



## REGIONAL WORKSHOP ON IMPACT-BASED FORECASTING:

# Training-of-Trainers and National Demonstration Planning for Temperature-Related Hazards

*SAHF IBF Working Group Implementation Plan Project*



09-13 February 2026



Kathmandu, Nepal



Thresholds Early Action Protocol  
Anticipatory Action IBF  
Early Action SOP  
Acting in Vein Readiness  
Anticipatory Action Protocol  
Risk Appetite Activation  
Forecast based Action  
Triggers No-regret Approach  
Forecast based Financing

Stakeholder Group	Typical Risk Appetite	What They Try to Avoid	What They're Comfortable Doing
<b>NMHS</b>	Low–Medium	Credibility loss, “false alarm” criticism	Internal early heads-up, technical advisories, tiered watch to warning
<b>National/Provincial/Local Disaster Management Authorities</b>	Medium	Political backlash, disruption, logistics failures	Preparedness activation, targeted alerts, staged readiness; cautious on evacuation
<b>Humanitarian agencies implementing AA</b>	Medium–High (for low-regret)	Harm from inaction; missing vulnerable groups	Early cash/top-ups, pre-positioning, targeted support
<b>Donors / pooled funds</b>	Low (unless rules are strong)	Fiduciary risk, “wasted funds” narrative	More willing when triggers/actions are pre-agreed + independently verifiable
<b>Sector Agencies &amp; Operators (power, roads, irrigation, water supply)</b>	Medium–High (asset protection)	Asset damage, downtime, liability	Pre-emptive operations, maintenance mobilization, service continuity steps
<b>Agriculture and Livestock services</b>	Medium	Farmer trust issues; wrong advisory timing	Advisories and low-cost inputs; cautious on expensive interventions
<b>Local government and Community leaders</b>	Mixed	Loss of trust, livelihood disruption	Community preparedness; reluctant on disruptive actions unless trust is high
<b>Private sector (large employers, logistics, insurers, telecom)</b>	Medium–High (if cost–loss is clear)	Financial losses, liability	Business continuity actions, supply chain shifts, worker protection measures
<b>Media / info intermediaries</b>	Low–Medium	Reputational risk, misinformation (?)	Will share clearer, simpler tiered messages; (or clickbaits?!)

# Risk Appetite of Various Stakeholders

## THE CAUTIOUS GUARDIANS (Low to Medium Risk)



**National Meteorological Services (NMHS)**  
**Prioritize credibility.**

They avoid “false alarm” criticism by favoring internal advisories over public warnings.



**Donors**  
**Focus on fiduciary safety.**

Risk is only accepted when triggers are pre-agreed and independently verifiable.



**Media**  
**Seeks clear, simplified messaging.**

They avoid reputational risk and misinformation while favoring tiered, easy-to-digest information.

## THE ACTION-ORIENTED RESPONDERS (Medium to High Risk)



**Humanitarians**  
**Prioritize the “Cost of Inaction.”**

They accept high risk to avoid missing vulnerable groups or causing harm through passivity.



**Sector Agencies**  
**Focus on asset and service continuity.**

They favor pre-emptive maintenance and mobilization to prevent infrastructure downtime and liability.

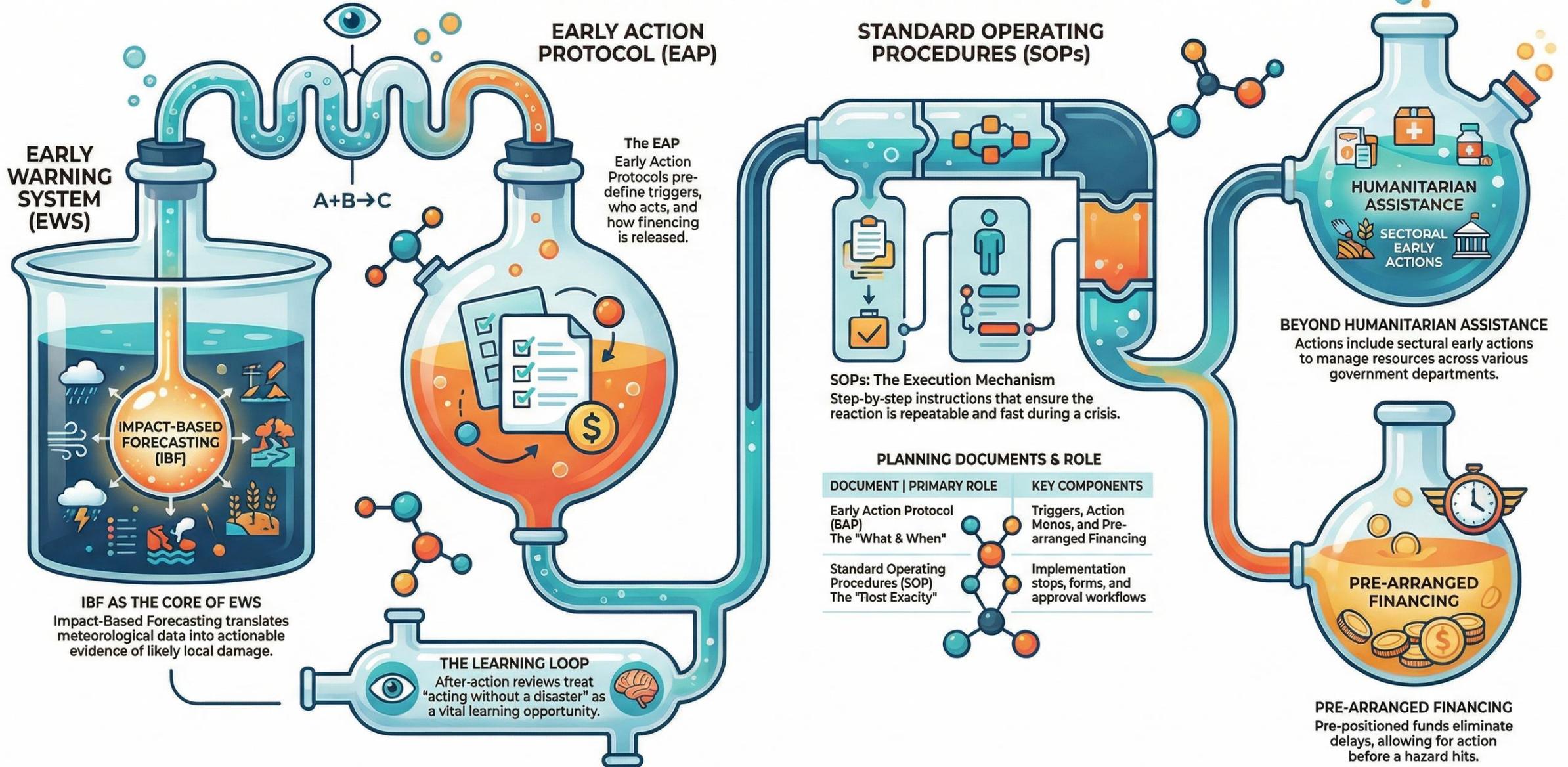


**Private Sector**  
**Acts when cost-loss is clear.**

Large employers prioritize business continuity, supply chain shifts, and worker protection.



# THE CHEMISTRY OF FORECASTS AND ACTIONS



# Deterministic vs Scenario-based Triggers for AA

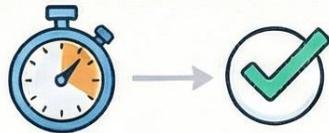
Triggers are the “if/then” logic that determines when to activate humanitarian aid before a disaster hits, Choosing the right mechanism—either fixed thresholds or probabilistic models—depends on forecast reliability and the complexity of the impact.

## Deterministic Triggers (“If X, then act”)



### Rule-based Thresholds

Activates when a specific indicator, such as river levels or windspeed, crosses a fixed limit.



### Key Finding: Fast, Clear, and Auditable

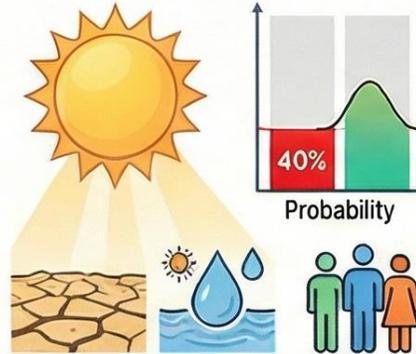
While easy to explain and automate, it may miss “near-miss” risks or vulnerability differences.



**Example: Rainfall > X mm in 24 hours**

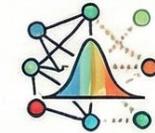
A simple, automated trigger used when forecasts are reliable and impacts are well-known.

## Scenario-based Triggers (“If risk is high enough, act”)



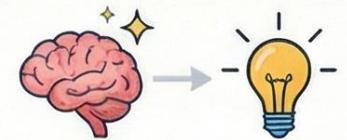
### Example: ≥ 40% Chance of Severe Drought

Focuses on predicted outcomes, such as “10,000 people affected,” rather than just hazard intensity.



### Probabilistic & Multi-indicator

Uses ensemble forecasts to combine hazard data with exposure and vulnerability information.



### Key Finding: Handles Complexity and Uncertainty

Better for targeting impacts in complex risks, though it requires high-quality data.

## Comparison Guide

Feature	Deterministic	Scenario-based
Best Use Case	Reliable forecasts + stable impacts	High uncertainty + varying impacts
Data Needs	Lower (Single source focus)	Higher (Includes impact/vulnerability data)
Governance	Simple, automated rules	Requires agreed “risk appetite”

# Anticipation to Action: The Scenario based Early Action Matrix

## Institutional Level

Trend \ Forecast	Forecast	
	Decreasing	Increasing
Danger Level		
More than 1m above Danger Level		
At danger level and Up to 1m above Danger Level		
Within 1m below Danger Level		<div style="background-color: orange; padding: 2px;">&gt;75% Probability of Danger Level Exceedance</div> <div style="background-color: green; padding: 2px;">&lt;75% Probability of Danger Level Exceedance</div>

*Expected duration, impact, forecast consistency, rate of increase, time to peak*



EWM



Forecaster & Stakeholders



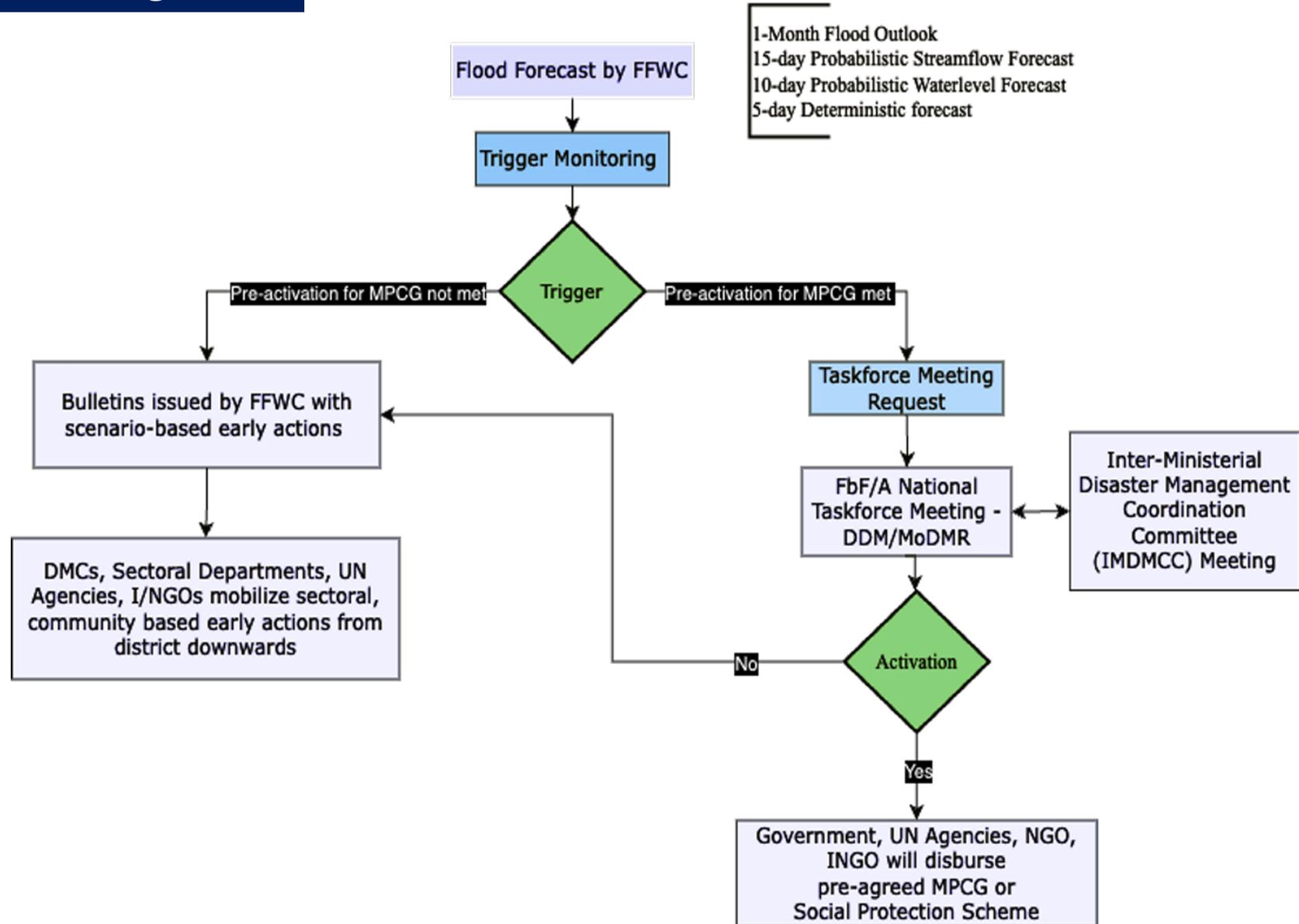
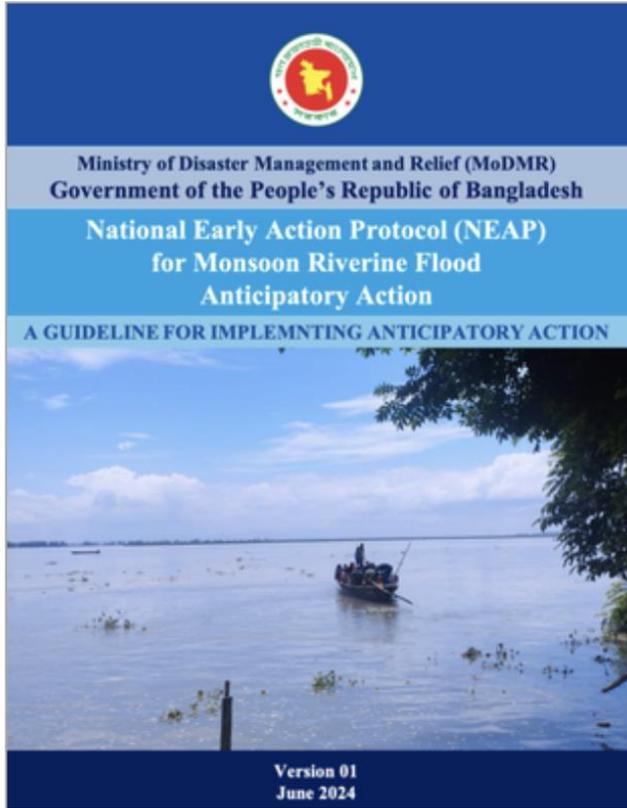
Disaster management & Humanitarian

# AA Triggers for Monsoon Riverine Floods in Bangladesh

Scenario	Actions	Responsible Institutions
3. Current water level is within 1 m below DL. Forecast is indicating likely increase of water level and there is more than 75% probability of DL exceedance as per 10- and 15-days forecast.	Issue flood bulletin with scenario-based actions	FFWC, BWDB
	National FbF/A task force meeting; AA technical working group meeting, Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) meeting	MoDMR, DDM
	<b>MPCG will be disbursed</b> if forecast for a location indicates high impact <sup>3</sup> for more than 3 days as per 5 days deterministic and or 10 days probabilistic water level forecast	MoDMR, DDM
	Early warning dissemination	DDM
	Disaster management committee meeting; Repairing evacuation routes; Shelter preparation/Preparation of evacuation points (repair rooms, WASH facilities, electric supply, with provisions for gender and special needs); Making arrangements for temporary shelter; Making a list of destitute and helpless families; Evacuate families at risk; Keep evacuation boats ready; Formation of volunteer teams, formation of women volunteer group; Distribution of temporary shelter kits for households evacuating from low-lying; Generator /solar power management; Arrange stock of dry food.	DMCs, LGED
	Installation/Repairing tube wells/latrines at shelters; Storage of emergency medicine supply; Formation of medical teams; Storage of water purification tablets.	UDMC, DPHE
	Issue special advisories including on crop harvesting, crop/ livestock/ fisheries management	DAE, DLS, DoF
	Arrange stock of livestock feed/fodder; Vaccination campaign for livestock	DLS, DMCs

Scenario	Actions	Responsible Institutions	
4. Current water level is at or above DL but below DL+1m. Forecast is indicating that water level is likely to decrease during next few days as per 5,10 days forecast and may fall below DL	Follow flood forecasts to monitor development of a subsequent flood situation	All	
	Provide instructions for repair of broken roads and embankments	UzDMC, BWDB	
	Stockpiling of emergency medicine	DGHS, DPHE	
5. Current water level is at or above DL but below DL+1m. Forecast is indicating that water level is likely to increase next few days during next as per 5,10 days forecast ( <i>At this stage flood impact is likely to be severe</i> )	Provide special advisory for the farmers	DAE, DLS, DoF	
	Disaster Management Committee meeting; Distribution of dry food and fodder; Make arrangement for hot meal distribution at the shelters; Rescue activities for people living in chars or low-lying areas; Distribution of dry food and fodder; Installation of temporary tube wells / latrines; Ensuring the safety of women and children in shelters; Installation of temporary mobile charging stations (solar); Dissemination of warning through loudspeakers, community radios etc.	DMCs	
	Provision of emergency healthcare facilities at flood shelters and evacuation points	UDMC, DGHS	
	Distribution of emergency medicine, dignity, and hygiene kits; Establishment of temporary health care center; Storage of disinfectants; Emergency medicine storage; Distribute water purification tablets; Provide special advisory from DPHE (use of purification tablets etc.)	DPHE, DGHS, UDMC	
	Provide special advisory for the farmers	DAE, DLS, DoF	
	6. Current water level is more than 1m above DL. Forecast is indicating that water level is likely to decrease during next few days as per 5/10 days forecast, and water level may fall below DL during this period ( <i>This scenario is likely after a flood peak</i> )	Follow flood forecasts to monitor development of a subsequent flood situation or possible worsening of flood situation	All
		Emergency medicine distribution; Water purification tablet distribution; Special advisory on health	DPHE
Provide special advisory for the farmers		DAE, DLS, DoF	

# AA Triggers for Monsoon Riverine Floods in Bangladesh



# AA Triggers or Flash Flood in Bangladesh

Trigger Level	Lead Time	Trigger Statement	Action
Readiness	7 days or more	<b>60% or more probability that the basin rainfall threshold for flash flood will be exceeded (considering PMDL).</b>	<ul style="list-style-type: none"> <li>- Disaster Committee Meeting at sub-national level</li> <li>- Disseminating situational awareness message to BWDB regional office, DAE HQ by FFWC</li> <li>- Identification of evacuation points (human and livestock), safe locations for grain storage</li> <li>- Preparation for early warning dissemination</li> <li>- Preparation for procurement if required; identification of local suppliers</li> <li>- Update combined harvester status by DAE</li> <li>- Evacuation boat preparation</li> </ul>
	5 days or more	<b>80% or more probability that the basin rainfall threshold for flash flood will be exceeded (considering PMDL).</b>	<ul style="list-style-type: none"> <li>- Inter-ministerial coordination meeting</li> <li>- Meeting of Disaster Management Committees for action prioritization</li> <li>- Dissemination of early warning advisories/ messages</li> <li>- Early harvesting of ripen crops as per DAE's advice</li> <li>- Distribution of inputs (Silo and Feed)</li> </ul>
Action	3 days or more	<p><b>FFWC's 3 days deterministic forecast indicates possibility of water level crossing the PMDL+0.5m in the relevant forecasting station</b></p> <p>Or</p> <p><b>Basin rainfall forecast indicates 80% or more probability of water level crossing the PMDL+0.5m in the relevant forecasting station</b></p>	<ul style="list-style-type: none"> <li>- Meeting of Disaster Management for coordinated actions</li> <li>- Dissemination of early warning message/advisories</li> <li>- <b>Cash distribution</b> to vulnerable households</li> <li>- <b>SRSP package distribution</b> to the registered beneficiaries</li> </ul>

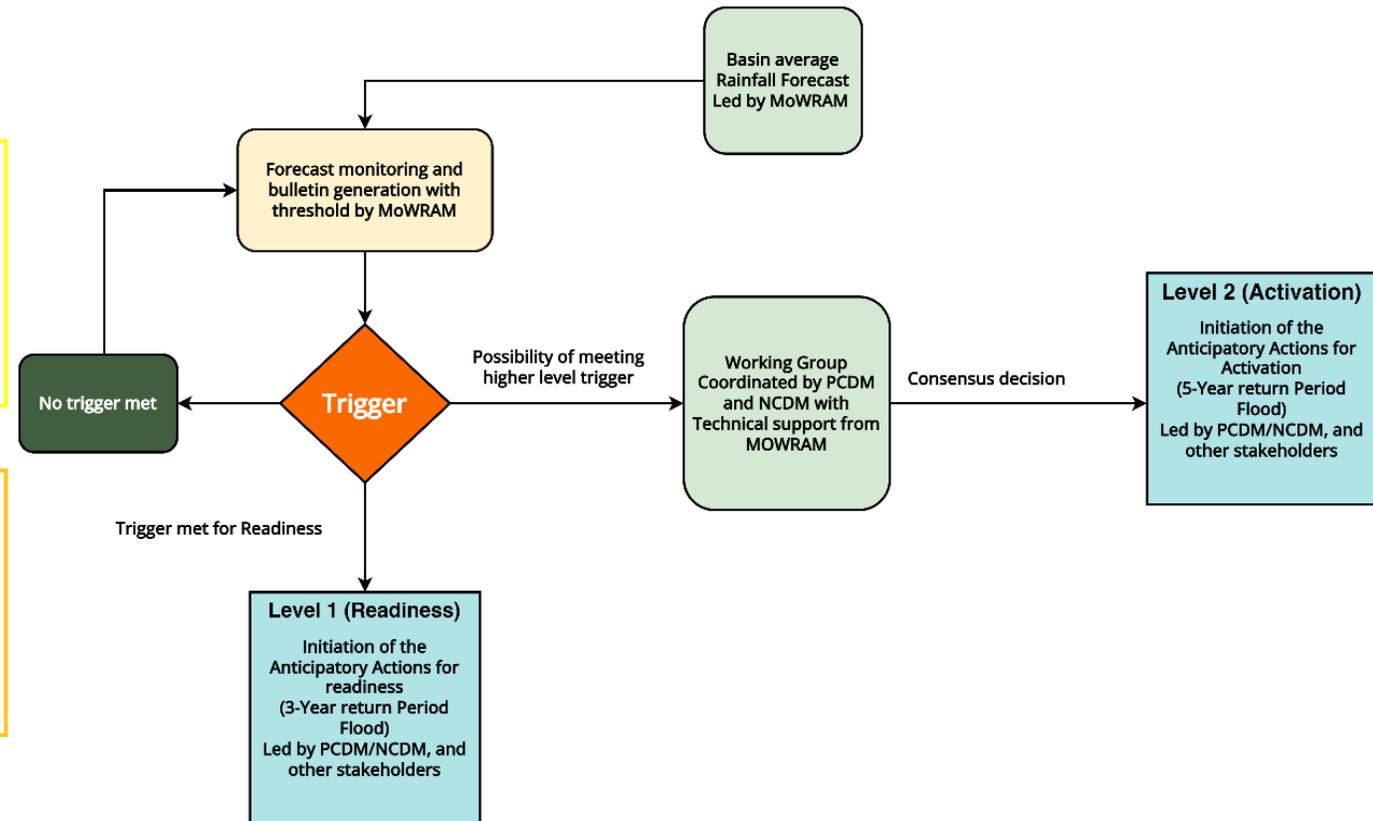
# AA Triggers for Flash Flood in Cambodia

## Readiness Level 1 (Lead time: 5-7 days)

- When there is 60% or more probability that the basin average rainfall threshold at Pursat Basin corresponding to the 3-year return period flood would be exceeded at Bak Trakoun station.

## Activation Level 2 (Lead time: 3 days)

- When there is 80% or more probability that the basin average rainfall threshold at Pursat Basin corresponding to the 5-year return period flood would be exceeded at Bak Trakoun station.

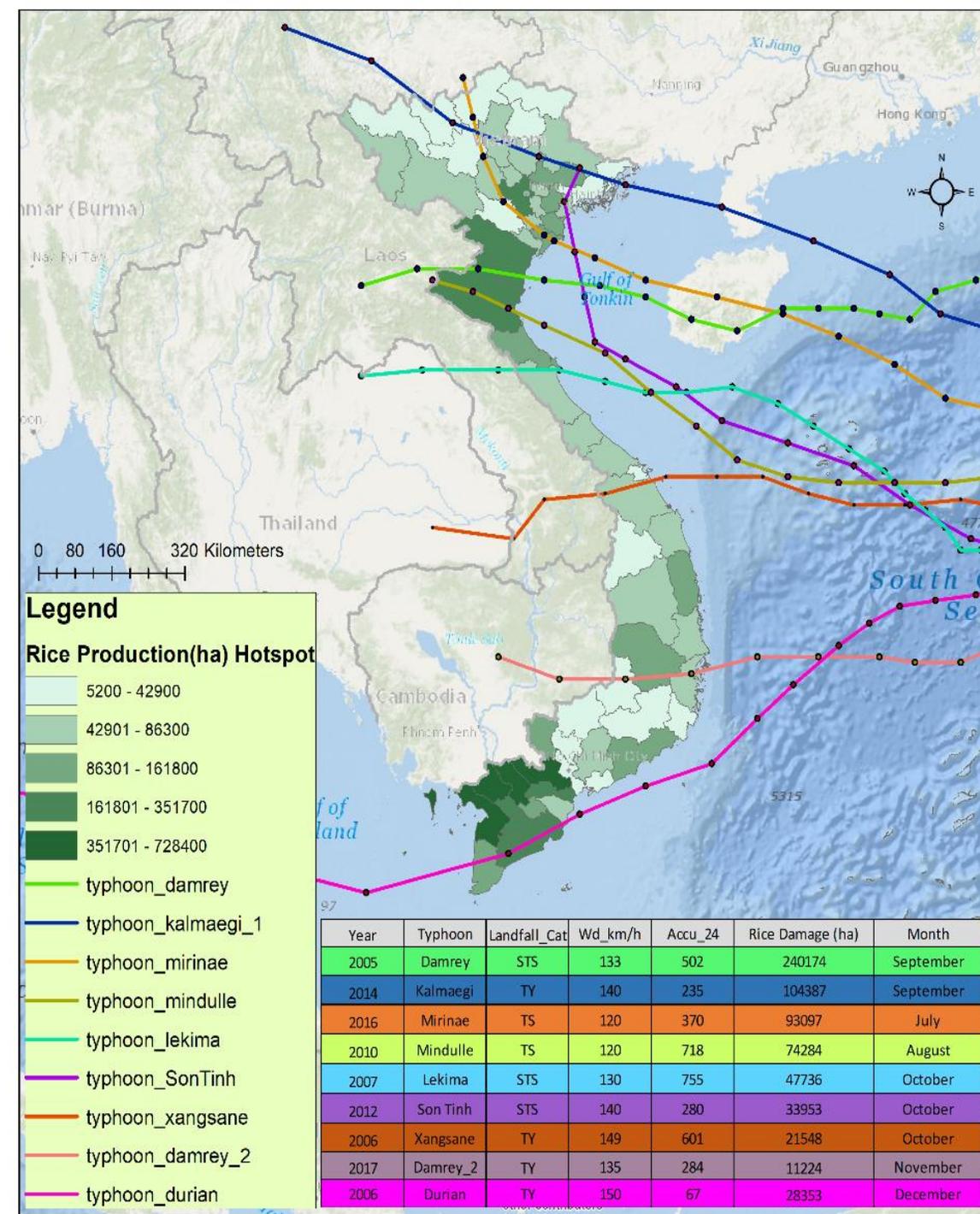


# AA Triggers or Typhoon in Vietnam

Parameters	Impact Correlation (country as whole)	Impact Correlation (Region)
------------	---------------------------------------	-----------------------------

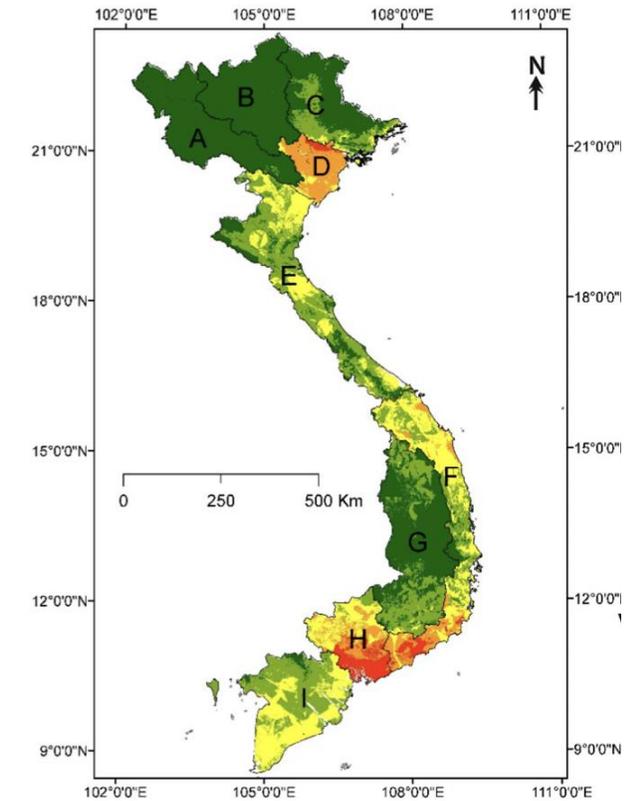
Wind speed	Correlated with housing structure damage, not correlated with crop or fisheries damage, no significant correlation with livestock loss	<p><b>North:</b> Impact on housing, not contributing to crop damage</p> <p><b>South:</b> Strong correlation with housing damage, somewhat correlated with crop damage</p>
------------	--	---

Rainfall	Have less impact on housing structure, significant impact on livestock, fisheries and 48 hour accumulation correlated with crop damage	<p><b>North:</b> highly correlated with livestock damage and good correlation between 24 hour rainfall accumulation and crop damage,</p> <p><b>South:</b> Very high correlation between 24/48 hour rainfall accumulation and crop damage, does not impact livestock</p>
----------	--	---



# AA Triggers or Typhoon in Vietnam

Forecast Wind speed (km/h) at the beginning of landfall	Rainfall Intensity (per 24 hr) (mm) Forecast	Sub-region	Vulnerability (Nguyen et al. 2019)	Expected Impact	Trigger Remarks
130 or above	>200	A, B, C, E	Low, Medium	Medium	Possible Activation in sub-region <b>A, B, C</b> , if <b>wind</b> trigger is met considering household impact; if only rainfall trigger is met, could be activated for <b>E</b> considering crop and other sectors.
120 or above		D	High, Very High	High	Activation if either of the triggers are met considering the crop/livestock sensitivity, population density and overall vulnerability.
130 or above	>250	F, I	Medium	Medium	Possible activation in " <b>I</b> " if wind trigger is met considering household impact; Possible activation in both <b>F</b> and <b>I</b> subregions if rainfall trigger is met considering crop and other sectors.
		G	Low, very low		Should be activated if both the triggers are met.
120 or above	>200	H	High, very high	High	Activation if either of the trigger meets considering the crop/livestock sensitivity, population density and overall vulnerability.



### Geographical zones

- A – North West
- B – North Central Mountains
- C – North East
- D – Red River Delta
- E – Northern Coastal
- F – Southern Coastal
- G – Central Highlands
- H – South East
- I – Mekong Delta

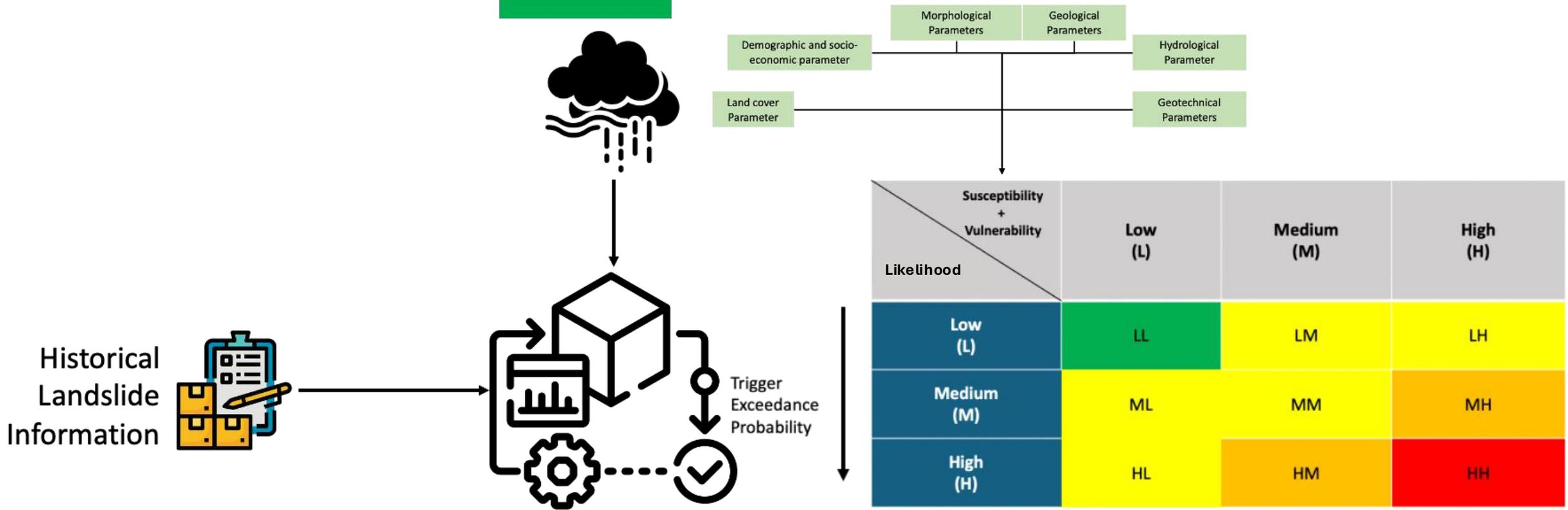
### Vulnerability Level

- Very low
- Low
- Medium
- High
- Very high

# AA Triggers or Landslides in Bangladesh

## Corresponding Rainfall Observation and Forecast data

Observation Forecast



# AA Triggers or Landslides in Bangladesh



No. 03/2025

## Special Warning Bulletin for Landslide

Issued on 30 May 2025, 18:00 BST

### Situation Overview

Due to the Land Depression over the Tangail and the adjoining areas, the districts of Cox's Bazar, Bandarban, and Chattogram may experience heavy rainfall during 31 May to 01 June 2025. According to the NWP model guidelines, the accumulated rainfall is expected to range from 100 to 250 mm over these districts.

Last 24 hours significant observed rainfall (up to 6 PM 30 May):

- Chattogram 229 mm**
- Bandarban 222 mm**
- Cox's Bazar 167 mm**

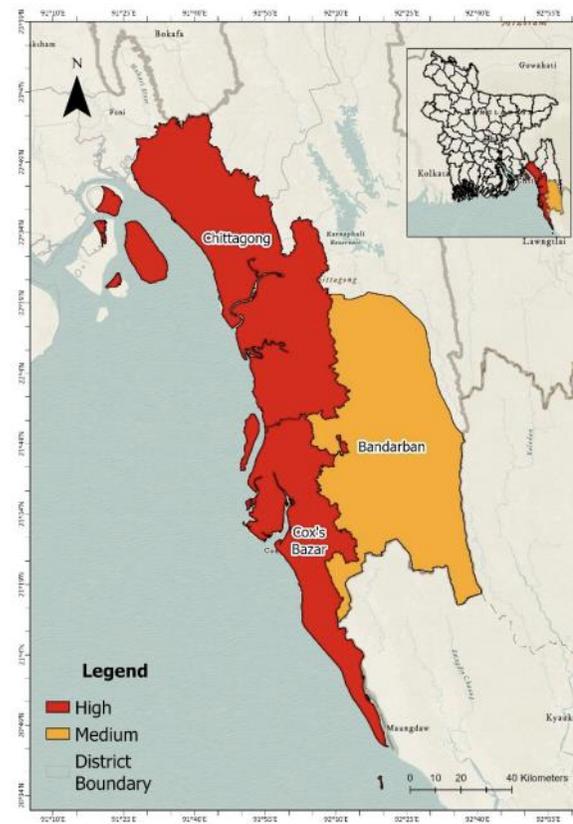
### High Landslide Risk Areas:

Risky areas are Teknaf and Ukhiya upazilas in Cox's Bazar; Naikhyonchari upazila in Bandarban; Sadhanpur, Pukuria, Kalipur and Boilchari unions in Banshkhali Upazila and Wards No. 7, 8, 9, and 14 in Chattogram City Corporation of Chattogram. .

### Medium Risk Areas:

Risky areas are Lama Sadar, Gajalia, and Fasiakhali unions at Lama Upazila of Bandarban,

## Potential Risk of Landslides (as of 30.05.2025 and valid till 01.06.2025)



### Advisory Associated with Risk Levels

- Promptly broadcast early warnings in communities
- Immediately evacuate from hilly slopes or high-risk areas to designated shelters. Prioritize the evacuation of the elderly, children, disabled individuals, and pregnant women to safe places.
- Take dry food, clean water, essential medicines, a flashlight, candles, matches, clothing for 3 days and secure important documents while going to shelter
- Maintain communication with family members, neighbors, volunteers, and the local disaster management committee
- Keep your phone charged and a power bank ready for emergency use.
- Be aware that flash floods may occur alongside landslides; avoid staying near rivers or streams to protect yourself from flooding
- Keep drains and water passages near your house clear
- Move livestock and pets to a safe place.
- Distribute anticipatory action packages to support immediate actions
- Follow the instructions of the local administration and disaster management committee and monitor forecasts regularly

- Initiate the shelter preparation.
- Promptly broadcast alerts in vulnerable communities
- Evacuate elderly, children, disabled individuals, and pregnant women from hilly slopes or high-risk areas to neighboring safe places.
- Ensure you are in a safe location during the night.
- Prepare dry food, clean water, essential medicines, a flashlight, candles, matches, clothing, and secure important documents
- Be ready for anticipatory action packages distribution to support early action.
- Maintain communication with family members, neighbors, volunteers, and the local disaster management committee
- Keep your phone charged and a power bank ready for emergency use.
- Remove any objects (branches, garbage) that could obstruct drainage and keep the drains and water passages near your house clear.
- Follow the instructions of the local administration and disaster management committees. Monitor forecasts regularly.



**REGIONAL WORKSHOP ON IMPACT-BASED FORECASTING**  
Training-of-Trainers and National Demonstration Planning for Temperature-Related Hazards

**THANK YOU!**

