

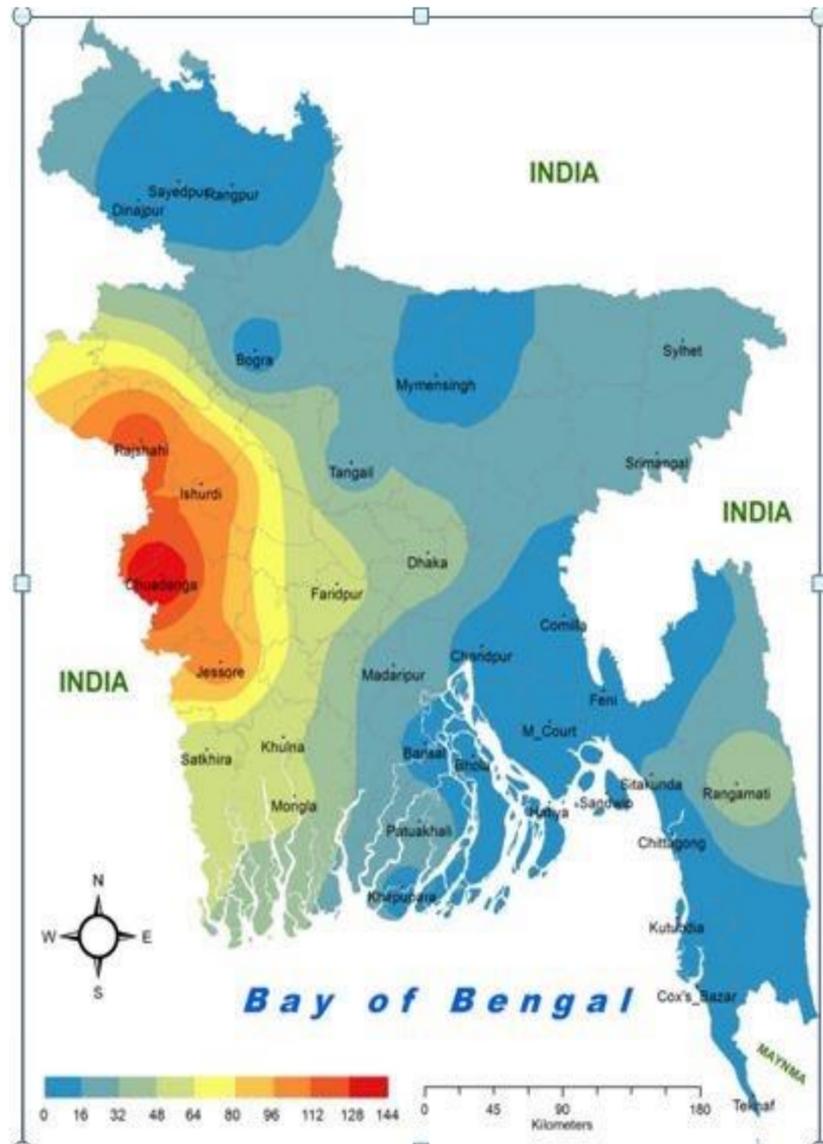


Regional Workshop on Framework and Toolkit Development

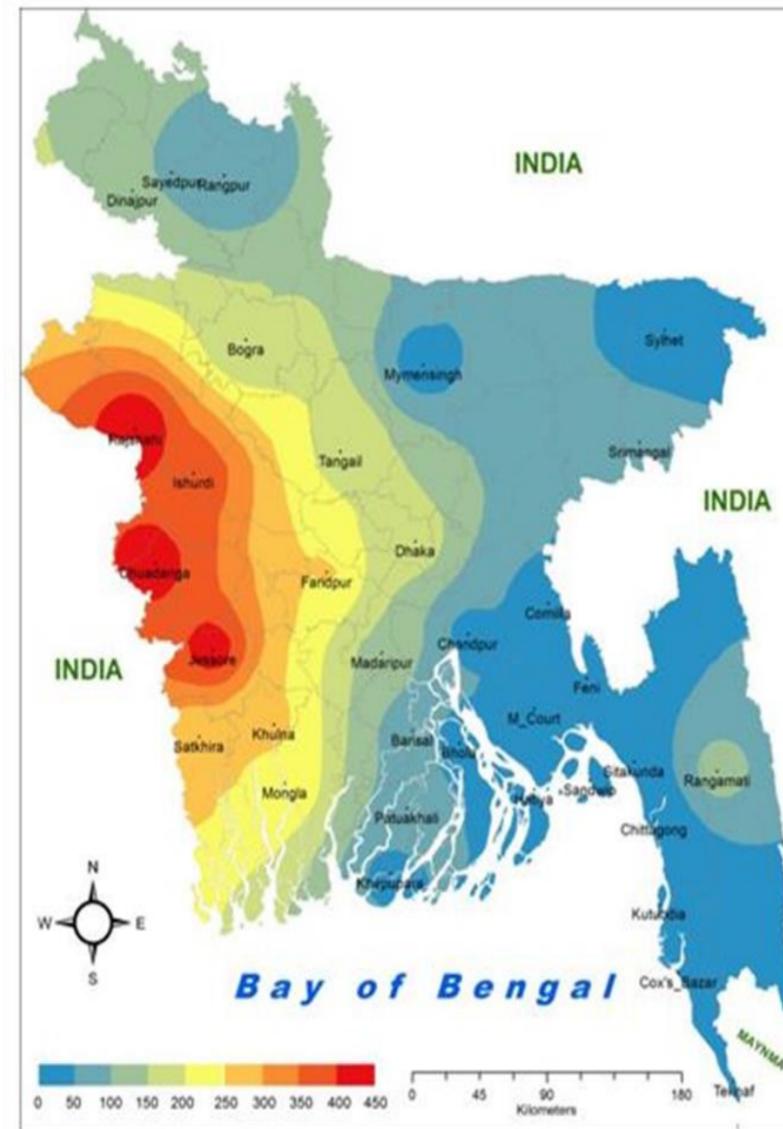
Temperature-Related Hazard: Case of Bangladesh

Raihanul Haque Khan

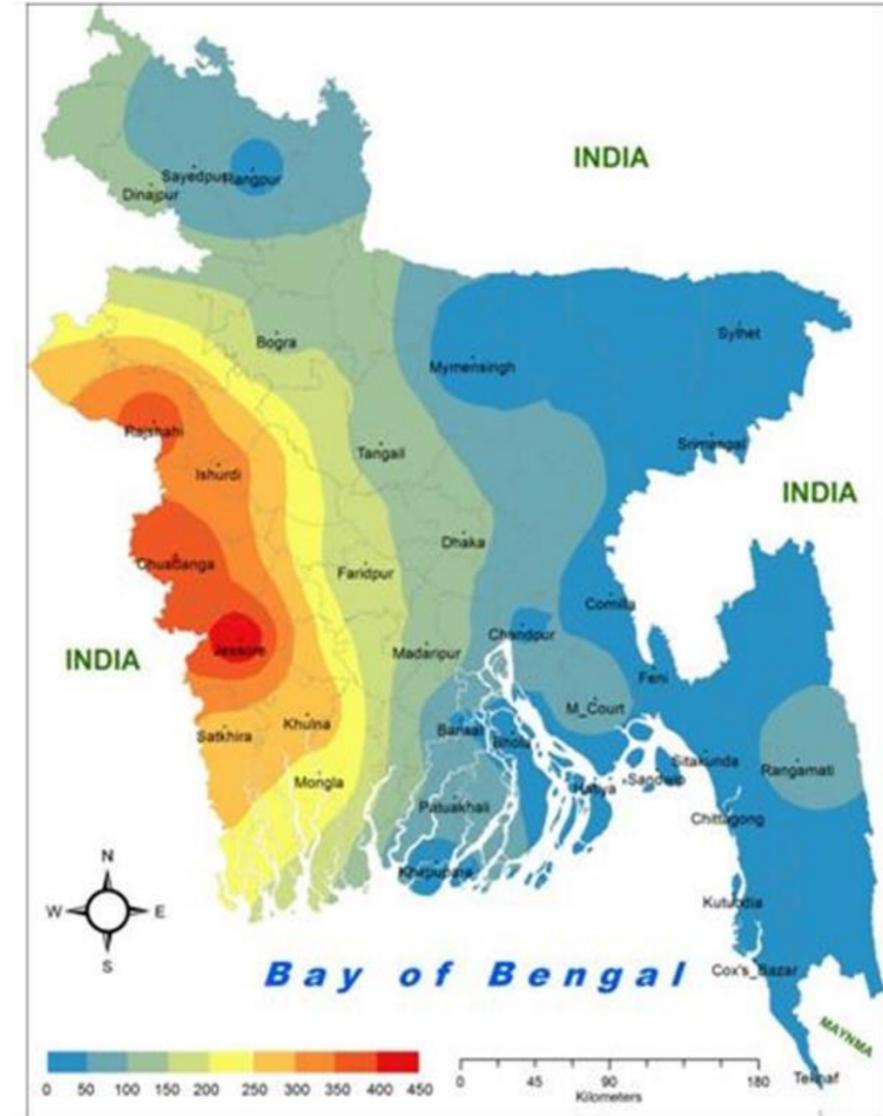
Bangladesh: Climate of Heat Wave Days: March-May During 1981-2025



March



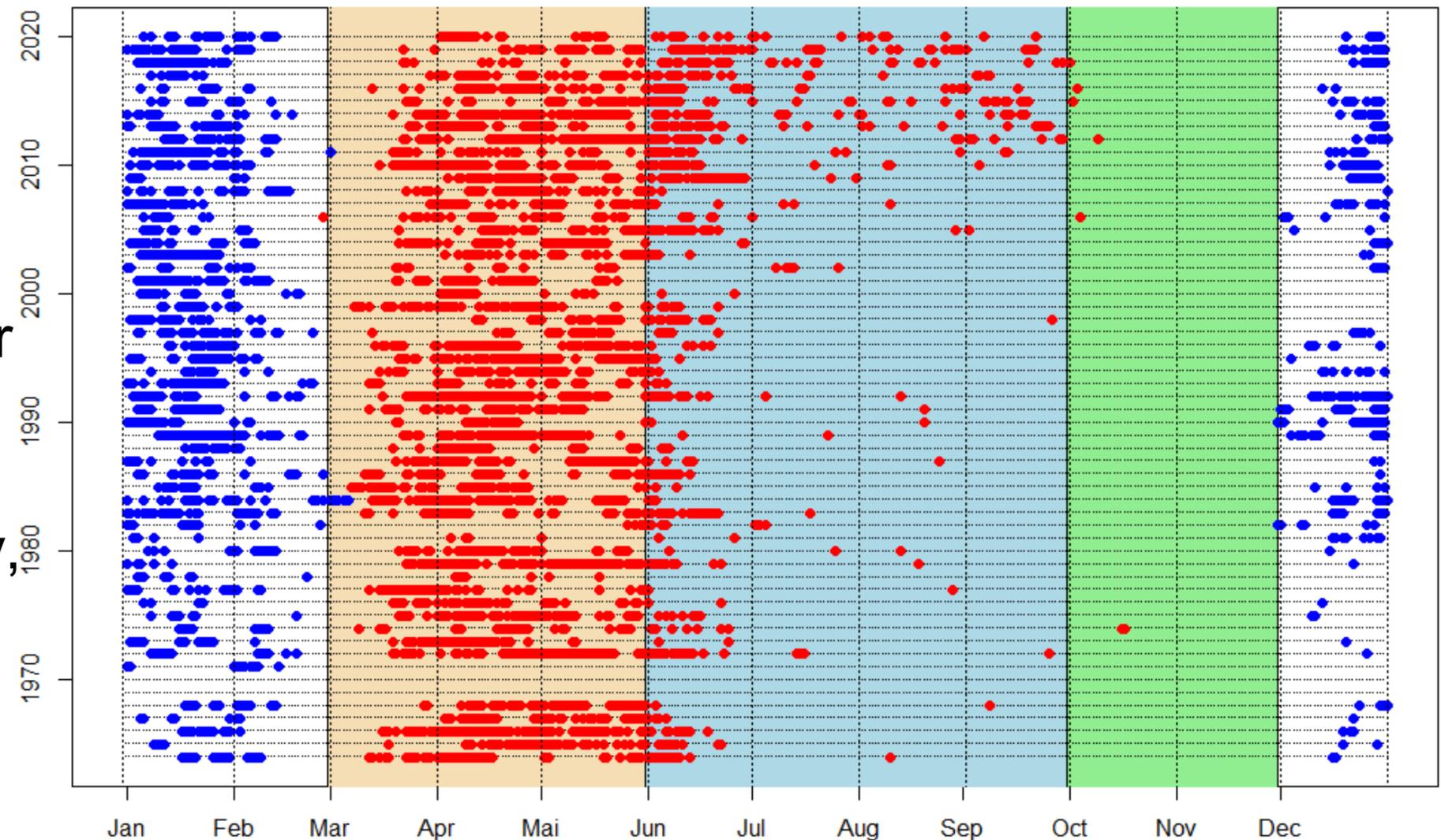
April



May

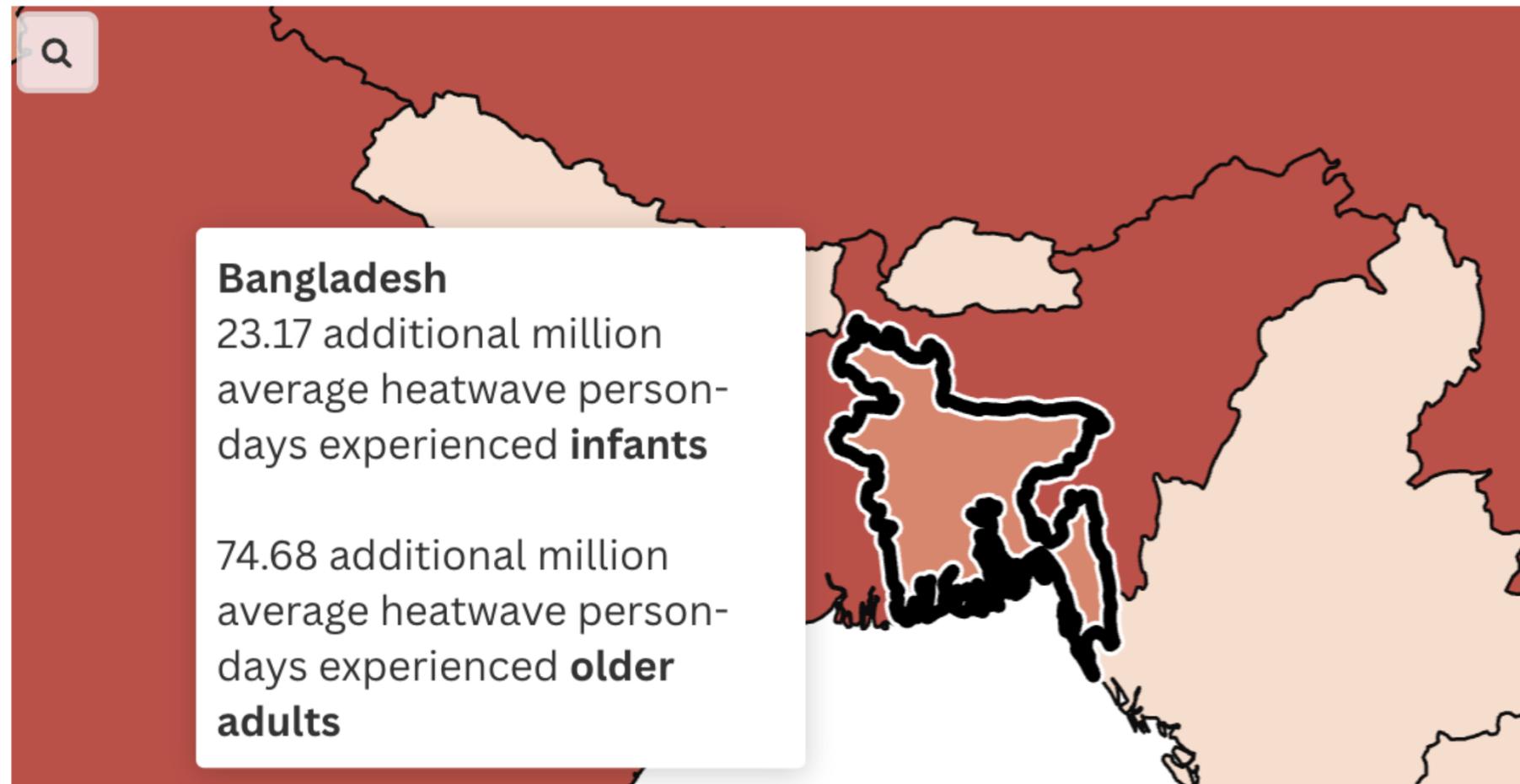
Number and heatwave (red) and cold wave (blue) days in Rajshahi

- Bangladesh is experiencing **record-high temperature extremes**.
- Heatwave days and heat-stress hours have increased sharply over the last 10-20 years.
- Vulnerable groups (infants, elderly, outdoor labourers) face heightened health and livelihood risks.
- Temperature hazards now drive **major economic losses** and **compound health burdens**.



Rapid Rise of Heat Stress Days

Change in Heatwave Days

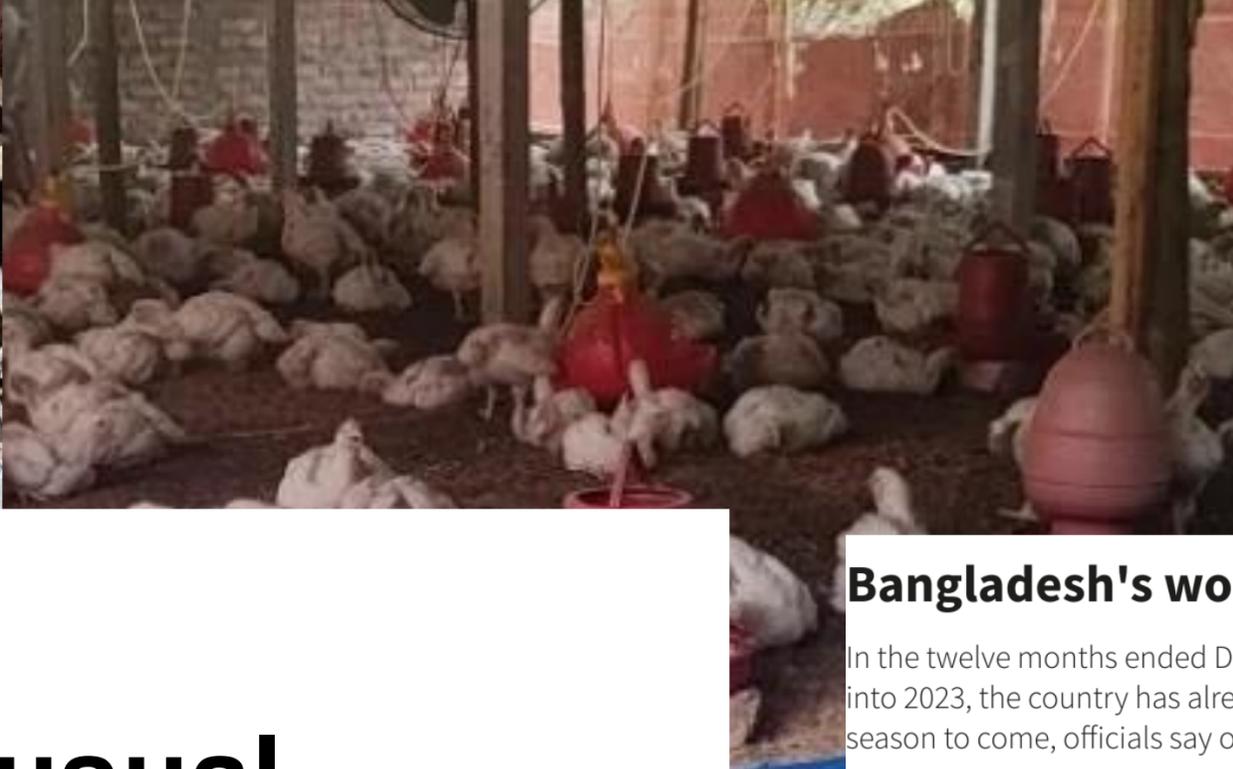


Long-term change:

- **Infants: 2.3X more** heatwave days than 1986-2005.
- **Elderly: 5.2X more** than baseline.

Recent Changes

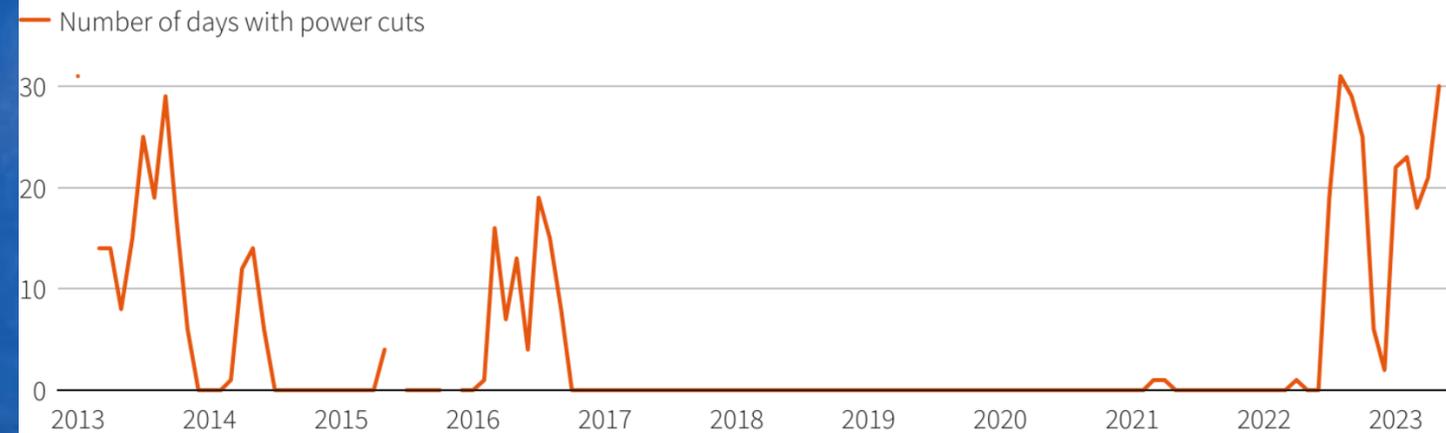
- 2024: average **28.8 heatwave days/person**
- 2023: Infants = **20.9 heatwave days**, Elderly = **20 days** (record high).



The unusual heatwave of 2023 and its impacts

Bangladesh's worst electricity squeeze in a decade

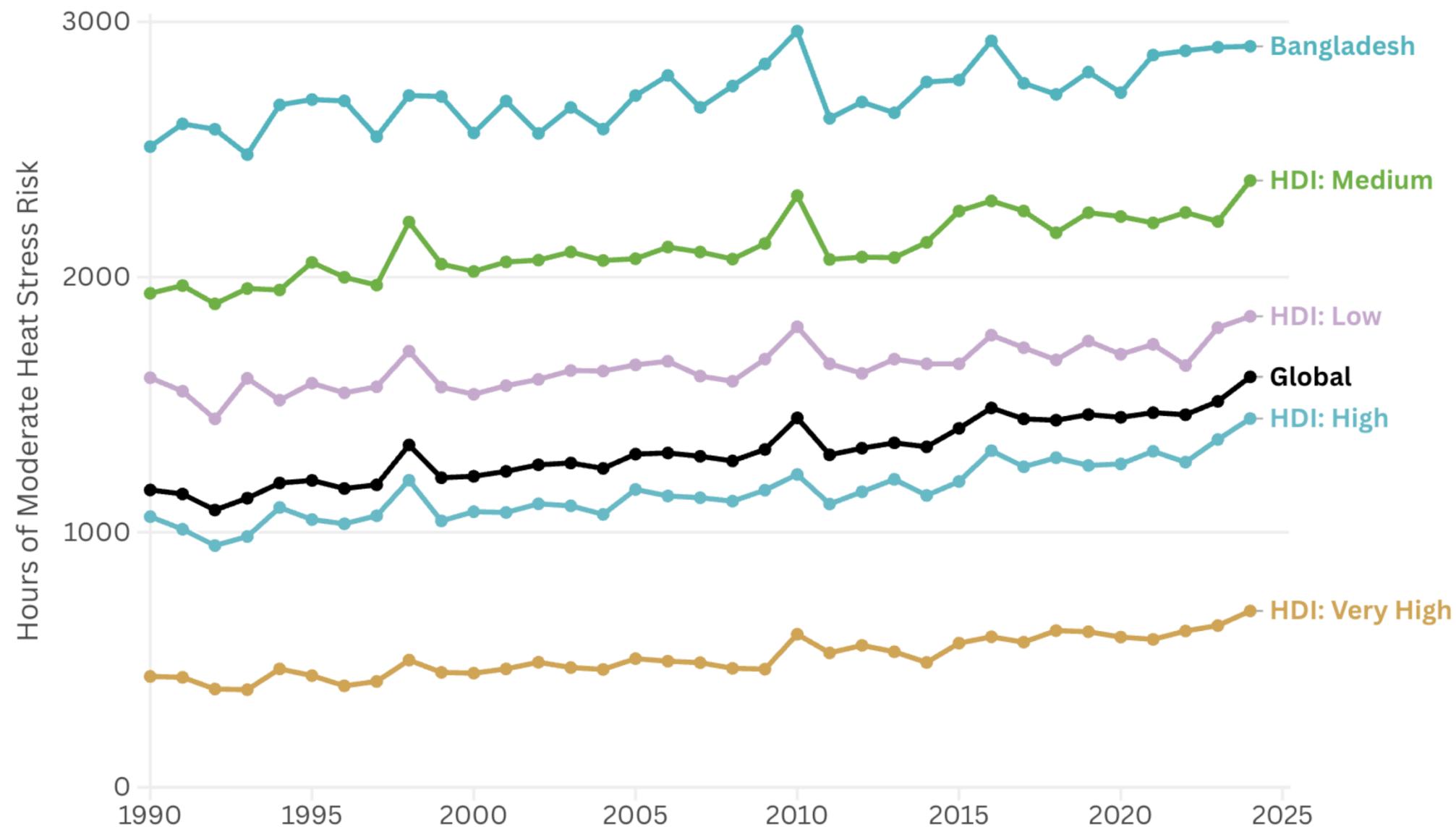
In the twelve months ended December 2022, Bangladesh had enforced power cuts on 113 days. Five months into 2023, the country has already faced shortages on 114 days. With temperatures rising and peak demand season to come, officials say outages could continue



Note: All figures in number of days; Data for Feb 2013, July and December 2015 unavailable
Source: Power Grid Company of Bangladesh



Rapid Rise of Heat Stress Days

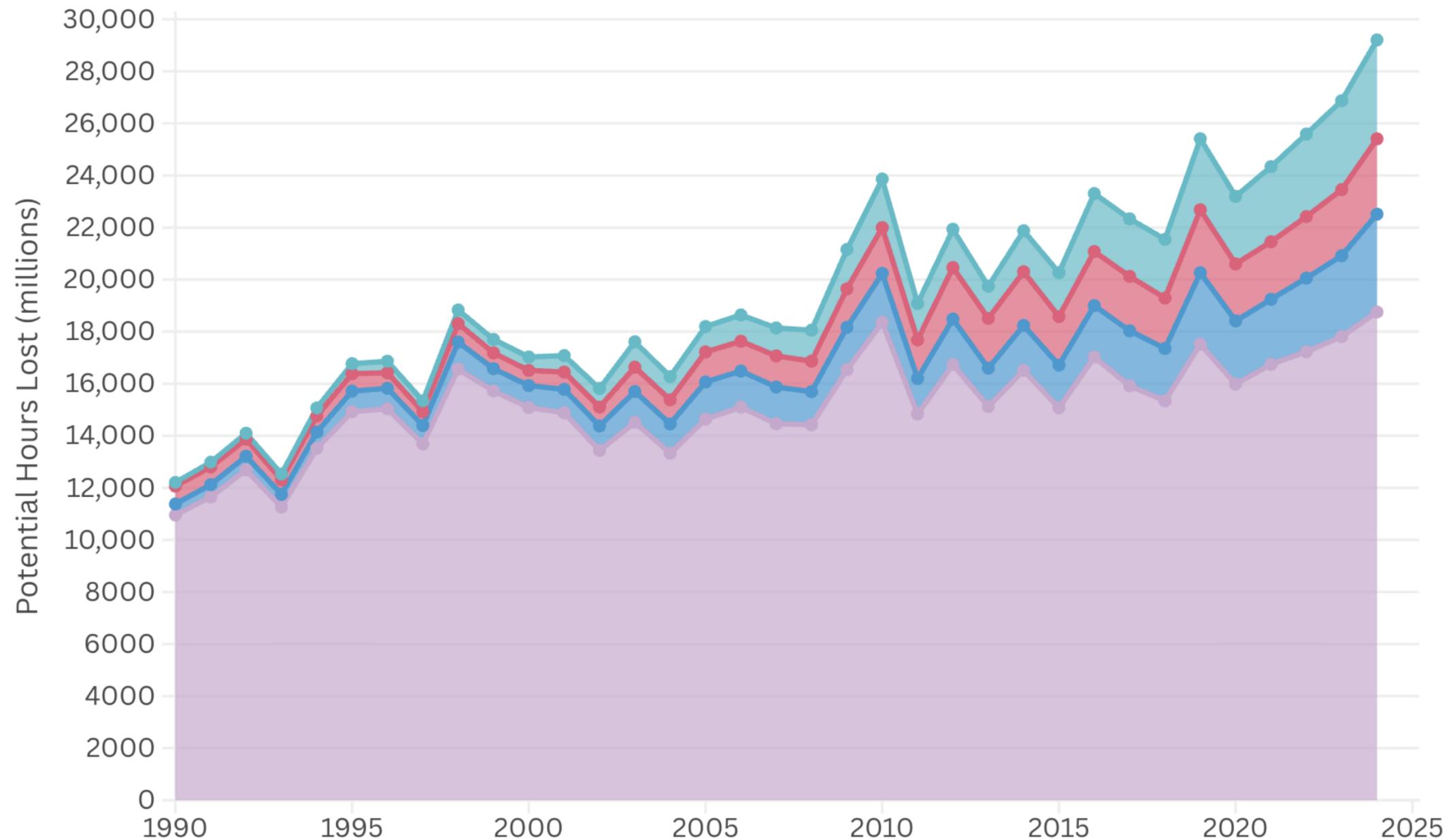


Compared to 1990-1999, in 2024, people were exposed on average to **237 more hours** during which ambient heat would have posed a moderate or higher risk of heat stress if undertaking moderate outdoor physical activity.

Heat is no longer episodic; it is **continuous and chronic!**

Temperature Related Hazards in Bangladesh : Productivity Losses

Agriculture Construction Manufacturing Service



Data: <https://lancetcountdown.org/explore-our-data/>

For 2024, heat exposure resulted in a loss of **29 billion potential labor hours**, 92% more than in 1990-1999. The agriculture sector accounted for 64% of the lost hours.

The associated potential income lost from labor capacity reduction due to extreme heat was **US\$24 billion in 2024**, equivalent to **5% of GDP**. The agriculture sector bore the brunt of these losses, accounting for **55% of total lost earnings in 2024**

Impact of Low Temperature: Humans



- **Respiratory Illnesses:** Sharp rise in pneumonia and bronchiolitis, especially in **children under 5**. Exacerbation of Asthma and COPD (Chronic Obstructive Pulmonary Disease) in the elderly.
- **Cold Diarrhea: Rotavirus** infections spike during cold weather, causing severe dehydration in infants (often called "Winter Diarrhea").
- **Skin and Other Issues:** Cold burns/chilblains among laborers working barefoot. Increased risk of hypothermia for the homeless population.

Impact of Low Temperature: Agriculture, Fisheries, Livestock



Boro Rice Injury: Seedlings suffer from "Cold Injury" in seedbeds. Prolonged fog blocks photosynthesis, turning seedlings yellow and brittle.

Potato Late Blight: High humidity and low temps create ideal conditions for fungal outbreaks, potentially devastating yields.



Fisheries Stagnation: Fish metabolism slows in cold water, stunting growth.

Disease Outbreaks: Epizootic Ulcerative Syndrome (EUS) or "fish sores" become prevalent in stagnant, cold-water bodies.



Cattle Disease: Cattle are highly susceptible to pneumonia during cold wave.

Milk Production: Reduced milk production is a direct consequence of cold stress.

Poultry Mortality: Smallholder farms often lack heating systems, leading to high mortality rates among chickens due to sudden temp drops.



Project Interventions

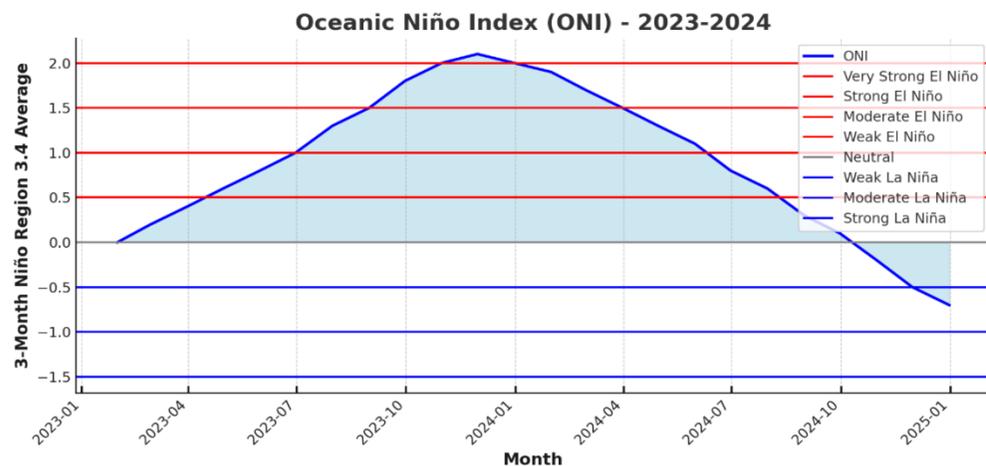
El Niño Anticipatory Action Project

Project Focus



Potential Heatwave

RIMES and Save the Children piloted this project based on the Global El Niño outlook issued.

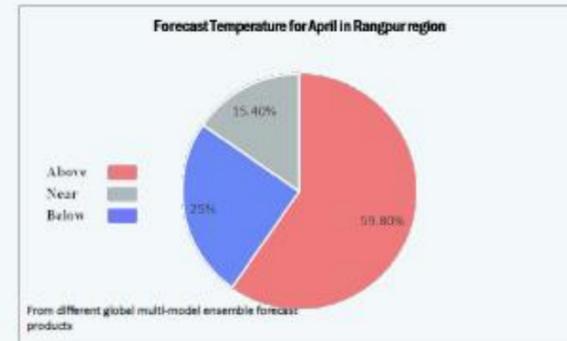


ENSO Outlook for the Month of April 2024

Global El Niño situation as of 8th April 2024

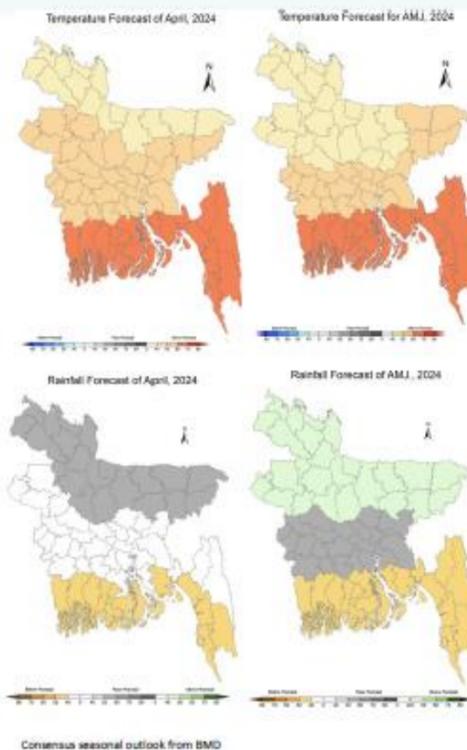
- The El-Niño condition is weakening.
- El-Niño will end and the tropical pacific atmospheric will transition to neutral conditions by the April-June(85% chance)

El Niño situation in Bangladesh as of 8th April 2024



Observed Temperature and Rainfall

77% Above normal Rainfall and Below Normal Temperature (3 Deg below than normal) for Rangpur Division in March 2024



Trigger situation for AA

- 'Warning' or Activation trigger has been set as the forecast temperature is likely to be above normal (40-50%) in both April and May and June

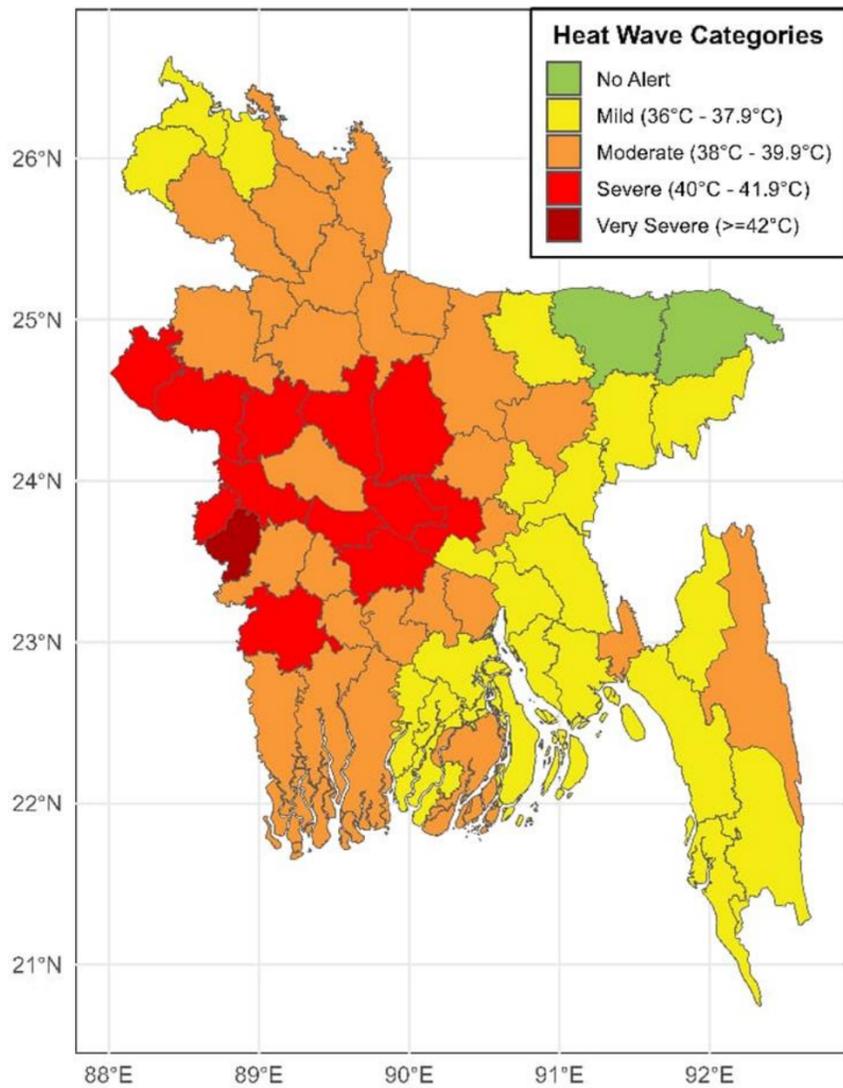
Anticipatory Actions

- Supplementary irrigation will be required for paddy, Maize and other irrigation dependent crops. But there is a chance of normal rainfall as well. So farmers are advised to follow the medium to short range forecast before irrigation, applying fertilizers, pesticides to reduce input costs.
- Allow provision and distribution of drought-tolerant seeds or crops.
- Promote water harvesting and upgrading/maintaining irrigation systems.
- Reinforce animal health surveillance awareness campaigns.
- Allocate more surface water for domestic use to reduce the pressure on groundwater.
- Knowledge creation on water scarcity and optimum use of ground & surface water and water preservation.
- Design and implement Early Action activities through protection and gender lens to address diversity needs of children and communities.
- Distribution of communication materials on drought impacts to children, women, and girls and possible mitigation measures.



BMD's Color-coded Heat Wave Alert

Forecast Issued on 08 May 2025



Govt. of the People's Republic of Bangladesh
Bangladesh Meteorological Department
Storm Warning Center
E-24, Agargaon, Dhaka-1207

Phone: 41025730, 41025731
FAX: 41025727, 41025728
Web Site: www.bmd.gov.bd
Email: info@bmd.gov.bd
enr@bmd.gov.bd

Date: 08.05.2025

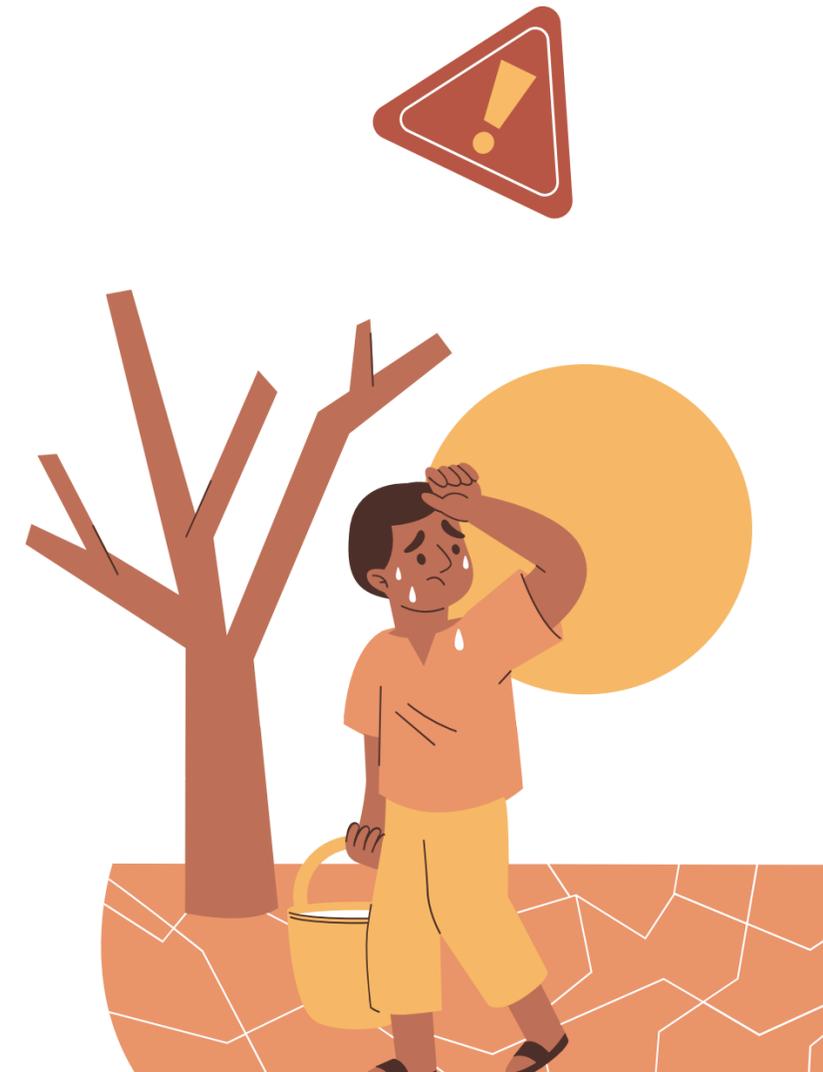
ALERT MESSAGE FOR HEAT WAVE

The prevailing mild heat wave condition over Khulna division may spread at many places over the country and it may continue as moderate to severe heat wave at places during next 72 hours commencing from 02:00 PM of today (08 May 2025).

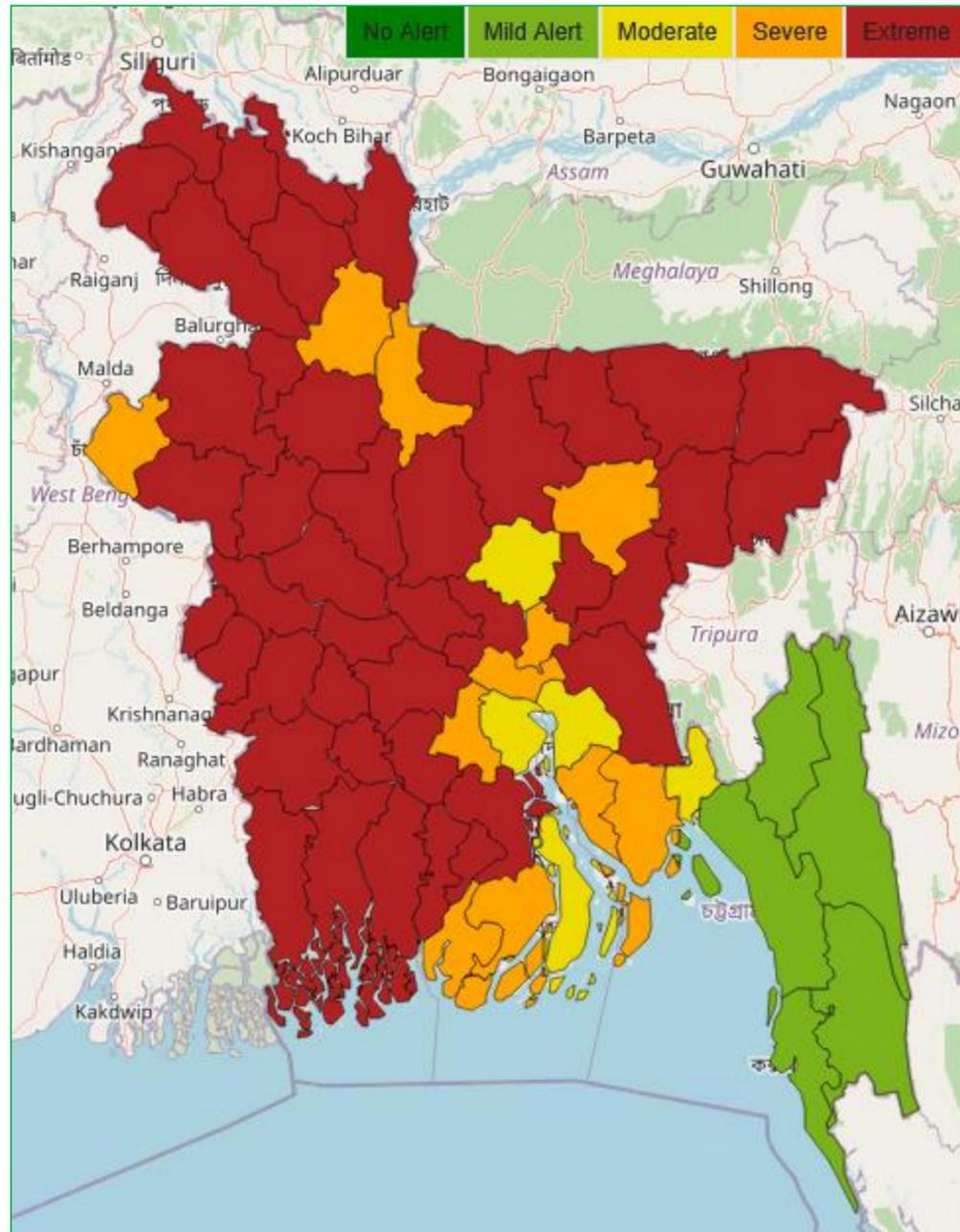
(Kh. Hafizur Rahman)
Meteorologist
For Deputy Director
08, 1330 BST

TO:

- HONBLE ADVISER, MINISTRY OF DISASTER & RELIEF, FAX: 9545805
- CABINET SECRETARY, FAX: 9566559
- PRINCIPAL SECRETARY TO THE HONBLE CHIEF ADVISER, FAX: 9143377
- SECRETARY, MINISTRY OF DEFENCE, FAX: 9119535
- SGP, BANGLADESH POLICE, FAX: 9565362
- SECRETARY TO THE HONBLE CHIEF ADVISER, FAX: 8128799
- SECRETARY, MINISTRY OF AGRICULTURE, FAX: 9545555
- SECRETARY, MINISTRY OF DISASTER MANAGEMENT AND RELIEF, FAX: 9566559/9545465
- SECRETARY, MINISTRY OF WATER RESOURCES, FAX: 9576773
- SECRETARY (W&D), SMD, FAX: 9110535, 11. SSE, FAX: 811351/9113651, 12. CPP, FAX: 9318401, 13. DDM, 9851615
- SRJ, FAX: 8754270, 9885631, 15. SHIPPING MINISTRY, FAX: 9660311, 9962007, 16. NDRCC, FAX: 9549148, 9540567
- BWTA, FAX: 9551022, 18. RTV, FAX: 8312927, 19. BETAR, FAX: 8117830, 20. EFWC, FAX: 9557386, 21. UNB, FAX: 9144556
- BSS, FAX: 9557929, 23. MMB, CTG, FAX: 031-2500988, 24. CDMP, FAX: 980854, 25. COAST GUARD, FAX: 9140092
- PORT AUTHORITIES, MONGLA 04662-75224, 27. PORT AUTHORITIES, CHITTAGONG 710393, 28. BSS, 9557929, 9551032
- HONBLE CHIEF ADVISER'S, ARMED FORCES DEPT. (AFD), FAX: 8754099, 8115960, 823233
- BANGLADESH ARMY, FAX: 8754455, 31. BANGLADESH AIR FORCE, FAX: 8751911, 32. REUTERS, 8312976
- BWTC, 9563633, 34. ATN, 811876/9139833, 35. UNICR, 8256557, 36. SPARRSO, 8113080, 37. UNDP, 8123196
- CHANNEL 1, 9143674, 39. RTV, 9130879-80, 40. EKA HD, 8991699, 41. PORT AUTHORITIES, PAYRA, FAX: 031-2510880
- D.C. CON'S



Experimental Temperature Related Products and Its Application



Ongoing Activities

- Developed experimental Heat-Index tool
- Capacity Building for Monitoring Heatwave and Coldwave for BMD and DLS
- Monitoring of WBGT and UTCI Monitoring
- Support BMD in developing tailored heat health advisory for target locations
- Dissemination of Sector-specific Alerts and Advisories for Heatwave and Coldwave through Voice Message
- Updating BAMIS mobile application to integrate heat health alerts advisories for farmers

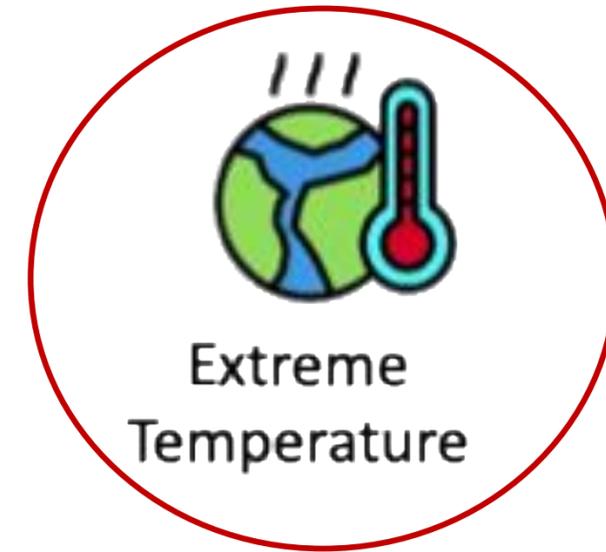
Future Plan:

- Support BMD in forecasting UTCI
- Capacity building of BMD officials on heat impact forecast
- Multi channel dissemination of alert and advisories
- Farmer group orientation on BAMIS mobile application to receive advisories

Temperature Related Hazards for Livestock



Flood



Extreme Temperature



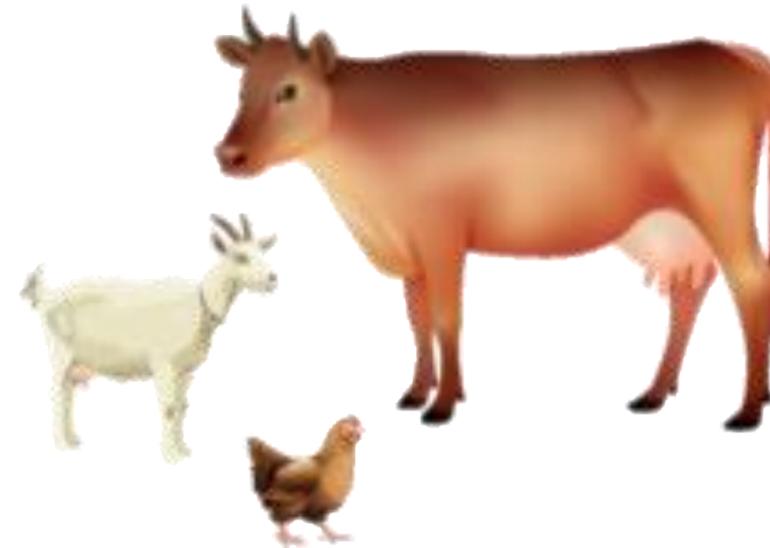
High Wind Speed



Dampness due to continuous rainfall

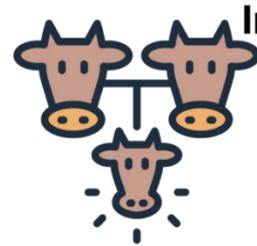
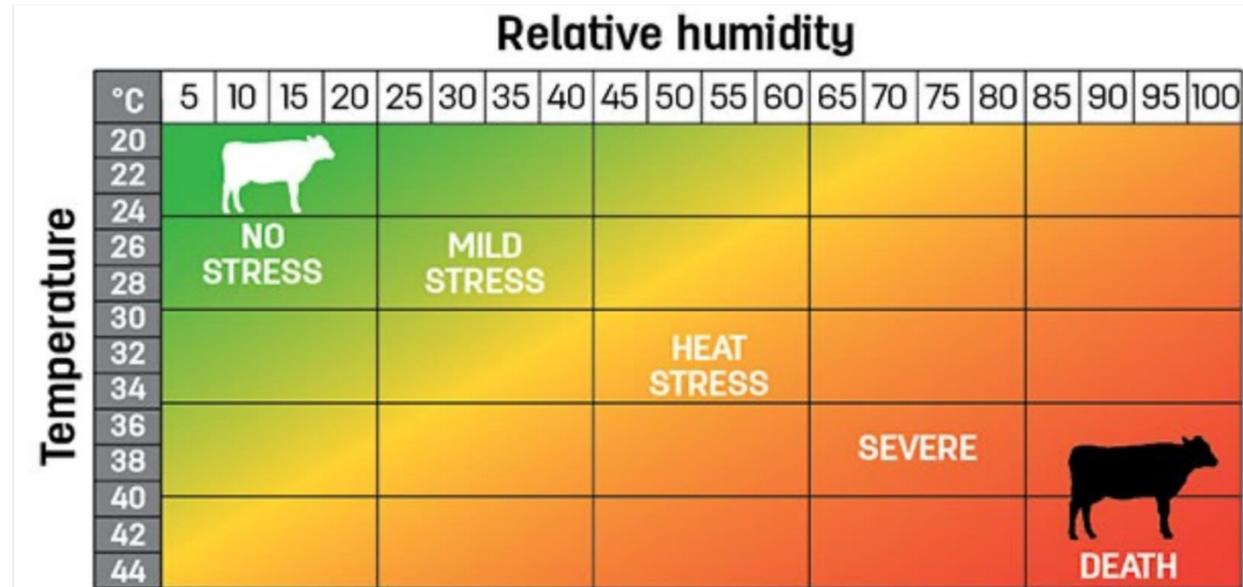


Heavy Rainfall



Humidity

Temperature and Livestock



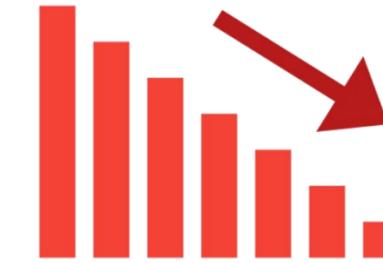
Impact on Reproduction

- Reduced oestrus intensity and length
- Lower fertility rate
- Slower ovarian follicle growth
- Increased early embryonic loss



Impact on Milk Production

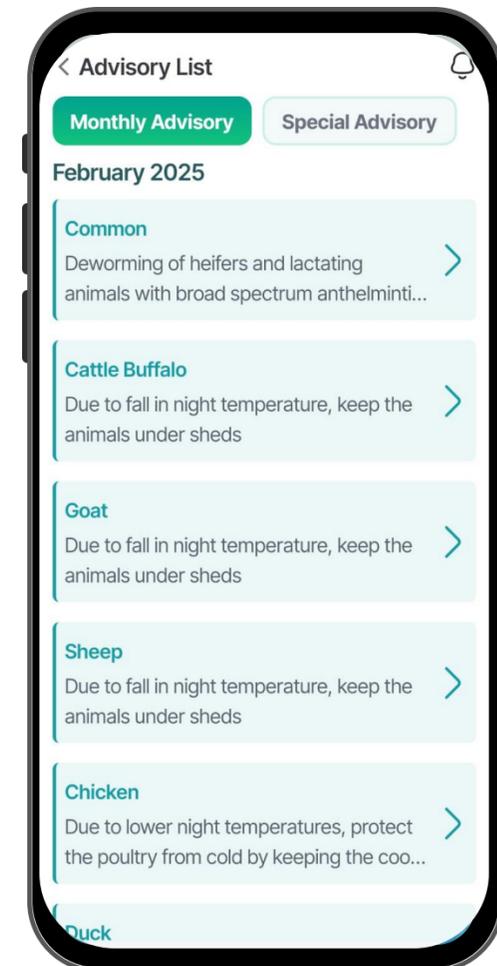
- Milk yield drops by 10–25% or more
- Higher energy use for maintaining body temperature
- Lower dry matter intake
- Less energy available for production
- Nutrient use disruptions



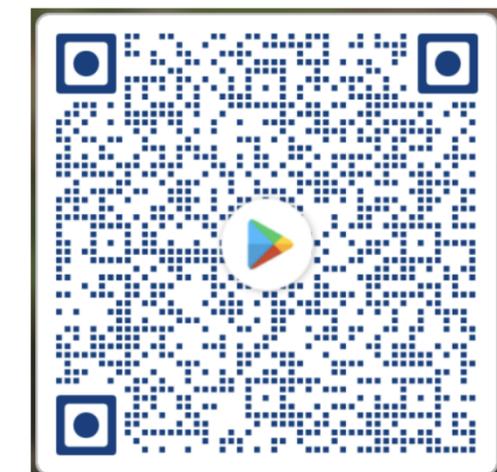
Impact on Physiology

- Reduced activity
- Increased water intake
- Reduced feed intake (above 22.5°C)
- Increased body temperature (≈39°C)
- Rapid respiration (>70/min)
- Hormonal changes
- Weakened immune function
- Reduced rumen fermentation efficiency

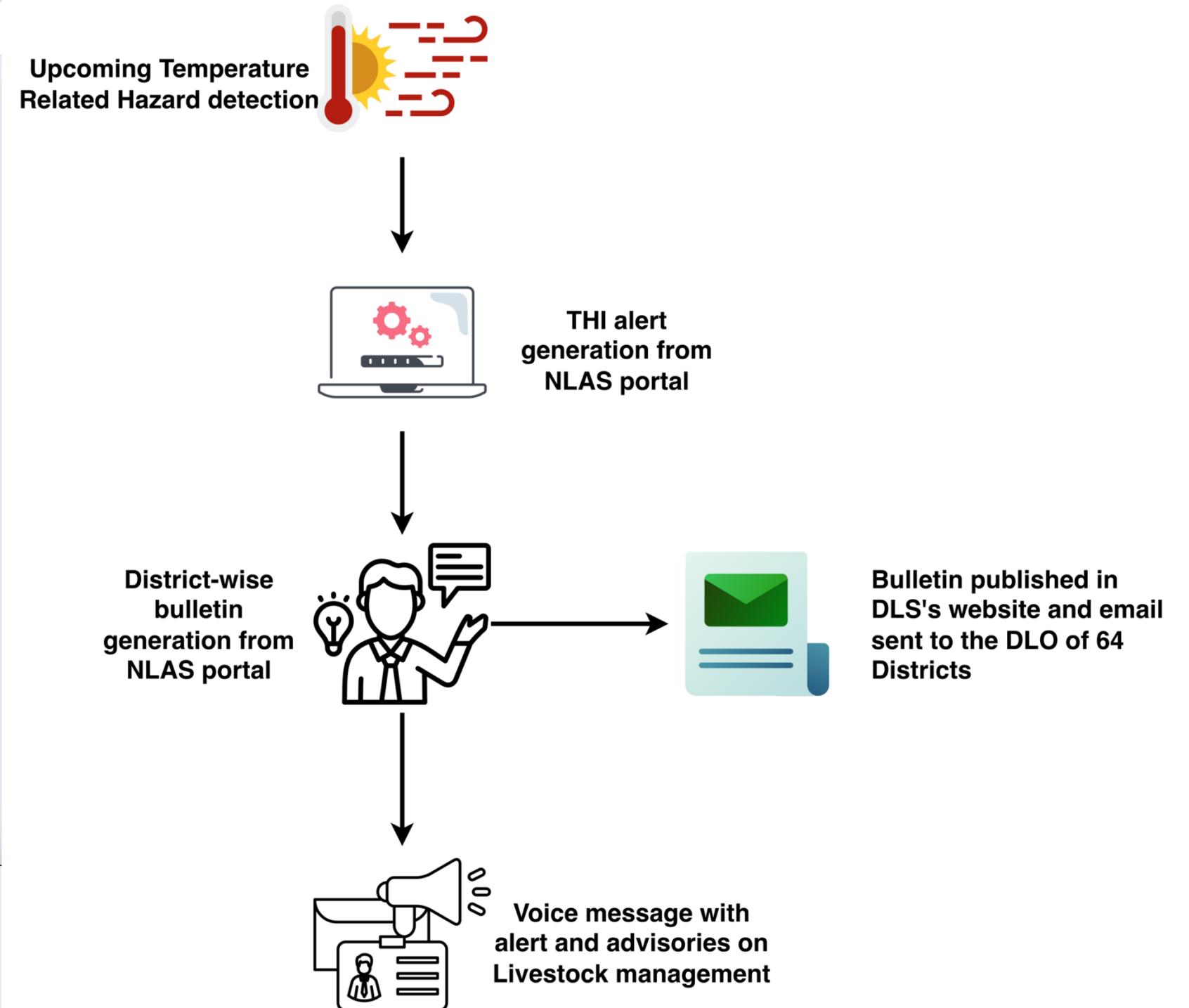
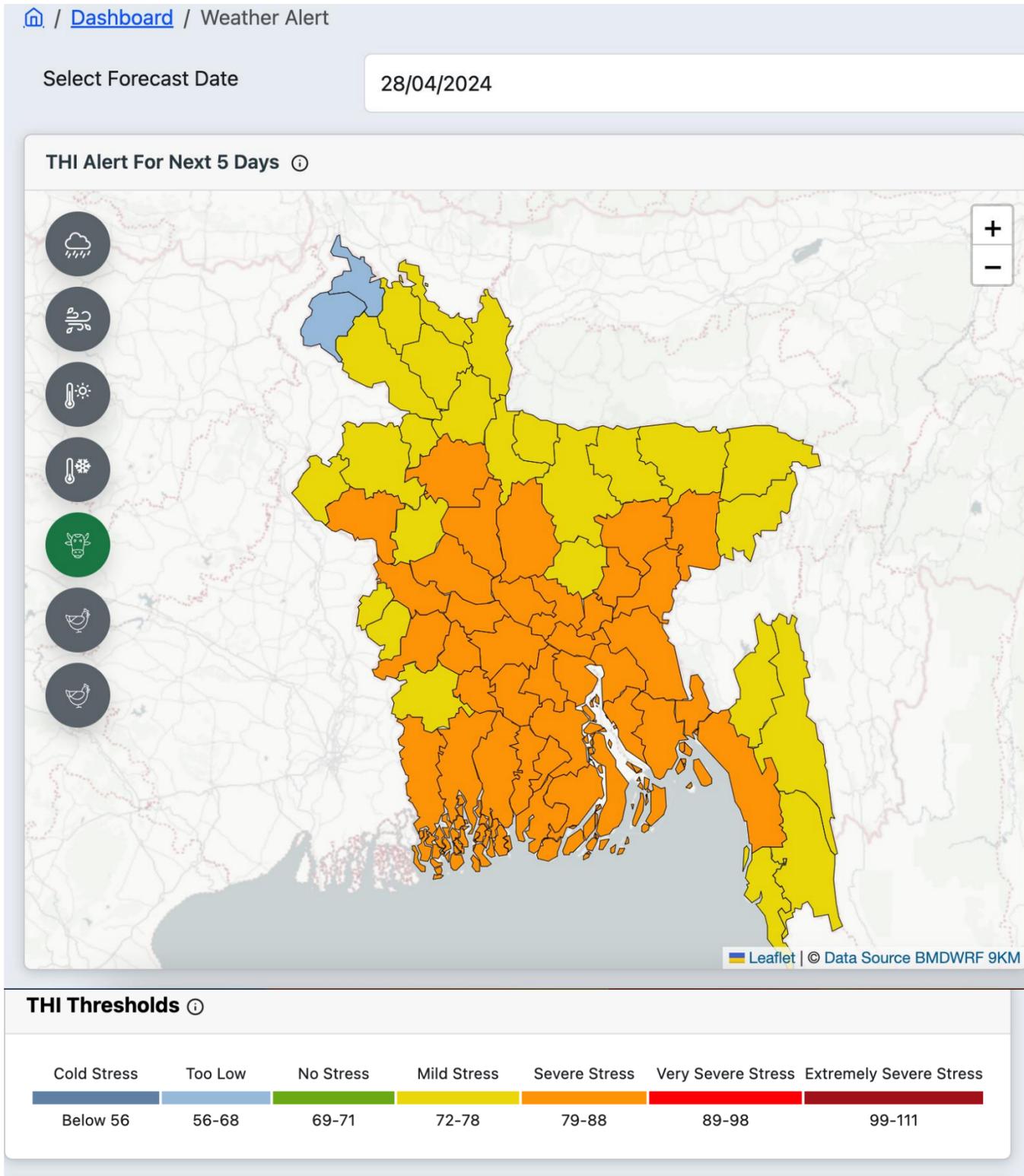
National Livestock Advisory System (NLAS)



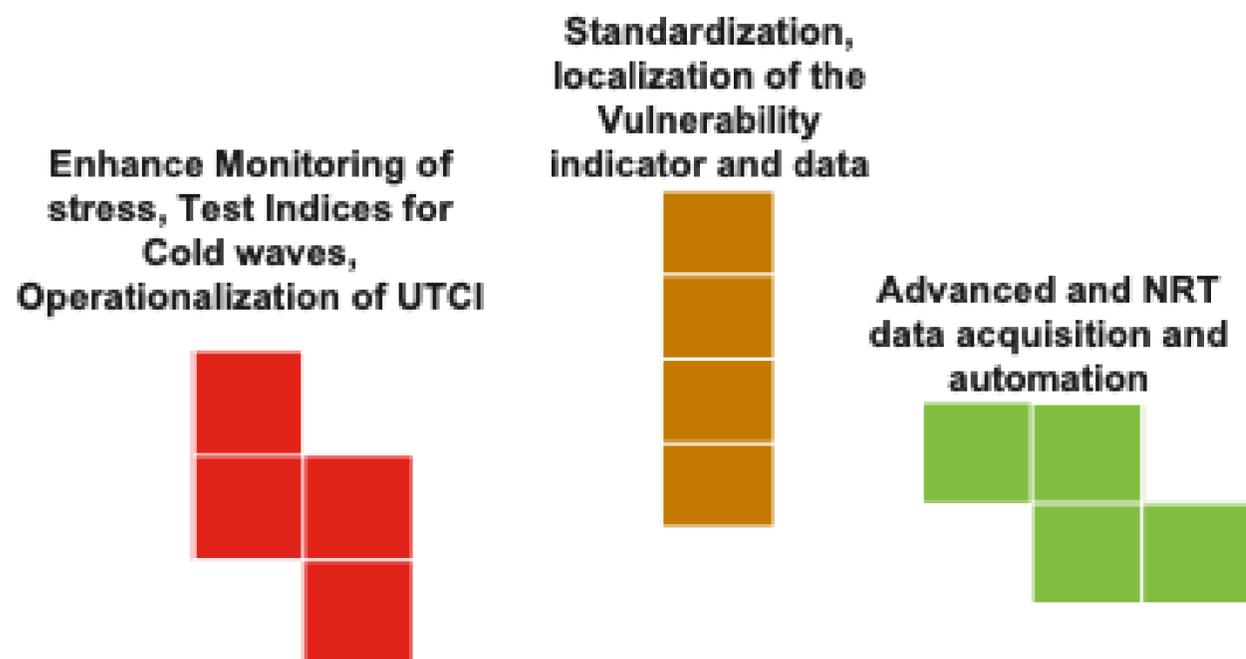
nlas.dls.gov.bd



National Livestock Advisory System (NLAS)



Existing Capacity to Future Readiness

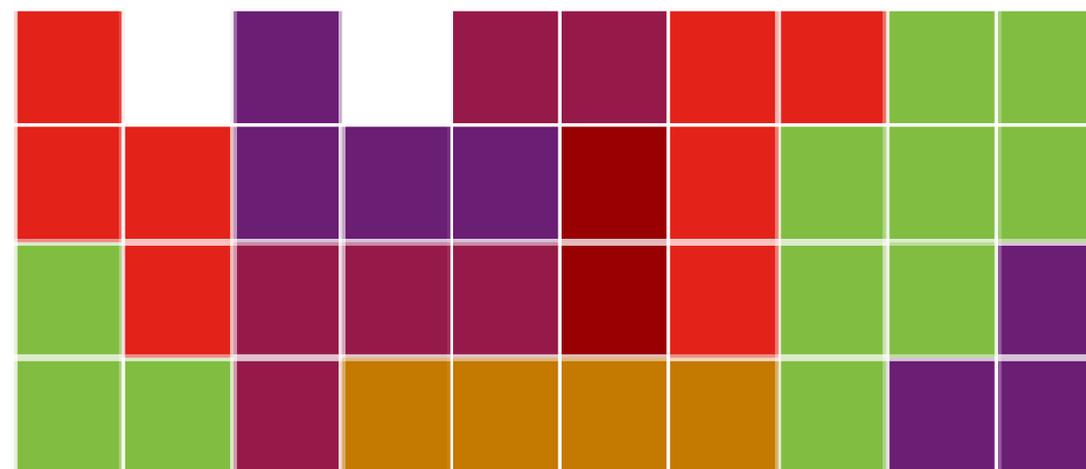


What we plan

Indices tested for temperature related hazards



Hazard



Exposure

Satellite and ground observation for different exposure indicators



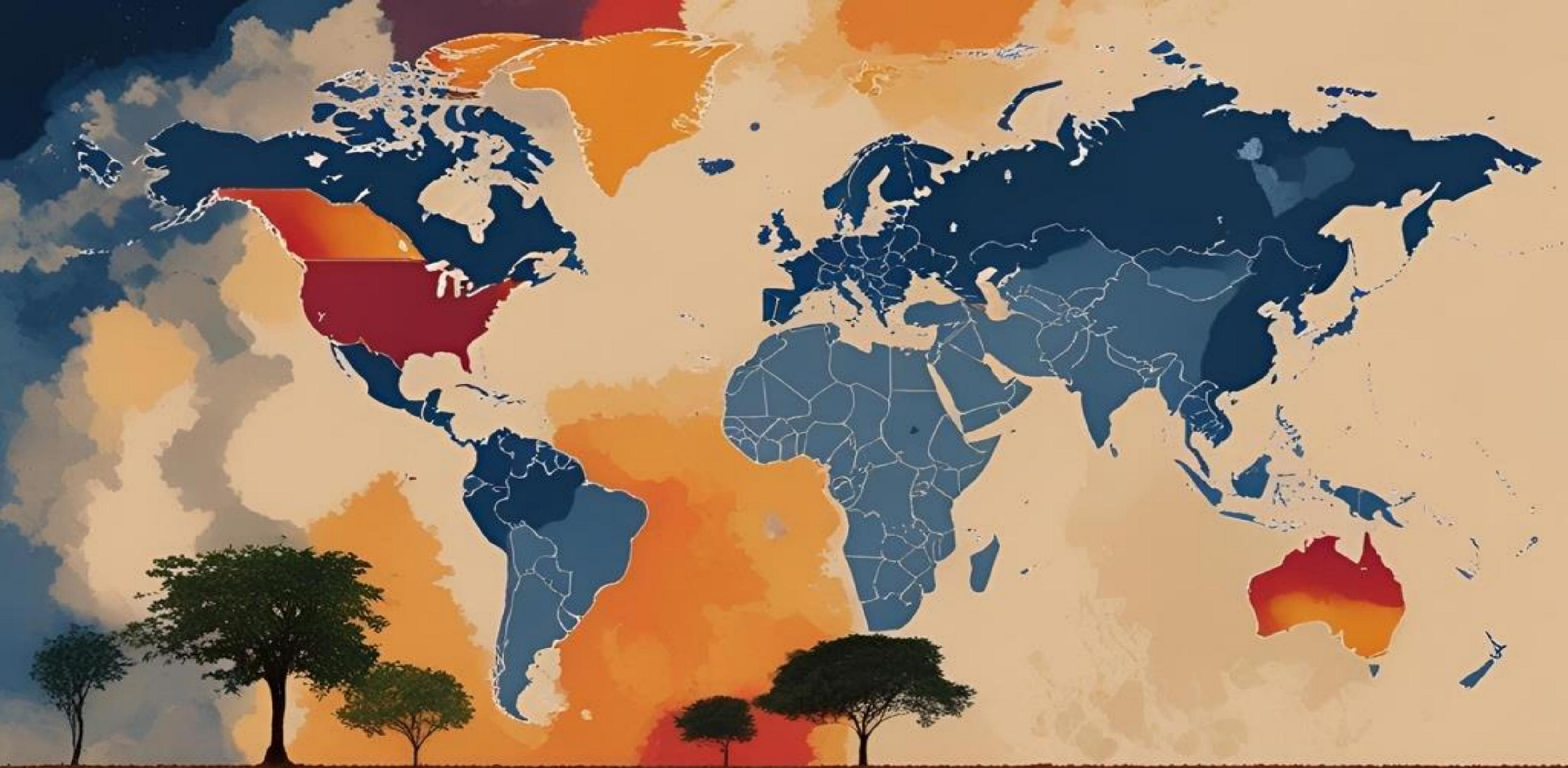
Vulnerability

National and sub-national level vulnerability information

What we have

Key Takeaways and Way Forwards

- Bangladesh is entering a new era where **temperature-related hazards are emerging as one of the most pervasive and system-wide climate risks.**
- The rising number of heatwave days, escalating heat-stress hours, and sharp increases in labor productivity loss illustrate that **temperature extremes are shaping national development trajectories** as much as riverine floods or cyclones
- The impacts extend far beyond human health: heat is weakening agricultural productivity, amplifying drought severity, elevating disease transmission risk, degrading air quality, and reducing the resilience of ecosystems and livestock populations.
- Sector specific advisory, anticipatory actions and response mechanisms need to be demonstrated and operationalized. Recent system development in the livestock sector can be leveraged to demonstrate Impact Forecasting
- Sector specific indices further need to be customized according to local context. Sector specific HAPs need to be developed.



Thank you for your attention!