Research to document the experiences of affected residents for disaster education and awareness to reduce the risk of severe thunderstorm-related disasters, including tornadoes, in Bangladesh.

Project Report

Project Term
July. 2024～June. 2025

Project Leader: Yuichi ONO
Tohoku University
International Research Institute of Disaster Science

Outline

1. BACKGROUND 1
2. OBJECTIVE 1
3. ACTIVITIES 2
4. INTERNATIONAL WORKSHOP 3
5. LESSON LEARN AND RECOMMENDATION 4
APPENDIX 5

1. Background

Bangladesh has the world's highest disaster risk from storm surges and floods, and is a country where disaster mitigation efforts have focused on these water-related disasters.

On the other hand, Bangladesh has the highest risk of severe thunderstorm-related disasters, including tornadoes, in the world, and despite the world's worst tornado disaster in 1989, which killed 1,300 people, no measures have been taken to mitigate wind-related disasters. Although the number of occurrences is not as high as in the U.S., the frequency per unit area is comparable to the U.S. Midwest, and once they occur, the number of fatalities remains high due to the high vulnerability.

2. Objective

This study will implement the Severe Thunderstorm-related Disaster Risk Reduction Strategy for Bangladesh developed two years ago with support from the Weathernews Foundation. The purpose of this study is to explore the development of a system to record and share the disaster experiences of affected residents in the past in order to educate and raise awareness about disaster preparedness.

Previous studies suggest that the construction of underground mini-shelters is an effective mitigation measure for wind-related disasters in Bangladesh. The results of a field survey in a previous project, which piloted the construction of mini-shelters for two households in Tangail district that had been affected by tornadoes in the past, showed that mini-shelters were not being used effectively due to maintenance problems.

Evacuation to robust buildings can be considered as a measure to mitigate damage from wind-related disasters, but it takes time to develop hard measures in rural Bangladesh, such as developing robust housing and strengthening the wind resistance of public facilities.

Since it takes time to develop hard measures and early warning systems, it is important to work on soft measures from the perspective of disaster education and awareness, such as sharing knowledge about wind-related disasters and measures to save lives.

3. Activities

The majority of records on wind-related disasters are textual information such as books, research papers, and newspapers. On the other hand, in the field of disaster education, the use of video is considered effective as a method to convey the enormity of disasters. The study on wind-related disasters in Bangladesh is uniquely original in terms of disaster education methods that utilize video, which has become easier to capture and share with the recent spread of smartphones.

(1)Analysis of the current situation of recording methods of wind gust disasters in Bangladesh

This study will analyze how wind-related disasters have been recorded in Bangladesh in the past and how they are planned to be recorded in the future. Specifically, interviews will be conducted with officials from the Bangladesh Meteorological Department, universities, and various local governments to understand the status of implementation of records related to wind gust disasters.

(2)Interviews with victims of tornado damage

In the Tangail area, which has been severely damaged by tornadoes in the past, as the target area of the survey, the weather conditions at that time, the damage situation, and the response situation will be confirmed according to the time series before, during, and after the event. The interview situation will be videotaped so that the content can be used for disaster education.

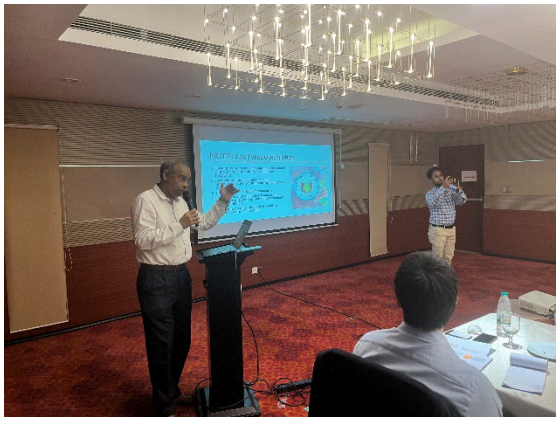
(3)Analysis of current methods and proposal of effective methods in disaster education

In previous years' projects, it was confirmed that disaster education on wind-related disasters has not been implemented in the field of education. We will collect and organize information on the status of disaster education on wind-related disasters not only in Japan, but also in the U.S. and other countries, and extract good practices. Then we will propose a highly effective disaster education method for wind-related disasters in Bangladesh.

4. International Workshop

- Title : Integrating Severe Local Storm Disaster Risk Reduction into National School Curriculum of Bangladesh
- Date : 3 May 2025, Saturday
- Venue : Multi-purpose Hall, Department of Disaster Management

Time	Event	Presenter
06.00 pm	Registration	
06.10 pm	Address of Welcome and Setting the Scene	**Mr. Muhammad Saidur Rahman** Director, BDPC
06.20 pm	Team Introduction	**Each Groups**
06.30 pm	Introduction of the Project	**Prof. Yuichi Ono** Tohoku University
07.00 pm	Presentation of the Research Report	**Prof. Yusuke Yamane** Tokoha University **Mr. Sayeed Ahmed Choudhury** Kagawa University
07.30 pm	Round Discussion	
07.40 pm	The Way Forward	**Prof. Yuichi Ono** Tohoku University
07.50 pm	Closing Remarks by the Moderator	**Mr. Muhammad Saidur Rahman** Director, BDPC
08.00 pm	Dinner	



5. Lesson Learn and Recommendation

(1)Know it better with data (research on tornadoes from many academic disciplines)

(2)Develop a tornado warning system (by Bangladesh Meteorological Department) with its Doppler radars to be adjusted and upgraded

(3)Develop a spotter system to share information on the occurrence of tornado quickly in the neighboring places through a mobile phone application (training is needed)

(4)Design and install safe places from tornadoes: Start doing it by protecting schools and hospitals

(5)Integrate the tornado knowledge and safety into the school curriculum

(6)Schools to consider architectural design of buildings. Schools should have secure areas or safe rooms for students to shelter in during a tornado event. Tornado safety education has to be coupled with structurally sound buildings in order to protect teachers and students from the harm of tornadoes.

(7)Develop a natural hazard/disaster museum in Dhaka

(8)As 90% of tornadoes occur in April, the month of April should be designated as Tornado Awareness Month of Bangladesh nationally

(9)April 26 should be designated as the National Tornado Day because…

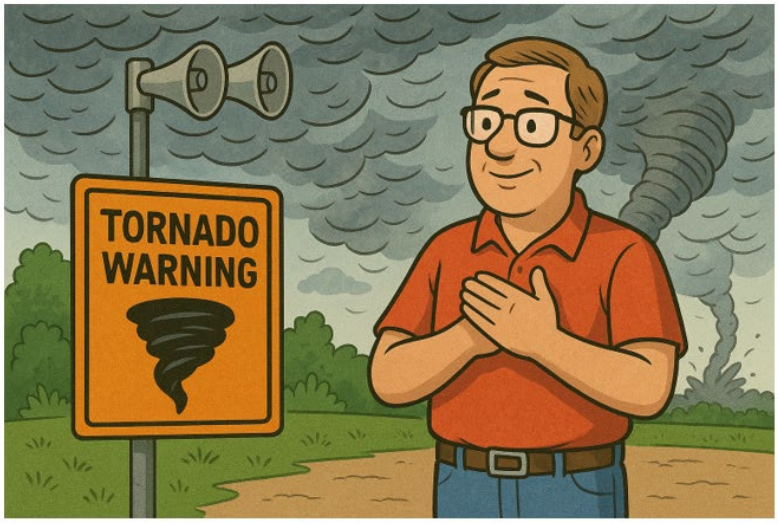
Appendix

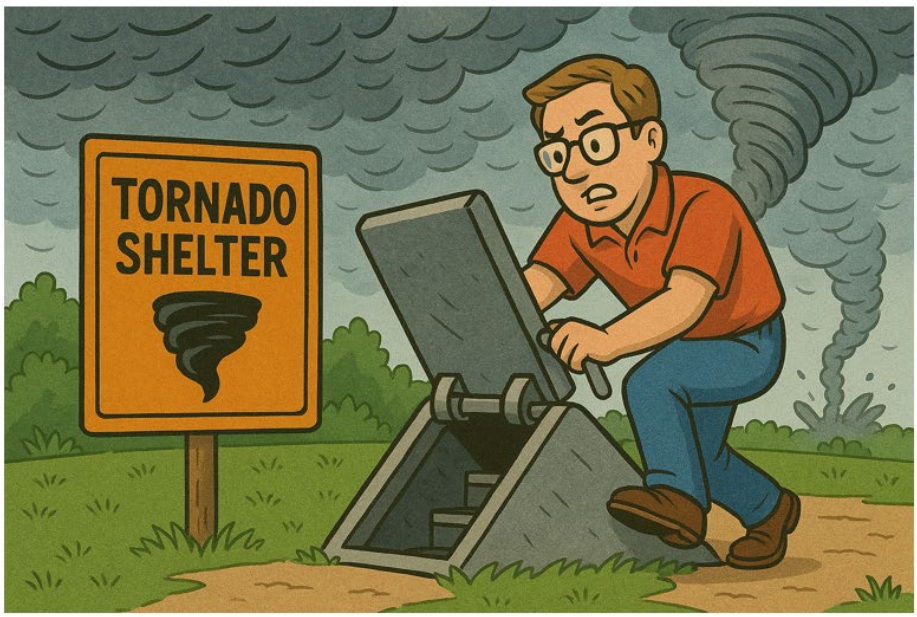
(1)Prescription to Reduce Severe Local Storm Disaster Risks for Bangladesh (Yuichi ONO)

Prescription to Reduce Severe Local Storm Disaster Risks for Bangladesh

Yuichi ONO (Ph.D.)

Deputy Director and Professor,
International Research Institute of Disaster Science (IRIDeS)
Tohoku University
Sendai, Japan


TORNADO
WARNING



Prescription to Reduce Tornado Risks for Bangladesh

1. Know the tornado risks
2. Warning System
3. Safe Place
4. Public Awareness and Education

In the United States, tornado education is integrated into various K–12 science and safety curricula, with a focus on understanding tornado formation, impacts, and safety measures. These educational programs are often aligned with the Next Generation Science Standards (NGSS) and are tailored to different grade levels.

Elementary School (Grades 3–5)

Teach Engineering – "Tornado!" Lesson: This 45-minute lesson introduces students to tornado characteristics, the Enhanced Fujita Scale, and basic safety practices. It emphasizes how engineers design structures to withstand tornado forces and includes hands-on activities like building model structures and analyzing tornado data.

Reference: teachengineering.org

Weather Wiz Kids: Offers interactive experiments such as creating a tornado in a bottle, along with safety tips and engaging explanations suitable for younger learners.
weatherwizkids.com

Twister! What to Do in a Tornado (SAS): Focuses on tornado safety, signs of impending tornadoes, and emergency preparedness. Students create safety brochures to share with their families.

Reference: pdesas.org

Middle and High School

UCAR Center for Science Education – Tornadoes Teaching Box: A comprehensive resource for middle and high school students that covers tornado formation, geographic distribution, societal impacts, and safety planning.

Reference: scied.ucar.edu

NG Science – Tornadoes Lesson Plan: Provides detailed explanations of tornado formation, effects on the Earth's surface, and the importance of safety measures, aligned with NGSS for K–6 education.

Reference: NG Science

BrainPOP Educators – Tornadoes: Offers animated videos and lesson plans that explore the science of tornadoes, their causes and effects, and safety precautions, suitable for grades 3–8.

Reference: BrainPOP Educators

State-Level and Safety-Focused Programs:

Texas Parks & Wildlife – Weather Watch: Provides activities and lesson plans focusing on weather phenomena, including tornado safety tips and the importance of understanding weather warnings.

Reference: Texas Parks & Wildlife Department

National Weather Service – Severe Weather Preparedness Guide for Schools:

Offers guidelines for school administrators to develop and implement severe weather preparedness plans, emphasizing the importance of drills and safety protocols.

Reference: weather.gov

Storm Ready Program:

A National Weather Service initiative that encourages communities and schools to enhance their severe weather readiness through planning, education, and awareness.

Online and Interactive Resources

HSI – Tornado Preparedness Course: An online interactive course that educates learners on tornado hazards, warning signs, sheltering practices, and post-tornado safety measures.

Reference: teachengineering.org

Michigan Online – Extreme Weather: Tornado Season Teach-Out: A short course exploring tornado frequency, formation, and preparedness strategies, suitable for high school students and adults.

In 1948 First tornado forecast issued by two Air Force Officers at Tinker Air Force Base, Okla., on March 25, 1948, was the first step in establishing the National Weather Service's organized watch and warning program

In the 1950s and 1960s tornado warnings developed. T.V. and the radio. warnings from the United States Weather Bureau.

Tornado sirens since the 1970s.

After a major tornado outbreak in 1974, the National Oceanic Atmospheric Administration's (NOAA) weather radios became available for citizens.

Currently, tornado warnings on the internet or sent directly to cell phones.

The average lead time for a tornado warning in the United States is currently about 13 to 15 minutes (NWS).

It was about 5 minutes in the 1980s.

Thanks to improvements in Doppler radar, computer modeling, and storm spotter networks.

Interesting article:

A tornado disaster subculture has developed in the Greater Moore Regional Area. In order to define the Moore, Oklahoma area as a disaster subculture, characteristics for the development of a disaster subculture by Wenger and Weller (1973) are outlined. First, the Moore area has experienced numerous tornadoes in the past few centuries. The National Weather Service Weather Forecast Office has kept track of the number of tornadoes that have been in Moore from 1875 to present. Moore has been hit by 22 tornadoes that have ranged from an 16 EF0 to EF5 in that time frame.

TORNADO SAFETY EDUCATION IN PUBLIC SCHOOLS, a master's thesis by Zephi Francis from the University of Delaware in 2015

As a result, their tornado safety education attainment is continuing to increase, although not necessarily in a linear or planned fashion. In other words, **children are accumulating more knowledge when the household learning is coupled with the institutional (school) learning.**

Recommendations for Tornado Threatened School Districts (by Zephi Francis)

1. School districts need to establish relationships with their local National Weather Service offices.

2. There are several meteorologists in the Oklahoma area who are encouraging schools to treat tornado events like snow storms.

3. It is important that school districts continue to update and evaluate their tornado response plans.

4. Schools in tornado-prone areas need to make sure information about tornadoes and tornado safety are embedded in the curriculum.

5. It is important that schools consider architectural design of buildings. Schools should have secure areas or safe rooms for students to shelter in during a tornado event. Tornado safety education has to be coupled with structurally sound buildings in order to protect teachers and students from the harm of tornadoes.

Our Recommendations for saving lives from tornadoes in Bangladesh

1. Know it better with data (research on tornadoes from many academic disciplines)

2. Develop a tornado warning system (by Bangladesh Meteorological Department) with its Dopplar radars to be adjusted and upgraded

3. Develop a spotter system to share information on the occurrence of tornado quickly in the neighboring places through a mobile-phone application (training is needed)

4. Design and install safe places from tornadoes: Start doing it from protecting schools and hospitals

5. Integrate the tornado knowledge and safety into school curriculum

6. Schools to consider architectural design of buildings. Schools should have secure areas or safe rooms for students to shelter in during a tornado event. Tornado safety education has to be coupled with structurally sound buildings in order to protect teachers and students from the harm of tornadoes.

Our Recommendations for saving lives from tornadoes in Bangladesh

7. Develop a natural hazard/disaster museum in Dhaka

8. As 90% of tornadoes occur in April, the month of April should be designated as Tornado Awareness Month of Bangladesh nationally

9. April 26 should be designated as the National Tornado Day because…

The **world's deadliest tornado** occurred in **Bangladesh** on **April 26, 1989**, and is known as the **Daulatpur–Saturia or Manikganj Tornado**.

Key Facts:
•**Date:** April 26, 1989
•**Location:** Daulatpur and Saturia Upazilas, **Manikganj District**, **Bangladesh**
•**Death Toll:** Approximately **1,300 people** (most widely accepted figure)
•**Injured:** Estimated **12,000**+
•**Homeless:** More than **80,000** people lost their homes

Impact and Characteristics:
•The tornado cut a path of destruction **1 mile wide** and about **50 miles long**.
•It completely **flattened villages**, with some structures blown away entirely.
•The **high population density** and **lack of substantial buildings** significantly contributed to the extreme death toll.
•Many victims were caught outdoors or in poorly constructed homes with no access to safe shelter.

Why It Was So Deadly:
•**No early warning system** or real-time alerts at the time.
•**Little public awareness** of tornado safety.
•The storm struck **in the late afternoon**, a time when many were outside or at home.
•Structures were generally **not built to withstand strong winds**.

(2)Japan torando education summary (Yusuke YAMANE)

Summary of Current situations of tornado education in Japan

- Tornado education has not been included definitely in the National Curriculum Standards in Japan.
- Some educational materials for tornado disasters are developed and provided by Japan Meteorological Agency (JMA) and National Research Institute for Earth Science and Disaster Resilience (NIED).
- Tornado education programs are conducted temporally and limitedly as special classes, especially in schools, which have been damaged by tornadoes in the past.
- School are required to develop manuals to take proper actions to mitigate damages of natural disasters.
- In this manual, how to mitigate damages of tornado is included.
- However, tornado education is significantly limited in Japan.

Educational materials for tornado disasters by JMA

- JMA provides teaching guide, movie and worksheet for reducing damages of severe weather associated with cumulonimbus cloud such as tornado.
- Contents of the teaching guide（45 minutes lecture）
  - Characteristics of severe weathers associated with cumulonimbus cloud (tornado, lightning, hail, heavy rainfall etc.)
  - Characteristics of signs with approaching of dangerous cumulonimbus cloud
  - How to protect yourself from severe weather
- Movie materials
  - Students watch situations associated with damages in a movie, and then consider what was wrong and what to do for avoiding damages.
- Worksheet
  - Students simulate proper actions to avoid damages under a dangerous situation.
- JMA provides a leaflet guiding for mitigating damages of severe weather associated with cumulonimbus cloud to the public through the website.

ここまでに学んできた、急な大雨・雷・竜巻を引き起こす原因は、発達した積乱雲です。積乱雲とはどのような雲で、私たちは自分の身を守るためにどうすればよいのでしょうか？
もう一度、ふりかえってみよう。
積乱雲ってどんな雲？
夏によく見られる、もくもくとした形で空に高くのびる大きな雲を積乱雲といいます。積乱雲は、急な大雨や雷、竜巻といった激しい自然現象を引き起こし、それが原因で人が死亡する事故も毎年のように起きています。
積乱雲はかみなり雲とも呼ばれています。
あっという間に変わる天気
一つの積乱雲が発生してから雨をふらせて弱まるまでの時間は、30分から1時間くらいです。そのため、今は晴れていたり、小雨だったとしても、あっという間に天気が変化して危険な状態になります。
わずかな時間で雲のようすが大きく変わります。
出かける前に天気予報のチェック
出かける前には天気予報をしっかりと確認しましょう。「大気の状態が不安定」「天気が変わりやすい」「雷雨に注意」といった言葉が出てきたら、注意が必要です。
4
積乱雲が近づいてくるときのサイン
積乱雲が近づいてくるときには、特ちょう的なサインがあります。
空が暗くなる
冷たい風が吹いてくる
雷が見える・聞こえる
このような天気の変化に気づいたら、なるべく外に出ないか、すぐにじょうぶな建物にひなんしましょう。
積乱雲が近づくのを感じたら
「空が暗くなる」「冷たい風が吹いてくる」「雷が見える・聞こえる」などの積乱雲が近づくサインを感じたら、まもなく急な大雨や落雷が起きます。竜巻がおそってくる場合もあります。鉄きんコンクリートのビルなど、すぐに近くのじょうぶな建物の中へ入りましょう。
大雨がふると、地下に水が流れ込むことがあるので、地上より上の階にいるようにしましょう。雷のときは車や列車の中も安全ですが、竜巻のときは車も飛ばされてしまうので危険です。また、飛んできたものが窓を突き破り、部屋にガラスが飛び散るおそれがあるので、窓に近づいてはいけません。テーブルの下など、飛んでくるものから身を守れる場所へひなんしましょう。
雷が聞こえなくなって20分くらいは、むやみに外に出ないでください。
5
キミならどうする？
竜巻が見えたとき
友だちと外にいたら、竜巻が見えました。そんなとき、どのようにすればよいと思いますか？
下の例のうち、正しいものには○、まちがっているものには×をつけて、その理由を書いてみましょう。
撮影：つくば市北条 吉澤さん
1 すぐに頑丈な建物へひなんする。（　）
理由
2 竜巻が近づいてこないかどうかを窓から見続ける。（　）
理由
3 できるだけ窓からはなれる。（　）
理由
3

竜巻から
竜巻注意情報
身を守る
『竜巻注意情報』は竜巻の発生する"危険な気象状況"をお知らせして、身を守るための行動の準備を促すものです。
平成11年9月に愛知県豊橋市で発生した竜巻（豊橋市提供）
気象庁
音声コード
『竜巻』が間近に迫ったら・・・
すぐに身を守るための行動をとってください！
屋外では 頑丈な構造物の物陰に入って、身を小さくする。
屋外では 物置や車庫・プレハブ（仮設建築物）の中は危険。
屋外では シャッターを閉める。
屋内では 家の1階の窓のない部屋に移動する。
屋内では 窓やカーテンを閉める。
屋内では 窓から離れる。大きなガラス窓の下や周囲は大変危険。
屋外では 電柱や太い樹木であっても倒壊することがあり、危険。
屋内では 丈夫な机やテーブルの下に入るなど、身を小さくして頭を守る。
「竜巻」に遭遇した人の声
このような場合には、あなたの身に危険が迫っています！
"ゴー"という音がしたのでいつもと違うと感じた。
山すそが見えないほど真っ黒い雲の底がろうと状に垂れ下がり、トタンのようなものを巻き上げながら進んでいくのを見た。
掃除機で吸っているようだった。トタンとか発泡スチロールとか色々なゴミが飛んでいた。
札幌管区気象台・災害時気象調査報告「平成18年11月7日から9日に北海道（佐呂間町他）で発生した竜巻等の突風」より
沖縄・下地島空港付近で観測されたろうと雲
※気象庁では、竜巻によると思われる突風災害が発生すると、現象解明のため、地元気象台が現地調査を行っています。

Educational programs for tornado disasters by NIED

- NIED provides educational programs for tornado disasters ,which has three steps as follows.
- The programs is developed based on the results of a questionnaire survey to clarify which actions students took when they faced to a tornado.
- Teaching guides, worksheets and additional materials are provided for each step.
- Step 1: Learning tornadoes
- Step 2: How to protect yourself from tornadoes
- Step 3: Training actions to avoid tornadoes

Nagata and Kimura (2014)

写真2　竜巻対応行動訓練風景

Future issues for tornado educations in Japan

- The programs and materials proved by JMA and NIED should be informed widely.
- Their programs and materials for tornado education should be practiced more widely and improved more through PDCA cycle.
- Tornado education should be included definitely in the National curriculum standards.
- The most of teachers do not have enough knowledge and skill to teach students tornado disasters. Teachers are required to be trained.
- Tornado researchers are required to contribute to enhance teacher's knowledge and skill for tornado disasters and develop programs and materials for tornado education.
- There are certificated weather forecasters in Japan, who have a license to certificate the special ability of meteorology and weather forecast. Certificated weather forecasters are expected to contribute to tornado education more widely.

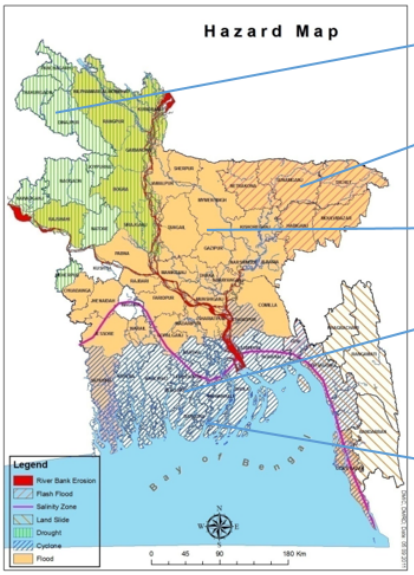
(3)Disaster Management of Bangladesh: An overview (Ahmadul Haque)

Ahmadul Haque
Additional Secretary and Director
Cyclone Preparedness Programme (CPP)
Ministry of Disaster Management and Relief

Disaster Management of Bangladesh: An overview

03 May 2025

BD Hazard Profile



DROUGHT	Affects 8.3 million ha land
	Reduced food grains by 1 million tons
	Loss of grazing fields, dried ponds, water shortage
FLASH FLOOD	Damages standing crops
	Damages infrastructures and facilities
	Unpredictable, uncertain
FLOOD	Inundates more areas, increases river erosion
	Breaches embankments, damages infrastructures
	Loss of crops, fisheries, livestock, biodiversity
SALINITY INTRUSION	Sea level rise, damage to Sundarbans watersheds
	Damages crop lands
	Spreading intrusion from 1.5 to 2.5 Mha
	Lack of drinking water, burden to women & children
	Projected displacement: 6-8 m by 2050
CYCLONE	Remain to be the deadliest and most destructive hazard
	Recurring event, lingering aftermath, complex recovery

2

Bangladesh: A nation of disaster vulnerability

Bangladesh's geographic vulnerability to natural hazards

- Bangladesh ranks among the most disaster-prone countries globally, with frequent cyclones, floods, landslides, lightning, river erosion, etc. impacting millions annually.
- The coastal belt, with its high population density and socio-economic vulnerabilities, remains particularly exposed to tropical cyclones.

Changing process

- Multi-hazard concern
- Urban focus
- Forecast capacity enhancement
- Communication, beyond dissemination
- Redesigned structure policy, resilience
- DM and Development

Key Factors of Vulnerability

Global Warming and Climate Change

Geographical location (Funnel shape of the Bay of Bengal)

Deltaic landscape, dominance of floodplains (80-82%)

Low elevation from the sea

High population density (1100/km^2 approx.)

High level of rural poverty

4

State we started with

1970

REACTIVE

- Early Warning System
- Legal and Policy Framework
- DRM Institutions
- Mitigation Infrastructure
- Investment in DRR
- Disaster Response Volunteers
- Community Engagement
- Inclusive and Gender-responsive DRM
- Anticipatory Actions
- All of Society Approach

1970 cyclone: an unforgettable event of the history

- Importance of preparedness
- Necessity of effective Early Warning system
- Value of a community-based approach

Evolution of Disaster Management in Bangladesh

Decade	Stage of Evolution
1970–1980	▪ Relief and rescue focused, shifted to Preparedness, ▪ institutional arrangement ▪ Community-based approach
1990–2000	▪ Awareness campaigns and infrastructure development
2000–2010	▪ Legal and policy frameworks (DM Act 2012, SOD)
2010–Present	▪ Participatory and data-driven management ▪ Multi-hazard EWS ▪ Anticipatory Action/early action, ▪ Technology integration ▪ Whole of Society approach ▪ Green/climate adaptive DM ▪ Focus shifting to urban hazards

7

GoB Capacity in Disaster Management

- Dedicated **Ministry of Disaster Management and Relief**
- Specialized **Department of Disaster Management (DDM):** shifting focus from relief to disaster management specially to risk reduction culture.
- DM operational instrument: Standing Orders on Disaster
- Disaster Management Information Centre (DMIC): down to Upazilla level to support info management & Coordination
- National Disaster Response and Coordination Center: 24X7 Reporting mechanism
- CPP (Cyclone Preparedness Programme): building a network of 80,000+ trained volunteers across the coastal belt
- Presence of **vibrant INGO/NGO communities**
- Vulnerable people demonstrates strong coping capacity to face the disaster challenges
- National Emergency Operation Centre (NEOC) & Emergency Response and Coordination Centre (ERCC) are going to be established.

8

DM intervention: Mitigation

Infrastructural Intervention

- Flood and Cyclone shelters
- Earthen fort
- DMIC
- HBB road
- Small bridge/culverts
- Resilient house

Non-infrastructural initiatives

- Policy instruments
- CBDRM- CPP, FPP, UCV
- National Volunteer Organization
- Community volunteers Capacity Development
- Preparing Resilient Community

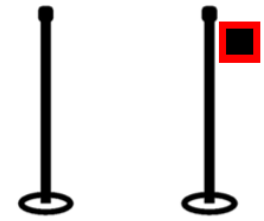
DM intervention: Preparedness

- **Cyclone:**
  - Early Warning System (Science-management Approach)
  - Anticipatory Actions
  - Early Action Protocol;
  - Community responders and Volunteers
- **Flood:** EWS, Early Action Protocol, responders and Volunteers
- **Landslide:** EWS, EA, Physical/mitigation interventions
- **Lightning:** Awareness, Safe Places, EW, Rapid dissemination (CB, LB-SMS)
- **Urban disaster:**
  - Urban Community Volunteers
  - LGI capacity development
  - City EWS
  - INSARAG

Overview of the Cyclone Preparedness Programme (CPP)

- A community-based approach
- A global flagship model
- Building social capital and social empowerment
- Established in 1972 (following Bhola Cyclone)
- Joint initiative of GoB and Bangladesh Red Crescent Society
- 80,000+ trained volunteers
- Community empowerment model
- Mission: Early warning, evacuation, rescue, first aid, relief support
- Replicable and scalable

CPP Early warning dissemination and actions



Signals 1 – 3
No flag. Verbal discussion on formation of depression/ cyclone.

Signal 4
One flag. Raise awareness on formation of cyclone and possibility of impact. Public address through megaphones and loudspeakers.

Signals 5 – 7
Two flags. Public address through megaphones and loudspeakers. Preparation for evacuation.

Signals 8 – 10
Three flags. Public address through megaphones and loudspeakers and use of static and hand sirens. Ensure evacuation.

- Based on warning messages issued by the **Bangladesh Meteorological Department (BMD)**
- **1 to 10 signals issued** with incremental early warning action at each stage
- **Signal 1 – 3 = 0 Flag**
- **Signal 4 = 1 Flag**
- **Signal 5 – 7 = 2 Flags**
- **Signal 8 – 10 = 3 Flags**

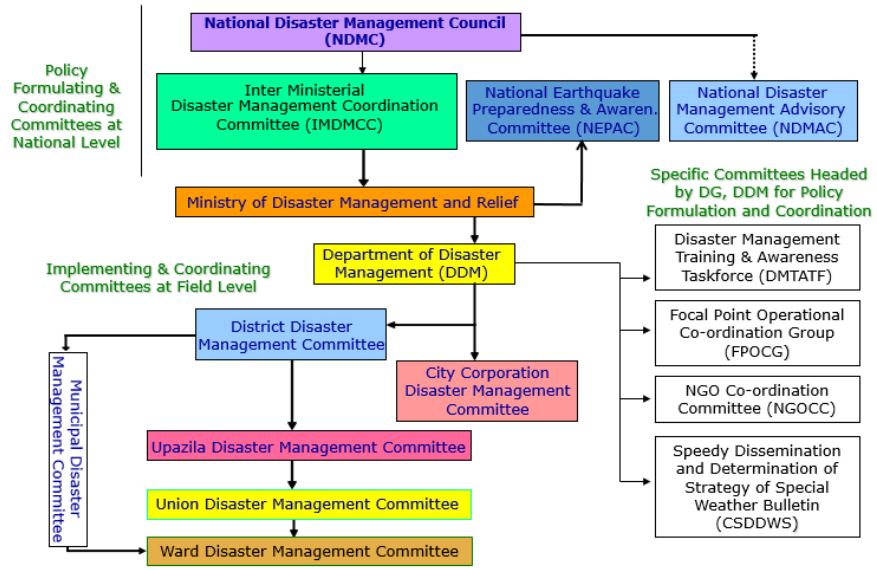
All hazard Early Warning Dissemination

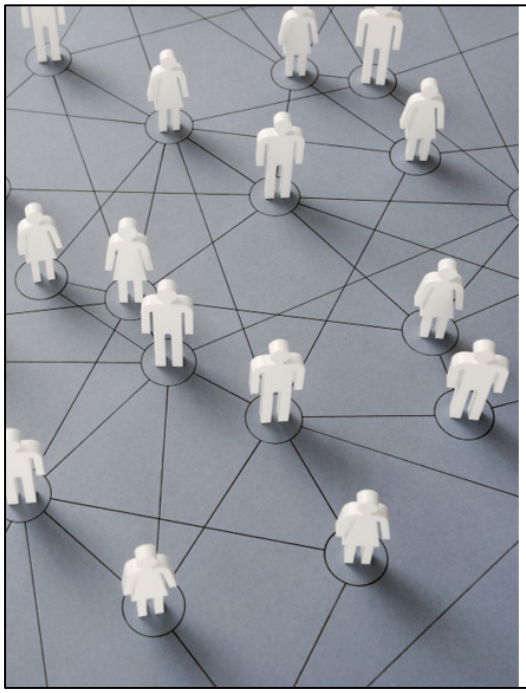
- BMD and FFWC generates Early warnings
- EWs are
  - Visible (by Flags, flayers, markers)
  - Audible (By PAs, Community/FM Radios, Voice message)
  - Readable (By Electronic and Social media, SMS service)
- Ensure receipt of warning signals of imminent disasters by all concerned officials and agencies
- Mass media play important role for Early Warning dissemination
- CPP plays vital roles for disseminating Cyclone EW to the community level in the coastal areas, Women-friendly EWS
- Field level Disaster Management Committees under SOD ensure EW dissemination at community level

Way of Dissemination at Community Level

Field Level Disaster Management Committees
CPP Telecommunication Network
CPP Volunteers using megaphones, hand sirens and public address system
Hoisting of Signal Flags
Microphones Using by Religious Institutions
Mass Media, Social Media, Website
Interactive Voice Response Service (IVR)
Cell Broadcasting System (CBS)
Short Message Service (SMS)
Pole-fitted Megaphone Siren (installed 35 in coastal areas)

Disaster Management Coordination

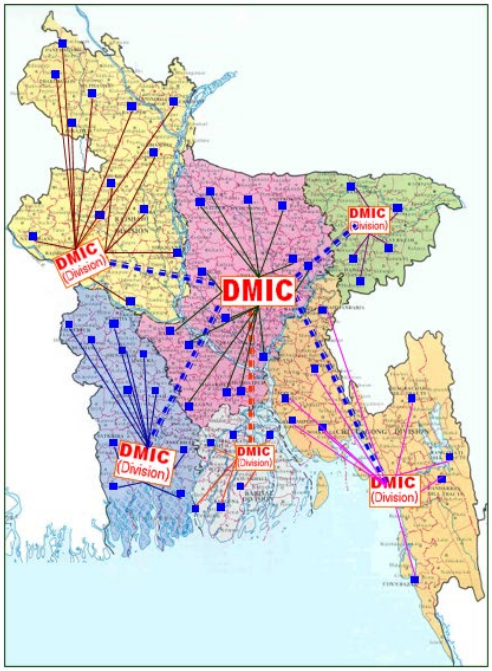




Information Management for Coordination

- Disaster Management Information Centre (DMIC) has been established to support information management and coordination.
- The key objectives are:
  - To enhance disaster management coordination through improved facilities and information sharing capacities of DMIC during normal and emergency periods
  - To improve the capacity of information sharing during normal (non-emergency) periods for DDR interventions
  - To run EOC more effectively and efficiently during disasters

DMIC at District Level



Response Mechanism & Key Organizations

- **National-Level Coordination:**
  - Ministry of Disaster Management and Relief: Policy leadership, inter-agency coordination, and oversight
  - Department of Disaster Management: Operational planning, relief distribution, shelter management
  - Armed Forces Division (AFD): Large-scale emergency response: rescue, logistics, engineering support
  - Fire Service and Civil Defence (FSCD): All-hazard response
- **Field-Level Response Entities:**
  - District, Upazila, and Union Disaster Management Committees (DMCs): Localized planning, immediate response, resource coordination
  - Fire Service and Civil Defence (FSCD): Search and rescue, firefighting, emergency medical support
  - Bangladesh Red Crescent Society: Emergency relief, shelter, and first aid through trained volunteers
  - Health Emergency Operations Centre: Mobilizes health resources during disaster and epidemic events
- **Community-Based Response Networks:**
  - Cyclone Preparedness Programme (CPP): 80,000+ volunteers for cyclone alerts, evacuation, and first aid
  - Urban Community Volunteers (under FSCD): Fire, earthquake, and urban emergency responders in cities
  - Flood Preparedness Programme (FPP): Replicated CPP model, being piloted.

Humanitarian Support

- Social Protection Programs, in normal time or post-disaster:
  - Vulnerable Group feeding
  - Gratuitous Relief (cash)
  - Gratuitous Relief (food assistance)
  - Gratuitous Relief (warm clothes)
  - Gratuitous Relief (CI Sheet)
  - Cash support for house repair/reconstruction
  - Food for work/cash, EGPP
- As response (facilitating shelter management)
  - Dry food
  - Baby food
  - Food grain for cooked/hot meal
  - Tents
  - Cattle feed
- Recovery
  - Gratuitous Relief (CI Sheet)
  - Cash support for house repair/reconstruction

- Bangladesh has taken number of initiatives for developing DRR strategies and investment
- Standing Orders of Disaster 2019, Formulation of Disaster Management Act during 2012
- Periodic (Five Years) National Plan for DM (NPDM)
- Delta Plan 2100, six hot spots with the view to initiate appropriate DRR measures with huge investment
- Multi Hazard Risk Assessment for whole country sets the basis for risk informed and inclusive investment
- Earthquake Risk Assessment for 3 Major Cities and 12 towns and their wards-based contingency
- National Strategies on Internal Displacement
- DRR Strategies are aligned with the SFDRR priorities
- Community-based Disaster Risk Reduction by Cyclone Preparedness Programme (CPP) and Gender Responsive DRR
- Disability inclusive Disaster Risk Management
- Anticipatory Actions in national policy

DRR good practices

Challenges and Opportunities

Challenges

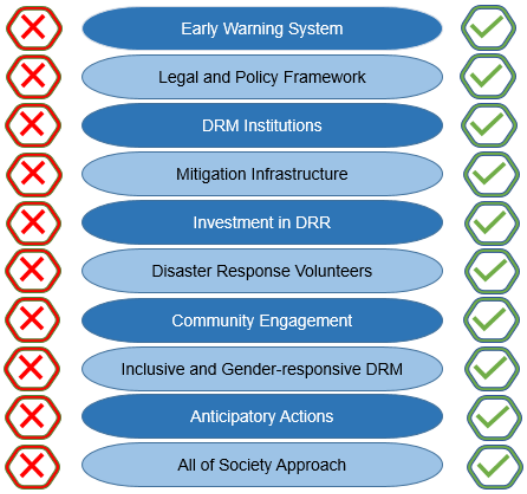
- **Rapid Urbanization and Unplanned Growth**
  - Increases exposure to urban disasters (e.g., building collapse, drainage failure, fire)
- **Climate Change and Rising Sea Levels**
  - Intensifies cyclone, flood, salinity, and displacement risks, especially in coastal areas
- **Institutional Coordination Gaps**
  - Fragmented roles among agencies; weak vertical coordination from national to local levels
- **Limited Access to Data and Technology**
  - Gaps in hazard mapping, real-time risk modeling, and localized early warning dissemination

Opportunities

- **Strong Community-Based Programs**
  - Established models like CPP and urban volunteerism enable scalable local engagement
- **Digital and Forecasting Innovations**
  - Expanding use of EWS, GIS, mobile alerts, and anticipatory action protocols
- **Policy and Legal Frameworks in Place**
  - Disaster Management Act (2012), NPDM, and DM Policy 2015 provide strategic direction
- **Youth Engagement and Public Awareness**
  - Rising youth activism and DRR curriculum inclusion foster a culture of preparedness

Where we stand now…

1970



2025

Call to Action

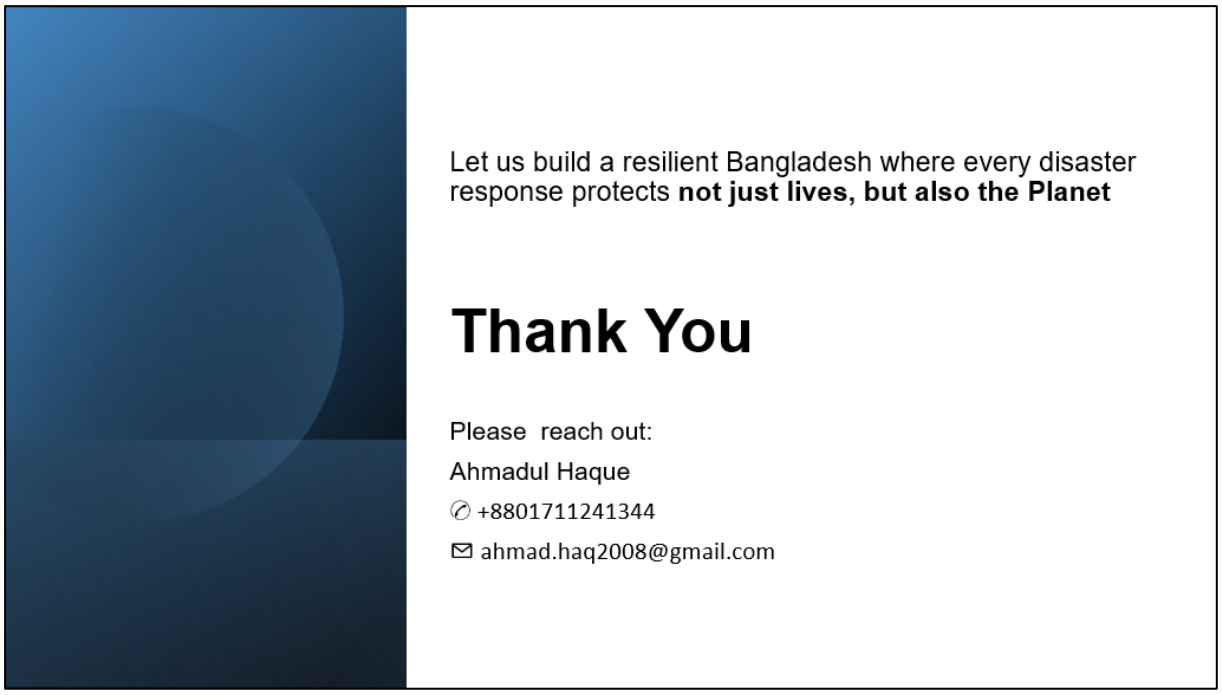
- **Empower Local Communities and Youth**
  - Strengthen ward-level disaster planning and volunteerism
  - Engage schools, madrassas, and youth clubs in preparedness drills
- **Invest in Resilient Infrastructure and EWS**
  - Expand climate-resilient roads, shelters, and embankments
  - Upgrade localized forecasting and anticipatory action protocols
- **Integrate DRR into All Development Planning**
  - Make DRR a core requirement in national and local budgets
  - Align DM efforts with SDGs, Delta Plan 2100, and climate strategies
- **Promote Inclusive and Tech-Driven Responses**
  - Ensure participation of women, persons with disabilities, and marginalized groups
  - Utilize GIS, mobile alerts, and AI for smart disaster response and planning

Disaster Education in Bangladesh – DM Policy 2015 (Section 5)

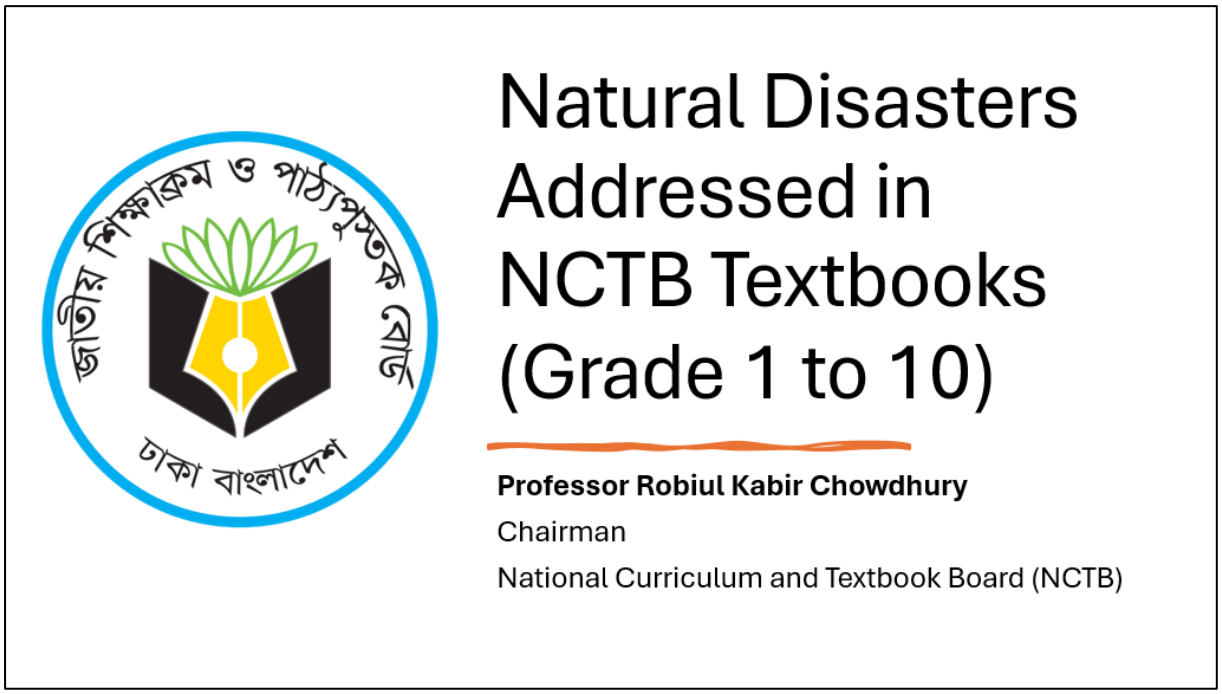
Objective:
To build a disaster-resilient society by promoting knowledge, preparedness, and action-oriented learning from school to community levels.

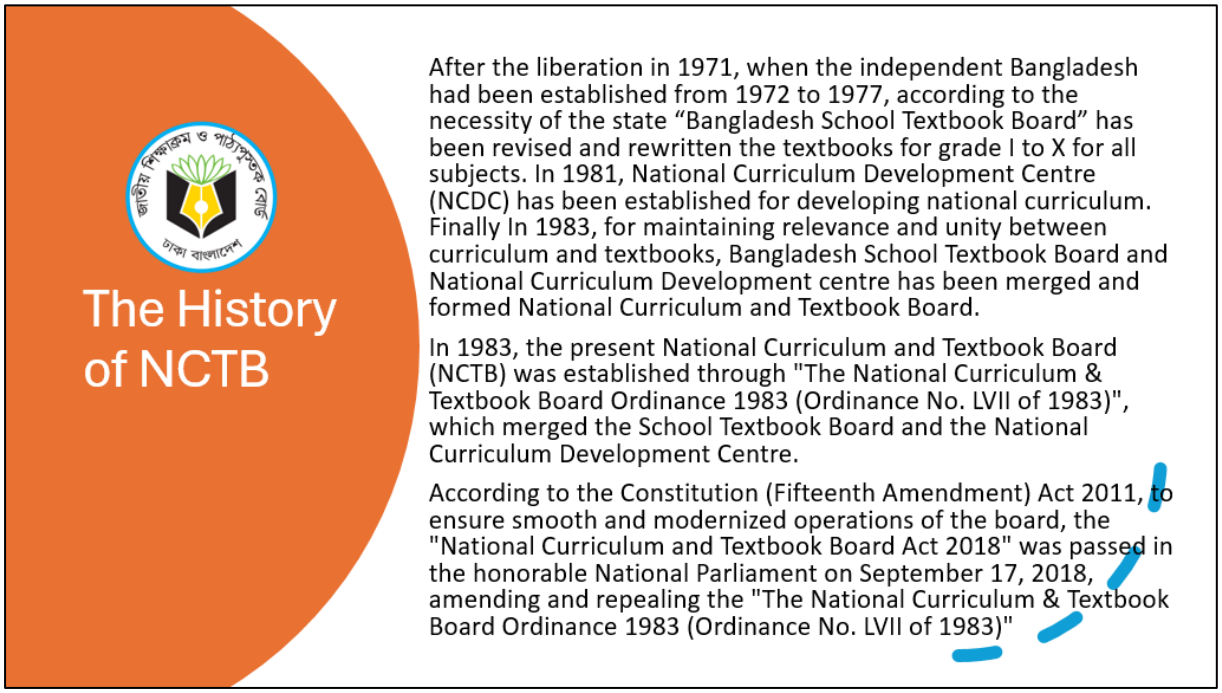
Key Provisions:

- **Curriculum Integration:** DRR education integrated into formal curricula across primary to tertiary levels
- **Textbook Inclusion:** Disaster-related topics incorporated into NCTB-approved educational materials
- **Teacher Training:** Capacity building for teachers and administrators on DRR concepts and practices
- **Research and Innovation:** Educational institutions encouraged to undertake DRR and climate adaptation research
- **Community Awareness:** Promotion of non-formal and community-based disaster education
- **Knowledge Platforms:** Establishment of networks for sharing DRR practices and innovations


Let us build a resilient Bangladesh where every disaster response protects **not just lives, but also the Planet**
Thank You
Please reach out:
Ahmadul Haque
✆ +8801711241344
✉ ahmad.haq2008@gmail.com

(4)Natural Disasters Addressed in NCTB Textbooks (Robiul Kabir Chowdhury)





NCTB: Key Responsibilities

1. Development, renewal, monitoring, and reform of the school curriculum, syllabus, and textbooks
2. Assessment and evaluation of the effectiveness of the curriculum, syllabus, and textbooks
3. Preparation of textbook manuscripts
4. Preparation and publication of accessible textbooks and learning materials for students with disabilities
5. Development of textbooks in the mother tongue for ethnic minorities

NCTB: Key Responsibilities

6. Creation and approval of digital and interactive books
7. Printing, publishing, distribution, and marketing of textbooks
8. Free distribution of textbooks for students of classes and levels declared by the government
9. Approval of textbooks, supplementary teaching-learning materials, prize books, and reference books
10. Encouragement of activities related to science, literature, and culture through donations and grants

Natural Disasters Addressed in NCTB Textbooks (Grade 1 to 10)

Disasters	Primary School					Secondary School				
	G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8	G-9	G-10
Fire-accident		✓	✓	✓						
Water-drown		✓	✓	✓						
Flood			✓	✓		✓	✓	✓	✓	
Earthquake			✓	✓				✓	✓	
Cyclone/ Tornado				✓		✓	✓	✓	✓	
Drought				✓		✓	✓	✓	✓	
River erosion				✓			✓	✓	✓	
Hail storm							✓		✓	
Waterlogging								✓	✓	
Tsunami						✓	✓	✓	✓	
Landslide								✓		
Acid-rain									✓	
Fog									✓	
Heavy Rainfall							✓			
Short rainfall							✓			
High Heat								✓	✓	
Low Heat								✓		
Wild fire								✓		

Some Deadliest Tornados in Bangladesh

The world's deadliest tornado occurred on April 26, 1989, in Bangladesh killing 1,300 people and 12,000 injured.

The 1996 tornado in Bangladesh destroyed tens of thousands of homes. At least 600 people were killed.

Class 3: Addressing Emergency Situations

Fire

Let us know the causes of fire :

- Keeping the cooking stove on unnecessarily
- Not throwing burning cigarettes, bidis, match sticks etc. in proper place
- Playing with fire
- Burning firecrackers carelessly
- Using of mosquito coils, candles, candlesticks and open kerosene lamps carelessly
- Faulty electric equipment
- Using electric equipment without obeying rules
- Using faulty gas cylinders

What to do to prevent fire :

- Closing stove properly after cooking
- Putting out the burning cigarettes, bidis, match sticks properly and throwing in a specific place.
- Checking the electrical fittings regularly
- Checking the gas cylinders used at homes, factories and vehicles regularly.
- Keeping fire extinguishers ready at home all the time
- Not playing with fire

What to do in case of fire :

- First protect yourself from fire
- Seeking help from neighbours in case of fire
- Instead of running, roll on the ground in case clothes catch fire
- Pouring a lot of water on the burn injuries of the body. Take advice from a doctor as soon as possible
- Call the fire service to inform them about the fire
- For emergency service call 999

Class 3: Addressing Emergency Situations

Flood

b) Let us write down what and how I should take things while going to the shelter centre during floods :

Serial	Stuff	How to take
1.		
2.		
3.		

c) Let us make a list of how to support parents during floods :

Serial	Activities	How to do
1.		
2.		
3.		

d) Let us make a list of what to do and not to do at the shelter centre :

Serial	What to do	Serial	What not to do
1.		1.	
2.		2.	

Class 3: Addressing Emergency Situations

Earthquake

b) Let us make a list of losses due to an earthquake :

1. .....
2. .....
3. .....
4. .....
5. .....

c) Let us write what to do and not do in the table below during earthquake at home or school :

Serial	What to do	What not to do
1.		
2.		
3.		
4.		

d) Let us drill what we will do during an earthquake when we are in the classroom.

Class 4: Combating Disasters

Flood

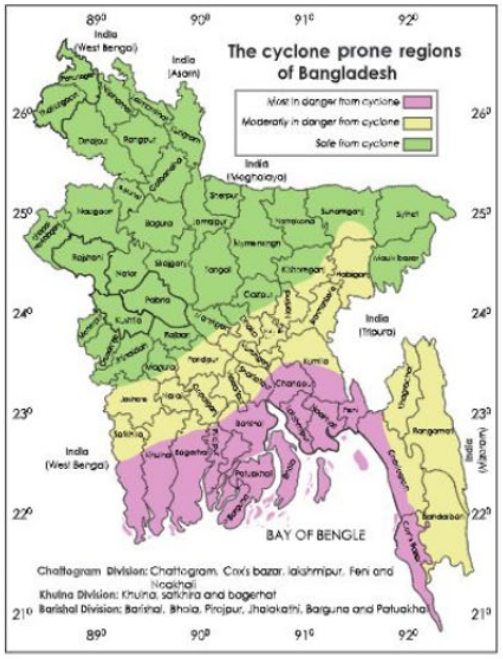
- Effects of Floods
- Causes of Floods
- Preparing for Floods

Cyclone

- Effects of cyclone
- Causes of cyclone
- Preparing for cyclone

Fire

- Effects of fire
- Causes of fire
- Dealing with fire



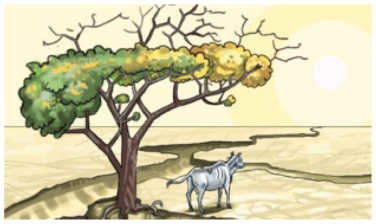
Class 5: Climate and Disaster

Riverbank Erosion

- Causes of erosion
- Effects of erosion

Drought

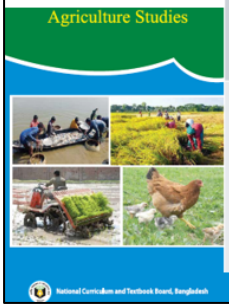
- Effects of drought
- Causes of drought



Earthquake

- Earthquake zones
- Cautions before, during and after earthquakes

Textbook name: Agriculture Studies

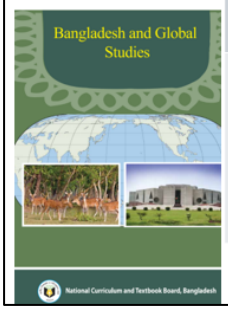


Grade	Topic	Key Discussion Points
Class-6	Weather and Climate of Bangladesh	Natural disasters like heavy rains, droughts, floods, cyclones, tidal surges, etc., have been mentioned.
Class-7	The Impact of Adverse Weather and Climate on Crop Production	The discussion highlights the types of damage caused to crops by excessive rainfall, hailstorms, droughts, and floods. Images of flood and drought-affected paddy fields are also provided.
Class-8	Protecting Crops and Livestock in Adverse Environments and Unfavorable Weather Conditions	Floods, waterlogging, drought, excessive heat, and extreme cold have been identified as climate-related elements that create adverse environments. Strategies for livestock and crop production under such unfavorable conditions have been discussed.
Class-9 & 10	Climate Change and Its Impact on Agriculture	Climate change, including high temperatures, sudden floods, storms, tidal surges, fog, hailstorms, severe droughts, and waterlogging, is creating various adverse conditions in the country. The impact of climate change on crops, fisheries, and livestock has been discussed.

Textbook name: Science

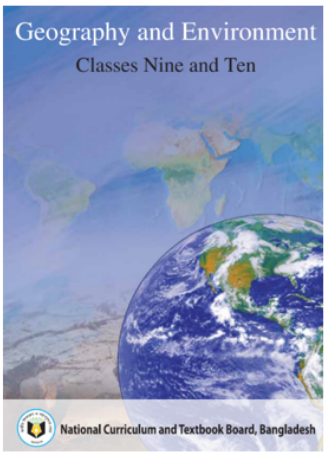
Grade	Key Discussion Points
Class-9 & 10	This includes detailed discussions on natural disasters such as floods, droughts, cyclones, tsunamis, acid rain, earthquakes, etc., covering comprehensive information, images, causes of disasters, prevention, coping strategies, immediate actions, and follow-up measures.

Textbook name: Bangladesh & Global Studies



Grade	Key Discussion Points
Class-7	The chapter includes topics related to the causes of natural disasters such as cyclones and storm surges, floods, river erosion, droughts, cold waves, tornadoes, nor'westers, etc., the severity of disasters, and necessary measures to tackle disasters. Additionally, pictures of various disasters and images depicting the severity of disasters are also included.
Class-8	Earthquakes, tsunamis, landslides, wildfires, river erosion, cyclones and storm surges, droughts, and other natural disasters—their causes, severity, and necessary measures to tackle them are included in this chapter. Additionally, pictures of various disasters and images depicting their devastation have been incorporated.
Class-9 & 10	This chapter includes a detailed discussion on earthquakes, covering their causes, types, consequences, preparedness and necessary steps for risk management, as well as post-earthquake actions. Additionally, it contains information and images about natural disasters caused by climate variations, such as cyclones and storm surges, along with details on the effects of monsoons.

Textbook name: Geography & Environment



Grade	Key Discussion Points
Class –9 & 10	Regarding Cyclones - Basic concepts, images of cyclones, and notable cyclones from the past few years—including their years of occurrence, names, and death tolls—are mentioned. Additionally, concepts on disaster management such as floods, droughts, river erosion, earthquakes, tsunamis, etc., are provided. It illustrates disaster management through the disaster management cycle, covering prevention, mitigation, preparedness, response, recovery, development, and coastal disaster management, among others.

Thank You