood Forecasting and Warning Centre.	Flood Forecasting & Warning Centre	Medium to long-term
Maximising the reach of issued warnings		
Translate complex danger signals (e.g., "10 cm above danger level") into simple, actionable terms that the public can understand.	Ministry of Disaster Management and Relief, Upazila Nirbahi Officer	Short to medium-term

(Table A1 contd.)

(Table A1 contd.)

Actions required	Responsible ministries/agencies	Timeline
Provide emergency alerts through SMS to all people in areas where a flood or extreme rainfall has been predicted.	Ministry of Information, Flood Forecasting & Warning Centre, Meteorological Department, Ministry of Posts. Telecommunication and Information Technology	Short to medium-term
All TV channels should provide weather forecasts.	Ministry of Posts, Telecommunication and Information Technology	Short to medium-term
Raising awareness of local citizens		
Take collaborative initiatives to make local citizens more aware of measures that can reduce flood damage.	Upazila Nirbahi Officer, Ministry of Disaster Management and Relief	Short to medium-term
Integrate Climate-adaptive measures in development planning and execution		
Implement proper planning and construction of infrastructures like roads, culverts and bridges to ensure that floodwater can flow naturally, reducing the chances of waterlogging and severe flooding.	Ministry of Road Transport and Bridges, Ministry of Planning	Medium to long-term
Develop a comprehensive land-use plan, designating areas for urban development, agriculture, and other uses to mitigate flood risks.	Ministry of Environment, Forests and Climate Change, Ministry of Disaster Management and Relief, Ministry of Agriculture	Medium to long-term
Recover occupied canals and rivers to restore natural drainage systems and prevent blockages during excessive rainfall.	Ministry of Environment, Forests and Climate Change, Ministry of Water Resources, Ministry of Local Government, Rural Development and Co-operatives	Medium to long-term
Ensure that future development projects are prepared for increased rainfall and more frequent flooding due to climate change.	Ministry of Finance, Ministry of Environment, Forests and Climate Change, Ministry of Planning, Ministry of Disaster Management and Relief, Ministry of Road Transport and Bridges	Medium to long-term
Improve water infiltration methods in urban areas by creating more open spaces and reducing reliance on costly water pumping systems.	Ministry of Housing and Public Works	Medium to long-term

Source: Authors' compilation.