

Bangladesh

Heat early warning system: current status and recommendations

October 2026



Introduction and objectives

This case study examines the current state of the heat early warning system (HEWS) in Bangladesh, including how heat risk is understood and monitored, and how warnings are issued, communicated, and acted upon across institutions. It forms part of a series of case studies conducted across eight countries of the Zurich Climate Resilience Alliance (the Alliance), which applies a common analytical framework to assess HEWSs across key pillars and identify good practices, gaps, and enabling conditions for people-centred, impact-based early warning for extreme heat.

Key messages

- **Research and risk knowledge on heat in Bangladesh are expanding but remain uneven.** There is a growing body of evidence on extreme heat, primarily focused on hazard trends and heat-health impacts, with more evidence for larger cities such as Dhaka. However, systematic data and research across sectors such as labour, agriculture, infrastructure, and livelihoods remain limited.
- **Bangladesh's public heat early warning system remains largely hazard-based and nationally uniform.** The Bangladesh Meteorological Department's (BMD) operational heatwave classification is based on maximum temperature using national thresholds. While this provides a simple and predictable basis for warnings, it does not systematically account for regional climatic differences, humidity, night-time heat or duration. Humanitarian and technical initiatives are beginning to test more spatially differentiated and impact-oriented approaches.
- **Heat warnings are widely disseminated, but translating warnings into locally actionable information remains a challenge.** The BMD communicates through bulletins, web platforms, and the media, complemented by humanitarian and community-based channels. However, responsibilities for cascading heat warnings and translating them into location- and sector-specific guidance are not yet consistently institutionalized, while systematic community feedback mechanisms remain limited.
- **Heat preparedness is advancing through anticipatory action, city-level planning, and an emerging national framework.** Humanitarian initiatives such as the Bangladesh Red Crescent Society Dhaka Heatwave Early Action Protocol and Start Fund Bangladesh demonstrate how forecasts can be linked to pre-agreed financing and targeted early actions. At the city level, Narayanganj adopted Bangladesh's first city-level Heat Action Plan in 2025. Building on emerging experience, the draft National Early Action Protocol (NEAP) proposes regionally and sectorally differentiated triggers and pre-agreed actions across health, agriculture, livestock, and livelihoods, providing an opportunity to embed anticipatory action within a nationally coordinated framework.
- **Governance and institutional coordination remain central challenges for moving from warnings to action.** While the BMD has a clear role in producing meteorological forecasts and warnings, responsibilities for translating these into preparedness and sector-specific action are not yet fully institutionalized. Heatwaves are not formally recognized as a disaster within Bangladesh's disaster management framework. Humanitarian and development organizations currently help bridge this gap, but their reach depends on programme capacity, resources and geography. The draft NEAP provides an opportunity to clarify responsibilities and strengthen coordination across national, sectoral, and local institutions.



Methodology

This case-study is based on a combination of semi-structured interviews and a targeted review of peer-reviewed literature and grey documentation related to extreme heat and the HEWS in Bangladesh. Five interviews were conducted between October and November 2025 with stakeholders across meteorology and humanitarian response (see list of organizations below). Evidence was synthesized using the four pillars of early warning systems, (1) disaster risk knowledge; 2) observations, monitoring, analysis, and forecasting; 3) warning dissemination and communication; and 4) preparedness and response capabilities alongside enabling components for effective systems.

Interviews were conducted with:

- Regional Integrated Multi-Hazard Early Warning System
- Concern Worldwide
- Start Network
- Bangladesh Red Crescent Society
- Red Cross Red Crescent Climate Centre

List of acronyms used

AA - Anticipatory Action

BDRCS - Bangladesh Red Crescent Society

BMD - Bangladesh Meteorological Department

CNRS - Center for Natural Resource Studies

CREWS - Climate Risk and Early Warning Systems

DDM - Department of Disaster Management

DGHS - Directorate General of Health Services

DNCC - Dhaka North City Corporation

DRM - Disaster Risk Management

EAP - Early Action Protocol

ECMWF - European Centre for Medium-Range Weather Forecasts

ESDO - Eco Social Development Organization

EWS - Early Warning System

FOREWARN - Forecast-based Warning, Analysis and Response Network

GFS - Global Forecast System

HAP - Heat Action Plan

HEWS - Heat Early Warning System

HI - Heat Index

IFRC - International Federation of Red Cross and Red Crescent Societies

IVR - Interactive Voice Response

MoDMR - Ministry of Disaster Management and Relief

NCC - Narayanganj City Corporation

NEAP - National Early Action Protocol

NGO - Non-Governmental Organization

RIMES - Regional Integrated Multi-Hazard Early Warning System

UDMC - Union Disaster Management Committee

UNDRR - United Nations Office for Disaster Risk Reduction

UNICEF - United Nations Children's Fund

WBGT - Wet Bulb Globe Temperature

WRF - Weather Research and Forecasting mode



Early Warning Systems

Early Warning Systems (EWS) are one of the best-proven and effective measures for saving lives and minimizing losses and harm caused by disasters. They help those at risk of floods, heatwaves, wildfires, and other climate hazards to take risk-informed, timely, meaningful, and impactful early action to keep themselves and their assets safe. The Alliance works across all eight components of EWS so that they deliver essential services for the most vulnerable women, men, and children, supporting communities to be resilient to climate hazards, enabling them to thrive.



Disaster risk knowledge

Historical trends and future projections

Extreme heat is an increasingly important hazard in Bangladesh, which ranks among the countries with the highest population exposure to rising temperatures (Mahmud et al., 2024). Between 1980 and 2023, maximum temperature increased by approximately 1.1°C, while “feels like” temperature increased by 4.5°C (Woo et al., 2021). Heatwaves have also become more frequent and intense; between 2001 and 2022, major metropolitan areas including Dhaka experienced 35 heatwave events, with six recorded in 2021 alone (Shahrujjaman et al., 2025b). Studies have also examined trends using different heat stress indicators. Between 1979 and 2021, heat stress increased by approximately 0.08-0.5°C per decade, while the number of days with high or extreme Wet Bulb Globe Temperature (WBGT), an indicator that combines temperature, humidity, wind, and solar radiation to estimate human heat stress, increased by 1-4 days per decade (Kamal et al., 2024). Climate projections indicate further increases in temperature extremes under 1.5°C, 2°C, and 4°C global warming scenarios (Khan et al., 2020). However, evaluations of climate models for Bangladesh identify biases in heatwave seasonality, interannual variability, and rainfall-heat relationships, creating uncertainty around projected changes in heatwave timing and variability (Nissan et al., 2020).

Interviewees reinforced the perception that extreme heat is becoming more prominent in Bangladesh. Stakeholders described record-breaking temperatures in recent years, with heat occurring earlier and lasting longer, and noted that heat is increasingly being incorporated into anticipatory action (AA) mechanisms alongside more established hazards such as floods and cyclones.

Impacts across sectors

Health impacts are the most extensively documented impacts of extreme heat in Bangladesh. Reported effects include excessive sweating, skin irritation, respiratory illness, and heatstroke, with impacts varying according to age, gender, and occupation (Patwary et al., 2025). Extreme heat has also been associated with heat-related illness in Rajshahi (Khan et al., 2024) and, particularly when combined with high humidity, increased cardiovascular morbidity in Dhaka (Rahman et al., 2025). Emerging evidence also links extreme heat to adverse mental health outcomes, including anxiety, depression, stress, sleep disturbances, and even suicidal ideation (Karim et al., 2024; Patwary et al., 2025; Shahrujjaman et al., 2025b).

Impacts extend beyond health to labour productivity and livelihoods. Informal and outdoor workers are particularly exposed because reducing working hours can result in immediate income losses. In Rajshahi, rickshaw pullers and auto-rickshaw drivers estimated income losses of approximately 20 per cent and 18 per cent, respectively, when reducing work during peak heat (Subedi et al., 2021). Ready-made garment workers, predominantly women, also experience heat exposure in poorly ventilated workplaces, contributing to fatigue, headaches, and productivity losses (Islam, 2024; Yeasmin et al., 2022). At the national level, heat-related health impacts in 2024 were estimated to have resulted in 250 million lost workdays and economic losses of up to USD 1.78 billion, equivalent to around 0.4 per cent of GDP (Mahmud et al., 2024).

Agriculture, livestock and food systems are also affected. Interviewees noted that when temperatures exceed 35°C during flowering, rice yields can decline substantially, describing cases where ‘*the rice plant is there, but there is no rice inside*’. Livestock and poultry are similarly vulnerable: extreme heat has resulted in large-scale poultry mortality, with reported cases of thousands of chickens lost on a single farm due to extreme heat. In contrast, farms that



implemented cooling measures such as sprinklers and feed adjustments were able to reduce losses, illustrating how adaptive capacity mediates outcomes. Heat also affects broader food system activities in Bangladesh, posing risks to food security and human health (Rahman et al., 2024). Still, knowledge across these sectors is uneven and often documented through practitioner observation rather than systematic datasets.

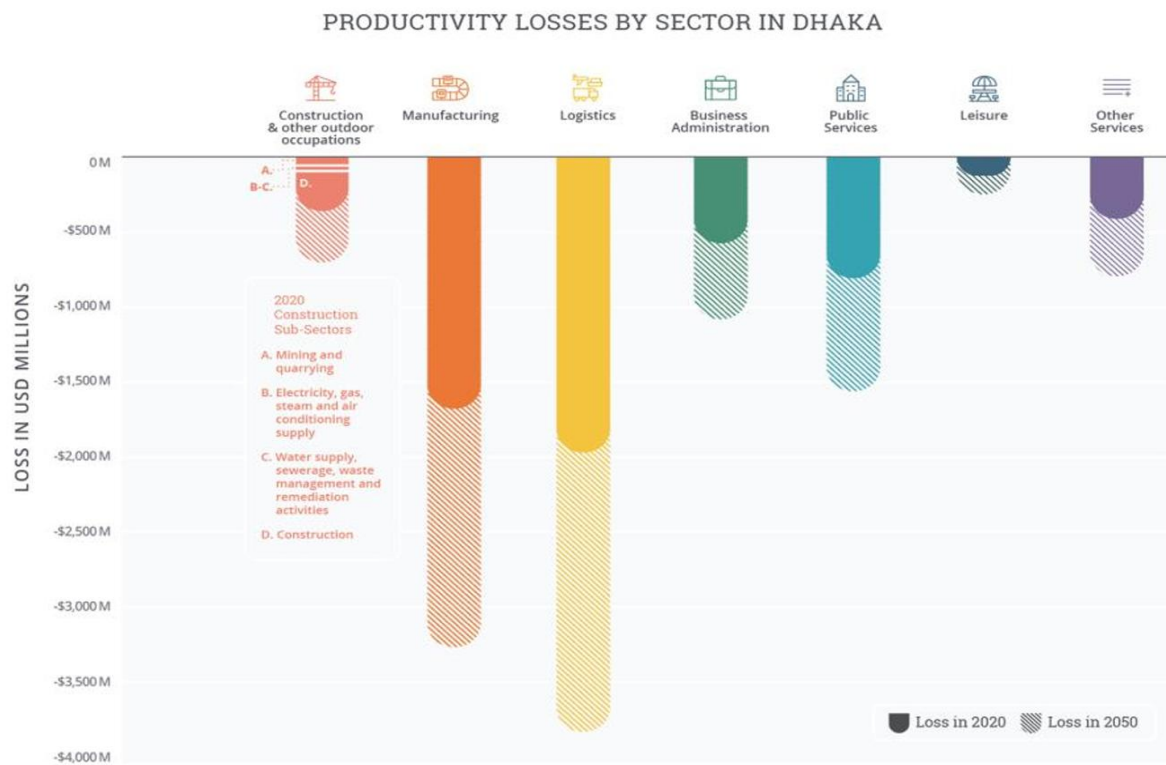


Figure 1 Productivity losses by sector in Dhaka. Source: Schulte, 2025. <https://cri.org/reports/my-body-is-burning-extreme-heat-and-labor-rights-in-bangladesh/>

Exposure and vulnerability patterns

Heat risk is strongly differentiated by factors such as occupation, socioeconomic status, gender, age and location. Interviewees identified pregnant and lactating women, children, older people, outdoor workers, farmers, day labourers and residents of informal settlements as particularly vulnerable. The majority of Bangladesh's workforce is employed in the informal sector, where occupational heat protections are weak or absent, meaning informal workers face especially high risks because they often cannot reduce exposure without losing income (Climate Rights International, 2025). Rising extreme heat stress is negatively affecting workers' health and is projected to reduce labour productivity by 46.2 per cent by 2080, with implications for poverty reduction and livelihoods. Daily wage earners and self-employed workers, such as rickshaw pullers and delivery riders, face a direct trade-off between income and health, as reducing exposure to extreme heat can mean immediate income loss. Qualitative research in Dhaka shows that some workers continue working despite heat-related illness, including returning to work after fainting, due to fear of lost wages or job dismissal (Climate Rights International, 2025).

Urbanization further shapes exposure. Rapid expansion of built-up areas and loss of vegetation have intensified urban heat in major cities of Bangladesh (Adnan et al., 2024). In Rajshahi, for example, green cover declined by approximately 50 per cent between 1989 and 2001 while land surface

temperature increased by 4.76°C (Marufuzzaman et al., 2021). Housing conditions also influence vulnerability, particularly in informal settlements where poorly insulated structures can intensify indoor heat exposure.

Risk perception and behavioural responses

Evidence suggests that awareness of heat risk does not necessarily translate into protective action. Informal workers in Dhaka demonstrate moderate awareness of heatwaves but important gaps remain in understanding health risks and adopting protective behaviours (Shahruijman et al., 2025b). Knowledge gaps, financial constraints, and broader political and economic inequalities influence this reluctance.

Similar patterns have been identified across other Bangladeshi cities. Although many residents regularly experience urban heat stress, awareness of heat-reduction measures was found to be limited (Patwary et al., 2025). Exposure and reported impacts vary according to factors including gender, access to home cooling, and time spent outdoors (Patwary et al., 2025). Some groups reported milder effects from the heat, including students, highly educated respondents, residents of traditional *katcha* houses, and respondents in good health. These findings indicate that behavioural responses are shaped not only by risk awareness but also by socioeconomic conditions and people's capacity to act on available information.

Risk assessment, monitoring, and use of scientific and experiential evidence

Risk assessments have increasingly been developed through humanitarian AA programmes. Bangladesh Red Crescent Society (BDRCS) feasibility studies for Dhaka and Rajshahi combine meteorological data with socioeconomic indicators, topography, and urban heat island mapping to identify priority locations and vulnerable populations, and to inform early warning thresholds and targeting for anticipatory heat action (BDRCS, 2021; Khan et al., 2024). More detailed heat-risk assessment is also emerging at the city level. The Narayanganj Heat Action Plan (HAP) was informed by spatial analysis of heat exposure and vulnerability across the city, identifying substantial differences between wards and particularly high vulnerability among informal-settlement residents and outdoor workers. The assessment considered both environmental and socioeconomic drivers of risk, including urban form, loss of water bodies, housing conditions, access to water and electricity, occupational exposure, age, and health-related vulnerability (Bhowmick and Rashid, 2025). These findings are used to inform geographically and socially targeted preparedness measures and longer-term urban heat adaptation.

This approach is being extended through the development of a National Early Action Protocol (NEAP) for heatwaves. Since 2025, sector-specific temperature thresholds and actions have been developed using meteorological analysis alongside stakeholder consultation and community-level knowledge. Interviewees described how lived experience from farmers, livestock owners, and workers has informed temperature thresholds for agriculture, livestock, fisheries, and livelihoods, recognizing that impacts differ by sector and location. At the time of writing, the first draft of the NEAP was submitted to the Ministry of Disaster Management and Relief (MoDMR) for official approval and publication.

Knowledge gaps and data challenges

Despite the expanding knowledge of extreme heat, interviewees emphasized that research on extreme heat remains very limited. In addition, research is geographically concentrated in major urban areas, particularly Dhaka and Rajshahi, while rural heat risk and impacts on agriculture, livestock, and livelihoods remain less systematically documented. One interviewee emphasized that



‘the dynamic for heatwave in rural scenario is very, very different’, where impacts potentially manifest more strongly through agriculture, livestock, and livelihoods than through immediately visible health outcomes.

A major gap is the lack of systematic historical hazard and impact data. While temperature trends are available, there is no consolidated national record of heatwave years, severity, associated impacts, or losses. Interviewees partly attributed this to heatwaves not being consistently recognized as formal disasters and therefore not being systematically captured within national disaster reporting systems. Evidence on economic losses, labour productivity, and non-economic loss and damage also remains limited. Health and vulnerability data are particularly limited. Interviewees reported engagement with hospitals and ministries. As one interviewee noted, *‘nowhere we could found [sic] the data which is linking the patient detail with any of the heated [sic] health impacts’*, concluding that *‘with hospitals the data management is very poor’*. Consequently, operational actors often rely on proxies; for example, the Red Cross Red Crescent network in Bangladesh uses the Heat Index (HI), alongside duration and contextual indicators, to approximate potential impacts in the absence of systematically linked impact data.

More advanced risk and vulnerability assessments are emerging through AA initiatives and the development of the NEAP, combining meteorological, socioeconomic and experiential information to identify vulnerable populations, sectors, and locations. However, strengthening systematic impact monitoring and expanding risk assessment across the country remain essential for developing a more robust, impact-based HEWS.

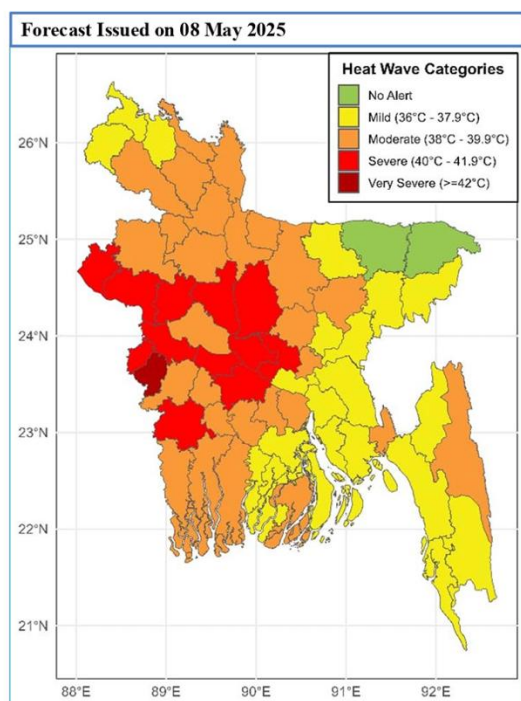
Observations, monitoring, analysis, and forecasting

Heat monitoring, metrics, and definitions

Heat monitoring in Bangladesh is led by the BMD. The BMD defines heatwaves using four temperature-based categories—mild, moderate, severe and extreme—based on maximum temperature thresholds which are the same across the country (Khan et al., 2024; Lubna et al., 2020; Figure 2; 3). Heatwave conditions are generally identified when thresholds are forecast to be exceeded for three consecutive days, generally approximately 48-72 hours in advance (Dhaka Tribune, 2025).

Heatwave thresholds			
Temperature range	Heatwave type	Intensity	Brief description
36°–38°C	Mild heatwave		Daily maximum temperature at 2m <38°C
38°–40°C	Moderate heatwave		38°C ≤ Daily maximum temperature at 2m <40°C
40°–42°C	Severe heatwave		40°C ≤ Daily maximum temperature at 2m <42°C
Above 42° C	Extreme heatwave		Daily maximum temperature at 2m ≤42°C

Figure 2 Heatwave thresholds used by BMD for Bangladesh. Source: Khan et al., 2024



Forecast Issued on 08 May 2025

Heat Wave Categories

- No Alert
- Mild (36°C - 37.9°C)
- Moderate (38°C - 39.9°C)
- Severe (40°C - 41.9°C)
- Very Severe (>=42°C)

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:

1. HONBLE ADVISER, MINISTRY OF DISASTER & RELIEF, FAX: 954365
2. ASST. SECRETARY, FAX: 956679
3. PRINCIPAL SECRETARY TO THE HONBLE CHIEF ADVISER, FAX: 954377
4. SECRETARY, MINISTRY OF DEFENCE, FAX: 951935
5. SUP. BANGLADESH POLICE, FAX: 956362
6. SECRETARY TO THE HONBLE CHIEF ADVISER, FAX: 952879
7. SECRETARY, MINISTRY OF AGRICULTURE, FAX: 954055
8. SECRETARY, MINISTRY OF DISASTER MANAGEMENT AND RELIEF, FAX: 956655/954565
9. SECRETARY, MINISTRY OF WATER RESOURCES, FAX: 957575
10. JOINT SECY. (DRD), MOF, FAX: 951035, 11. SEC. FAX: 951131/951265, 12. CIP, FAX: 951801, 13. DDM, 951815
14. NID, FAX: 954251/954252, 15. SHIPPING, MINISTRY, FAX: 966611/966612, 16. NIDRC, FAX: 954948, 954957
17. BWA, FAX: 951052, 18. BTV, FAX: 951267, 19. BAF, FAX: 951786, 20. FIRC, FAX: 951786, 21. UNR, FAX: 954556
22. BWS, FAX: 951025, 23. AMO, CIG, FAX: 951258/951259, 24. EMP, FAX: 954556, 25. COAST GUARD, FAX: 951806
26. PORT AUTHORITIES, MONGLA, 954627/954628, 27. PORT AUTHORITIES, CHITTAGONG, 951031, 28. DSS, 955729, 955102
29. HONBLE CHIEF ADVISER, ARMED FORCES, FAX: 951031, 32. AIRCRAFT, 951256
30. BANGLADESH ARMY, FAX: 954555, 31. BANGLADESH AIR FORCE, FAX: 951031, 32. AIRCRAFT, 951256
33. BANGLADESH NAVY, FAX: 954555, 34. INTC, 952557, 35. SPARCO, 951031, 36. UNDP, 952116
37. CHANNEL 1, 954555, 38. BTV, 951031, 39. BWA, 951031, 40. PORT AUTHORITIES, PAYRA, FAX: 951210/951211
41. D.C. COYS

Figure 3 Example of heatwave alert issued on May 8th, 2025. Source: <https://www.sahf.info/wp-content/uploads/sahf-events/ibf-toolkit-workshop-nov-2025/presentations/Session-5-2-Temp-Related-Hazard-in-Bangladesh.pdf>



Forecasting capacity

The BMD produces short-term weather forecasts that inform heat alerts, using the Weather Research and Forecasting (WRF) model alongside synoptic station observations. Forecasts extend approximately 5-10 days, with the WRF operated at resolutions of around 9-18 km (BDRCS, 2021; Khan et al., 2024). Studies indicate that the WRF can reproduce important spatial and temporal characteristics of heatwaves in Bangladesh, although forecast skill decreases with lead time (Lubna et al., 2020; Chaki et al., 2025). As one interviewee noted, ‘*we are pretty much sure about next three days*’, while longer lead times are used ‘*just for an idea*’.

Dhaka’s heatwave Early Action Protocol

Beyond BMD’s national heatwave warnings, humanitarian actors have developed additional trigger systems that incorporate information beyond maximum temperature. The BDRCS, with support from the International Federation of Red Cross and Red Crescent Societies (IFRC), operates a Heatwave Early Action Protocol (EAP) for Dhaka (IFRC, 2023). Its development followed a feasibility study initiated in 2020 and completed in 2021, as well as a simulation exercise during the 2021 heatwave season (BDRCS, 2021). The EAP was first activated in April 2024 during Dhaka’s longest-recorded heatwave.

The EAP combines temperature, duration, and humidity through a two-stage trigger. The thresholds were informed by analysis of 44 years (1972-2016) of three-hourly observed temperature data from Dhaka, alongside HI analysis, available evidence (though limited) on observed health impacts, and consideration of Dhaka’s urban heat island effect (BDRCS, 2021). The feasibility study found that reported health impacts occurred at lower levels than existing proposed HI thresholds, leading BDRCS and its partners to develop a more impact-oriented threshold for Dhaka (BDRCS, 2021). The selected temperature threshold of 38°C represents approximately a 1-in-7-year event in Dhaka. Pre-activation occurs when European Centre for Medium-Range Weather Forecasts (ECMWF) and/or Global Forecast System (GFS) forecasts indicate maximum temperatures of at least 38°C for two consecutive days, together with a HI of at least 38°C for two consecutive days, providing approximately 5-7 days of lead time. Activation uses the same thresholds but requires forecasts from the BMD and either ECMWF or GFS, providing approximately 2-3 days of lead time for implementation of early actions (IFRC, 2023). Following activation, forecast information is overlaid with risk analysis to prioritize the wards and *thanas* expected to experience the greatest impacts (IFRC, 2023).

Start Network anticipatory action

Start Network complements national forecasting and early warning through its AA mechanisms in Bangladesh. The Forecast-based Warning, Analysis and Response Network (FOREWARN) Bangladesh, established in 2019, brings together forecasting information providers, academics, and sectoral experts with humanitarian organizations and community representatives to support risk analysis, hazard monitoring, trigger development, and operational early action planning. Its analysis informs anticipatory decision-making through Start Fund Bangladesh, which can release financing ahead of forecast hazards (Start Network, n.d.-a; Start Network, n.d.-b). For heat, this mechanism was used in May 2025, when Start Fund Bangladesh activated an anticipatory heatwave alert for Jessore and Rajshahi and allocated £70,000 for early action implemented by the Center for Natural Resource Studies (CNRS) and Eco Social Development Organization (ESDO) (Start Network, 2025).

Interviewees described how heat risk is monitored by triangulating forecasts from the BMD, ECMWF and GFS models with contextual and field information on emerging impacts. ECMWF weekly temperature anomalies are also used to assess whether temperatures are likely to be above or below normal at longer lead times. Agreement between forecast products is used to increase

confidence rather than formally combining model outputs; as one interviewee explained, ‘we don’t combine two models, but if both say the threshold is crossed, we are more confident’. Forecast uncertainty is recognized but remains challenging to operationalize, with interviewees noting that probabilistic information is often translated into simpler messages for operational decision-making and community communication, because, as one interviewee noted, the ‘community [is] not ready’ to engage with probability or uncertainty concepts.

Heatwave alert portal

In May 2024, the Regional Integrated Multi-Hazard Early Warning System (RIMES), in collaboration with Save the Children, launched the Heatwave Alert Portal for the BMD and Dhaka North City Corporation (DNCC) (RIMES, n.d.; Figure 4). The platform provides experimental five-day HI forecasts. Plans include supporting WBGT and Universal Thermal Climate Index monitoring (a thermal index), developing tailored heat health advisories for target locations, sector-specific alerts for heatwaves through voice messages, and updating the Bangladesh Agro-Meteorological Information Service mobile application to integrate heat health alert advisories for farmers.

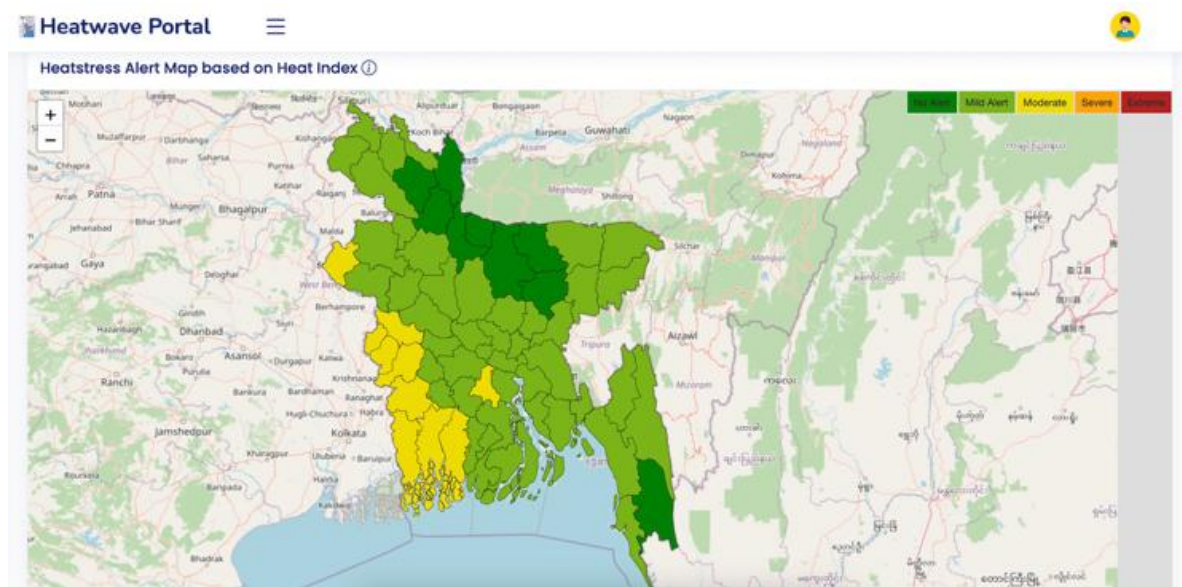


Figure 4 A heatwave alert based on the HI for the next five days in Bangladesh, displayed on the Integrated Forecast Dissemination Portal (INSTANT). Source: <https://instant.rimes.int/alerts/weather> & https://rimes.int/News_HeatwavePortal_Bangladesh

Development of a National Early Action Protocol for heatwaves

Several humanitarian organizations such as the BDRCS and the Start Network have developed heat AA approaches in different locations in Bangladesh, although with their own limited resources and operating at limited geographical context. To harmonize triggers and early actions, a NEAP for heatwaves has been under development since 2025, with a first draft submitted to the Government in June 2025.

The NEAP represents a shift towards more impact-oriented and sector-specific triggers. Rather than applying a single national temperature threshold, the proposed framework divides the country into four zones and considers regional climate conditions and vulnerability. Different triggers have been developed for health, livelihoods, agriculture, and livestock, incorporating combinations of temperature, HI and sector-specific indicators such as the Temperature-Humidity Index for livestock. Interviewees explained that thresholds were developed using historical meteorological analysis alongside stakeholder consultation and field investigations, including focus group discussions and key informant interviews. For sectors where systematic impact data are limited,

experiential evidence from farmers, livestock owners, and workers has helped identify conditions associated with impacts. The proposed NEAP also uses readiness and activation stages, allowing early actions to be initiated according to forecast conditions and expected impacts. However, these thresholds remain to be validated across different parts of the country.

Gaps and challenges

Several limitations constrain the development of more localized and impact-based heat monitoring and warnings. Interviewees identified limited weather-station density and spatial resolution as important challenges, particularly for distinguishing conditions at district and sub-district level. Forecasts were described as remaining ‘*very broad*’ and not always reflecting ‘*what people are actually experiencing on the ground*’. Effective lead time can also be shortened by delays in institutional coordination and decision-making.

Maximum temperature provides a simple, widely available, and relatively predictable basis for operational heatwave monitoring and warning, and remains the primary indicator used by the BMD. At the same time, actors in Bangladesh increasingly recognize that maximum temperature alone does not capture all dimensions of heat stress and its impacts. Other relevant factors, including humidity, night-time temperatures, duration, regional climatic differences, and population vulnerability are not systematically incorporated into the national warning thresholds. Interviewees particularly emphasized the role of humidity, noting that experienced heat can be substantially greater than air temperature alone suggests. They also highlighted regional differences, with temperatures considered extreme in eastern and hilly areas potentially being relatively common in hotter western parts of the country. Humanitarian and technical initiatives have begun complementing maximum temperature with indicators such as the HI and more spatially and sectorally differentiated thresholds, but these approaches are not yet integrated into BMD’s national heatwave warning framework. Interviewees also identified technical capacity constraints, including challenges in model calibration and bias correction, particularly in representing sudden temperature increases and fine-scale spatial variability.

The development of impact-based forecasting is further constrained by limited systematic impact data. As discussed in the Section “Disaster risk knowledge”, health information systems do not routinely link morbidity and mortality to heat exposure, while comparable data on livelihood, agricultural, and livestock impacts are also limited. This makes it difficult to establish and validate empirical relationships between meteorological conditions and observed impacts. Consequently, emerging impact-based thresholds often rely on proxy indicators, limited historical impact evidence, and experiential knowledge.

Warning dissemination and communication

Dissemination pathways

The BMD is responsible for issuing national heatwave warnings and disseminates information through its website, bulletins, colour-coded warnings, media briefings and direct communication with humanitarian organizations (BMD, n.d.; Mannan, n.d.). In principle, warning information flows from the BMD through the Department of Disaster Management (DDM) to district and local authorities. Interviewees indicated, however, that this institutional cascade is less established for heat than for hazards such as floods and cyclones. In practice, the BMD also communicates warnings directly through its website and the media, while information disseminated through the DDM is not always accompanied by additional operational or locally specific guidance. The media therefore play an important role in bringing heat warnings to the wider public.

Humanitarian organizations complement these public dissemination pathways. The BDRCS described receiving meteorological information directly from the BMD, including station-level temperature and humidity data, allowing it to undertake impact analysis and develop advice ahead of wider dissemination. Under the Dhaka Heatwave EAP, early warning dissemination and awareness raising are predefined early actions, with messages targeted towards vulnerable and highly exposed populations, including informal-settlement residents and outdoor workers (IFRC, 2023). Start Network similarly uses complementary dissemination channels. Interviewees described how forecast bulletins are summarized together with advisories and shared with member organizations, which then communicate through their established local networks. Communication can also work in the opposite direction: local organizations and communities provide information on emerging impacts, such as health symptoms, livestock stress, and crop damage, which can inform anticipatory decision-making even where formal meteorological thresholds have not yet been reached. This provides an important complement to top-down hazard communication by incorporating locally observed impacts into decision-making.

Heat communication also involves sectoral actors. The Directorate General of Health Services (DGHS) issues heat-health advisories and guidance, including information targeted at children and other vulnerable groups (BSS, 2025). In Cox's Bazar, the Inter-Sector Coordination Group disseminates heat alerts based on the BMD warnings and tailored advice to groups including children, pregnant and lactating women, elderly, people with disability, and households engaged in livestock and crop production, across Rohingya refugee and host communities (ISCG, 2024).

Several initiatives are also strengthening last-mile connectivity. The DDM has implemented an Interactive Voice Response (IVR) system in Dhaka through which people can access weather and early warning information (Sen et al., 2022). Bangladesh is also developing a Cell Broadcast Early Warning System, with technical support from the International Telecommunication Union and collaboration between the Bangladesh Telecommunication Regulatory Commission and the MoDMR, to enable rapid and targeted mobile warning dissemination to at risk groups such as outdoor workers. The CREWS South Asia project is further supporting the BMD and the Bangladesh Water Development Board to strengthen warning services and last-mile connectivity (UNDRR, 2025b).

Audience targeting, inclusivity, and accessibility

The BMD has increasingly used simplified, colour-coded heat information to make warnings easier to interpret. Interviewees viewed this as an important step, noting that temperature values alone can be difficult for non-technical audiences to relate to experienced heat. Colour categories can help translate numerical thresholds into more intuitive levels of heat risk.



Efforts to target vulnerable groups are growing, although approaches remain uneven and often project-based. Humanitarian and development actors described prioritizing residents of informal settlements, pregnant and lactating women, older people, female-headed households and households with many children. Start Network interviewees noted that FOREWARN can provide guidance on priority groups, while final targeting decisions generally remain with implementing member organizations.

The Dhaka EAP provides a more formal example of targeted communication. Target populations include outdoor workers such as rickshaw and van pullers, construction workers, and street vendors, alongside people living below the poverty line, older people, pregnant and lactating women, people with disabilities, residents of informal settlements, and people living in poorly ventilated housing (IFRC, 2023). Early warning and awareness messages are explicitly intended to help vulnerable populations recognize heat-related health risks and understand protective actions. The EAP was informed by community consultations showing that people may experience symptoms such as vomiting, headaches, and fatigue without recognizing them as heat-related or knowing how to respond (IFRC, 2023).

Community-based channels are particularly important for accessibility, especially in rural areas. Concern Worldwide, in collaboration with RIMES, has used voice messages to deliver forecasts and accompanying advisories to local actors and volunteers, who further disseminate information through Union Disaster Management Committees (UDMCs), community networks, and ‘miking’ (announcements through loudspeakers), including through mosques. Community Resilience Action Groups can similarly support door-to-door and megaphone communication, translating warnings into locally understandable messages and actions (Ndiaye et al., 2025). Research has identified miking, voice messages, word-of-mouth and television as important channels for communicating heatwave information in Bangladesh (Binthe Ahmed et al., 2025).

‘We have [a] voice message system with RIMES, they will actually provide a forecast through voice messages to the rural people along with the advisories’ (Concern Worldwide)

Earlier initiatives also demonstrate the value of combining mass media with community-based communication. BBC Media Action’s *Amrai Pari* programme (2014-2016) used television, which was accessible to around 90 per cent of the population and widely regarded as a credible information source, alongside community radio, peer learning, and community screenings to communicate practical information on extreme weather. In rural areas, community screenings were organized in collaboration with the BDRCS (Sen et al., 2022).

A persistent challenge is translating meteorological information into messages that people can readily understand and act upon. Interviewees described ‘*translating and transforming*’ forecasts into relatable information as a key bottleneck, particularly because temperature values may have limited meaning without information on expected impacts. Duration was considered easier for some communities to relate to than specific temperature thresholds. Probabilistic forecasts and uncertainty pose an additional communication challenge, with one interviewee highlighting the need for ‘*translators in between who can translate us scientifically*’. This highlights the importance of intermediaries who can connect technical forecasts with locally relevant information and practical actions.

Effectiveness, trust, and feedback

The actionability of heat warnings is an area for further development. Interviewees reported that the BMD increasingly provides general protective guidance alongside heat warnings, but this advice is not consistently location- or sector-specific or systematically linked to local response procedures. As a result, local authorities and communities may receive information about expected heat

conditions without clear guidance on the actions that should follow. Humanitarian mechanisms demonstrate how warnings can be more directly linked to action. Under the Dhaka EAP, early warning and awareness messaging is accompanied by predefined measures including drinking water and oral rehydration salts, multipurpose cash assistance, cooling stations, and ambulance support (IFRC, 2023).

Trust in warnings is influenced by forecast performance and how closely forecasts correspond with locally experienced conditions. Interviewees reported that forecast reliability has improved in recent years, while noting that previous false alarms had affected confidence in meteorological information. Limited weather-station coverage was also identified as a constraint on producing sufficiently localized information. As one interviewee noted *‘the number of weather station[s] that we have in different places is not enough to actually provide the more accurate data or forecast’*. This causes people to not always trust meteorological information and forecast products with *‘people ... not fully relying on BMD data in some cases’*.

Some feedback mechanisms exist. Concern Worldwide described conducting rapid assessments following interventions to determine whether messages were received and understood, whether they prompted action, and how timing and content could be improved. RIMES similarly described using community consultation and feedback from BMD to refine messages and test whether heat-stress categories are appropriate for local conditions. However, systematic two-way feedback mechanisms between communities, local authorities, and national warning providers are not yet embedded across the national heat warning system.



Figure 5 A rickshaw puller moves through Shaheb bazar in Rajshahi, Bangladesh in the intense afternoon heat, working despite the exhausting conditions. Source: Mst Israt Jahan/GHHIN-EJN Extreme Heat Photo Contest 2025, <https://www.flickr.com/photos/climatecentre/55084646043/in/album-72177720331898677/>

Towards a nationally coordinated communication system

The draft NEAP for heatwaves represents an important effort to institutionalize and scale several of these approaches in Bangladesh. The protocol was developed in recognition that existing AA initiatives, including those of BDRCS and Start Network, have operated with limited resources and geographical coverage, creating a need for a harmonized national framework (EIMS, 2025). The NEAP proposes a defined coordination structure involving the National Taskforce on Forecast-based Financing/Action, the Anticipatory Action Technical Working Group, the BMD, the DDM, health and agricultural agencies, local government, and humanitarian partners. It calls for the development of specific, timely, and actionable advisories linked to warning triggers and targeted communication for at-risk groups, including outdoor and informal workers, older people, children, and people with chronic illness. Proposed communication channels include SMS, IVR, local FM radio, mobile megaphones, and public announcements (EIMS, 2025).

The proposed framework also assigns differentiated communication roles across institutions. The BMD would provide forecast triggers and risk maps; the DDM would disseminate heatwave alerts, risk messages, and early-action guidance; the DGHS would issue public health advisories; agricultural and livestock agencies would communicate sector-specific guidance through field staff, SMS, and media; and the BDRCS and humanitarian partners would support house-to-house communication and community-level action (EIMS, 2025). City Corporations and local government institutions are also expected to support dissemination through community networks, identify vulnerable populations, and connect warnings with locally appropriate preparedness measures (EIMS, 2025).

Importantly, the NEAP recognizes communication as more than one-way dissemination. It proposes evaluating community understanding of heat risk and revising outreach messages accordingly, alongside community-centred awareness strategies and engagement with local institutions (EIMS, 2025). However, as the NEAP remains a draft protocol at the time of writing, these arrangements should be understood as a proposed pathway for strengthening the national system rather than established operational practice. Translating this framework into clearly mandated, resourced, and routinely tested communication procedures will therefore be important for implementation.

Preparedness and response capabilities

Institutional and policy frameworks

Bangladesh's preparedness for extreme heat has expanded in response to increasingly severe heatwaves, but arrangements remain fragmented across sectors, governance levels, and geographic areas (Mahmud et al., 2024). At the national level, the Ministry of Environment, Forest and Climate Change leads climate adaptation policy, while the MoDMR and DDM coordinate disaster preparedness and response. Local governments, humanitarian organizations, and Non-Governmental Organizations (NGOs) also play an important role in implementing heat preparedness and response at the community level (UNDRR, 2025a; 2025b).

Heat is also becoming more visible in national policy. The National Adaptation Plan of Bangladesh (2023-2050) recognizes extreme heat and identifies adaptation measures, whereas earlier frameworks such as the Bangladesh Climate Change Strategy and Action Plan (2009) gave heat considerably less explicit attention (Khan and Blackwell, 2022). In the health sector, the DGHS, with support from UNICEF, developed national heat-health guidance in 2024, including measures to protect children, pregnant women, and other vulnerable groups and strengthen recognition and management of heat-related illness (Rita, 2024). However, interviewees described preparedness as uneven, particularly in rural health facilities where capacity to manage severe heat-related illness remains limited.

From 2023 to 2024, Asia's first dedicated Chief Heat Officer worked with DNCC through an initiative supported by the Adrienne Arsht-Rockefeller Foundation Resilience Center. The role focused on heat-risk awareness, stakeholder coordination, and advancing urban heat resilience.

Bangladesh's first city-level Heat Action Plan in Narayanganj

At the city level, Narayanganj City Corporation (NCC) developed Bangladesh's first city-level HAP, with technical support from ICLEI South Asia. Initiated in 2024 and building on the city's earlier Climate Resilient City Action Plan, the HAP was developed as a locally led framework for strengthening preparedness and resilience to extreme heat (ICLEI South Asia, 2024; Bhowmick and Rashid, 2025). The plan prioritizes populations particularly vulnerable to heat, including residents of informal settlements, outdoor workers, older people, children, pregnant women, and people with pre-existing health conditions. It is informed by spatial heat-risk and vulnerability analysis across the city, which is used to inform targeted preparedness and longer-term adaptation measures (Bhowmick and Rashid, 2025).

The HAP combines immediate heat preparedness and response with medium- and longer-term institutional and urban adaptation measures. Short-term actions (0-1 year) include heat-risk communication and training, cooling centres, drinking water and oral rehydration salts, mobile health services, and targeted outreach to high-risk communities. The plan also includes occupational measures such as shaded rest areas, breaks during peak heat hours, and adjustments to working hours for outdoor workers (Bhowmick and Rashid, 2025). Medium-term priorities (1-3 years) include establishing a technical heat task force, standardizing city-wide heat emergency response protocols, appointing a dedicated Heat Officer within NCC, and piloting measures such as cool roofs and nature-based solutions. Longer-term ambitions (3+ years) focus on embedding heat resilience into urban development planning and expanding structural measures such as urban greening, restoration of water bodies, heat-resilient building design, and cooling infrastructure (Bhowmick and Rashid, 2025).



Humanitarian anticipatory action

Humanitarian organizations have been important drivers of operational heat preparedness in Bangladesh, particularly through forecast-based AA. These approaches link predefined forecast triggers with pre-agreed actions and financing, allowing measures to be implemented before the most severe impacts occur.

One example is the BDRCS Heatwave EAP for Dhaka, approved in 2023. The protocol makes up to CHF 499,930 available through IFRC's Disaster Response Emergency Fund and aims to support approximately 123,700 vulnerable people through early warning and awareness activities, drinking water and oral rehydration salts, multipurpose cash assistance, cooling stations, and ambulance services (IFRC, 2023). Actions particularly target exposed and vulnerable groups, including outdoor workers, informal-settlement residents, older people, pregnant and lactating women, people with disabilities, and people with chronic illnesses (IFRC, 2023).

Start Fund Bangladesh provides another mechanism for rapidly financing AA. In May 2025, an anticipatory heatwave alert for Jashore and Rajshahi released approximately £70,000 for interventions implemented by the CNRS and ESDO (Start Network, 2025). Activities included cooling centres, awareness activities and the distribution of cooling and heat-protection items. Start Fund activations follow a rapid governance process in which members raise alerts, decision committees assess activation, and funding is allocated within 72 hours. Although community consultation is mandatory, interviewees noted that the shorter time frame was a constraint. As one interviewee noted, *'it is not always possible to do a wider range of communities because of the short time frame'*.

Towards nationally coordinated anticipatory action

Building on experience from humanitarian AA, the draft National Early Action Protocol for heatwaves, submitted in June 2025, represents an important effort to establish a nationally coordinated AA framework. It proposes defined responsibilities across the BMD, the DDM, health, agriculture, livestock, local government, and humanitarian organizations, organized around forecast, action, and finance (EIMS, 2025). Proposed actions include health-system preparedness and public-health measures, agricultural and livestock protection, adjustments to outdoor work and school activities, drinking-water provision, cooling and shaded spaces, and targeted support for vulnerable groups (EIMS, 2025).

Community-level preparedness and engagement

At the community level, preparedness combines household adaptation, awareness raising and targeted humanitarian interventions. Research in Rajshahi identified common coping measures including increased water consumption, staying indoors, bathing, resting under trees or near water, rooftop and courtyard gardening, and whitewashing roofs and walls (Tawsif, Alam and Al-Maruf, 2022). A subsequent feasibility study identified medical camps, unconditional cash assistance for vulnerable households, and strengthened early warning as potential anticipatory actions (Khan et al., 2024).

Humanitarian organizations have increasingly complemented awareness raising with practical measures to reduce heat exposure. During April-May 2025, the BDRCS operated three cooling centres in heavily crowded locations, supporting more than 15,000 people with drinking water, oral rehydration salts, basic health checks, first aid, and emergency referrals. Humanitarian programmes have also distributed umbrellas, hats, and portable fans and provided targeted support to outdoor workers and vulnerable households.

Community participation is also incorporated into AA. Start Network requires consultation with communities and local authorities in the design and validation of proposed actions. Through pilots in Jashore, community feedback helped identify highly heat-exposed groups for targeting. ESDO and CNRS also developed 36 contextualized messages covering heat safety, dehydration, heat-stroke symptoms, and relevant hotline numbers. In Rajshahi, six schools hosted campaigns for children aged 10-13, with teachers also engaged to strengthen recognition of heat-related symptoms and appropriate responses.

The BDRCS, with support from the American Red Cross and the IFRC, has participated in Heat Action Day since its launch in 2022, using public engagement and community-based activities to increase awareness of heat risks and promote protective behaviour. Activities have included street performances, public demonstrations, and outreach in high-exposure urban areas. More recent activities have combined awareness raising with practical support. In 2025, the BDRCS conducted heat-risk and safety sessions with school students, distributed essential items and heat-awareness materials, provided oral rehydration saline to pedestrians, and targeted highly exposed outdoor workers, including rickshaw drivers, with drinking water, protective items, and heat-health information (IFRC, 2025). These activities illustrate how the BDRCS's volunteer and branch network can support community-level heat preparedness and translate risk information into practical protective action.



Figure 6 With support from the IFRC and American and German Red Cross, Bangladesh Red Crescent volunteers are pictured distributing drinking water and offering advice on how to stay safe during the latest extreme heat to affect the country as part of Heat Action Day 2023. Source: Bangladesh Red Crescent Society, <https://www.flickr.com/photos/climatecentre/52953951752/in/album-72177720308864148>

Local disaster-management structures provide another entry point for preparedness. Interviewees described training UDMCs and other local committees to interpret forecasts and connect communities with relevant sectoral departments. Locally identified measures include tree planting for shade, shaded rest areas and water points, roof modifications, and rooftop or vertical gardening. Local Adaptation Plans of Action are also being piloted in Hatibandha Upazila through engagement with communities, local leaders, and government officials. Interviewees highlighted their potential to translate locally identified adaptation priorities into dedicated local preparedness budgets, rather than relying solely on response funding.

Challenges and gaps

Despite growing activity, heat preparedness remains uneven across Bangladesh. Many of the most operationally developed approaches, including forecast-based financing, cooling interventions, targeted assistance, and community outreach, have emerged through humanitarian AA programmes with relatively limited geographic coverage. The draft NEAP recognizes this fragmentation and seeks to provide a more harmonized national framework (EIMS, 2025).

Interviewees also identified practical capacity constraints, including limited staff capacity for impact analysis, volunteer turnover, funding constraints, and administrative procedures that can affect the speed and scale of AA. These challenges are particularly relevant as heat preparedness moves from individual projects and pilots towards more sustained and nationally coordinated implementation.

A further challenge is enabling highly exposed populations to act on warnings. Outdoor and informal workers may have limited ability to reduce their exposure without losing income. While emerging initiatives increasingly recognize occupational heat risk, including measures proposed in the Narayanganj HAP and draft NEAP, stronger links between heat preparedness, worker protection, and social protection could help address these underlying constraints (Bhowmick and Rashid, 2025; EIMS, 2025). Interviewees also described emerging efforts to use existing social-safety-net mechanisms for AA, for example by bringing forward payments to older people ahead of forecast extreme heat, although these approaches are not yet established at the national scale.

Overall, the draft NEAP represents an important step towards greater national coordination by proposing clearer institutional responsibilities and linking forecasts with pre-agreed sectoral actions and financing. As it had not yet been formally adopted at the time of writing, operationalizing these arrangements across sectors and levels of government, with sufficient capacity and sustainable financing, remains an important next step (EIMS, 2025).

Multi-hazard approach

Bangladesh has a well-established disaster risk management (DRM) architecture covering multiple hazards, but integration across hazards within a multi-hazard early warning approach is still developing. Heat is increasingly being incorporated into systems and interviewees described efforts to align heat preparedness and AA with approaches already established for other hazards. The BDRCS currently supports national EAPs for floods and cyclones, while the draft NEAP for heatwaves represents an effort to establish a comparable framework for extreme heat. A broader multi-hazard approach to AA is also under discussion, although it is in its inception phase; as one interviewee noted *‘the multi-hazard condition... is already in discussion’* but there is *‘nothing concrete yet’*.

Limited institutional and technical capacity may complicate this transition. Meteorological services must monitor and forecast multiple hazards simultaneously, often with the same limited human resources. As one interviewee explained, *‘the same person forecasts thunderstorm... cyclone... heat wave... one person cannot cover the whole system’*. Strengthening multi-hazard approaches therefore requires not only integrating heat into existing frameworks, but also sufficient technical and institutional capacity to monitor and respond to multiple hazards.

Integration of compound and cascading risks is also still emerging. Extreme heat can coincide with or exacerbate other stresses, such as drought, water shortages, or power outages, yet predefined protocols for managing these interacting risks are not systematically established. Further integrating heat within Bangladesh’s multi-hazard early warning and AA frameworks could support more coordinated decision-making and preparedness when multiple or interacting hazards occur simultaneously.

Gender and social inequalities addressed inclusively

Heat vulnerability in Bangladesh is strongly differentiated by age, health, livelihood, housing conditions, and access to resources. Interviewees identified people living in informal settlements, outdoor and daily-wage workers, pregnant and lactating women, older people, children, and people with disabilities as groups requiring particular attention. Housing and livelihood conditions can compound these vulnerabilities: informal settlements commonly include poorly ventilated structures made from corrugated iron sheets that retain heat, while residents may have limited access to cooling, water, and other resources needed to reduce exposure.

Humanitarian AA initiatives have increasingly sought to reflect these differences in their targeting. Start Network pilots in Rajshahi and Jashore prioritized informal-settlement residents, pregnant and lactating women, older people, households with larger numbers of children, and female-headed households. Schoolchildren were another priority group, with heat-awareness campaigns conducted in six schools where classes remained open during heatwave conditions. Interviewees emphasized that needs differ between locations and population groups, creating a need for more differentiated heat-action packages. While established assistance packages such as dignity kits, hygiene kits, and multipurpose cash are available for other hazards, interviewees noted the need to further develop heat-specific assistance tailored to groups such as informal-settlement residents, heat-exposed workers, rural farmers, and households dependent on livestock and poultry.

Gender and reproductive status can further shape heat exposure and the ability to take protective action. Qualitative research among workers in Dhaka documents particular challenges for pregnant workers and shows how inadequate access to drinking water, toilets, and rest can exacerbate heat-related health risks (CRI, 2025). Some workers reported deliberately restricting their water intake because of inadequate or restricted toilet access, contributing to dehydration and urinary tract



infections. More broadly, workers described limited ability to take breaks or reduce their workload during extreme heat because of workplace expectations and fear of losing income or facing retaliation (CRI, 2025). These findings show that heat vulnerability is shaped not only by meteorological exposure, but also by working conditions, income security, access to basic services and existing social inequalities.

Efforts to make heat warnings and preparedness more inclusive are emerging but remain largely project based. Humanitarian initiatives have used targeted approaches such as community outreach and *miking* to reach vulnerable groups. However, there is less evidence on the extent to which certain groups are systematically involved in the design and evaluation of heat warnings and anticipatory actions. Strengthening accessible, two-way feedback mechanisms could help identify whether warnings are received, understood, and actionable, and whether different groups face barriers to taking protective action.

Local community involvement

Local community engagement in HEWSs and AA is driven largely by humanitarian and NGO-led initiatives, which help bridge gaps between national-level information and local needs. Start Network's member-led model provides one example: local and national NGOs can raise alerts based not only on forecast thresholds but also on conditions and impacts observed in communities. As one interviewee explained, *'when our members realize they are feeling bad... though the threshold did not reach... they raise the alerts'*. Following activation, community consultation is used to refine targeting and proposed actions, although rapid funding timelines can limit the breadth of engagement.

Other humanitarian and development organizations similarly rely on local knowledge and community networks. RIMES described using extensive key-informant interviews and focus-group discussions to contextualize heat thresholds and categories, while organizations such as Concern Worldwide and the BDRCS work through community volunteers, UDMCs, religious leaders, and youth groups to disseminate warnings and preparedness information. Voice messages, *miking*, and mosque loudspeakers can extend information beyond the immediate project area, with local actors acting as intermediaries between technical information and communities.

These examples demonstrate the potential for community knowledge and local networks to inform activation, targeting, and dissemination. However, such engagement remains largely programme-based rather than systematically embedded within the national HEWS, and its coverage depends on the geographic reach, capacity, and resources of implementing organizations. Strengthening these links between national institutions and local communities could support a more consistently people-centred HEWS.

Effective governance and institutions

Governance arrangements for heat are evolving, but responsibilities for translating forecasts into preparedness and early action are not yet fully institutionalized. Formally, the BMD is responsible for producing meteorological forecasts and warnings, while the DDM has responsibility for disaster preparedness and dissemination. Interviewees noted that coordination can be complicated by the agencies sitting under different ministries and the procedures required for information exchange: the *'BMD is responsible to generate the early warning, but [the] DDM is responsible to disseminate it'*, yet *'they need to maintain so many protocols... sharing things from one ministry to other ministry'*.

Interviewees reported that heatwaves are not formally recognized as disasters within existing disaster-management arrangements, which can limit the DDM's mandate to initiate heat-specific actions. At the same time, the BMD's primary role is meteorological, and interviewees noted that translating forecasts into sector-specific impact and action guidance requires input from other institutions. As one interviewee explained, *'BMD are like meteorologists... for them to advise people on specific actions, it's very difficult'*. As a result, humanitarian and development organizations have played an important role in bridging the gap between forecasts and action, including through AA, impact advice, community outreach, and targeted preparedness measures.

Partnerships between government and humanitarian or technical organizations are helping to strengthen these links. The BDRCS described a formal data-sharing arrangement with the BMD through which meteorological information can be shared ahead of public dissemination, allowing the BDRCS to prepare impact advice. RIMES similarly works with the BMD on the development and review of forecast information. These arrangements demonstrate growing collaboration, but much of the translation of heat information into targeted early action also remains programme-based rather than embedded systematically across government institutions.

The draft NEAP for heatwaves represents an important step towards addressing this gap by proposing clearer responsibilities across forecasting, action, and financing and defining pre-agreed sectoral actions linked to heat triggers.



Key recommendations

- **Strengthen impact data and locally grounded risk knowledge:** Expand systematic monitoring of heat-related health, labour, agricultural, livestock, and livelihood impacts, including in rural areas, and strengthen links between meteorological and impact datasets. Continue combining quantitative evidence with community and sectoral knowledge to identify vulnerable populations and locations and support the development and validation of impact-based thresholds.
- **Strengthen heat monitoring and warning thresholds:** Maximum temperature provides a simple, widely understood and relatively predictable basis for heat warnings, but nationally uniform thresholds may not reflect Bangladesh's climatic variation. Regionally differentiated temperature thresholds should therefore be considered. Building on this, the added value of incorporating humidity, night-time temperatures, and duration should be assessed to further improve the representation of heat stress and risk.
- **Localize and simplify early warnings:** Translate technical forecasts into clear, actionable messages in local languages, explaining what is happening, who is at risk, when, and what action to take, using trusted community and accessible communication channels.
- **Put communities at the centre of HEWSs:** Build on and institutionalize existing humanitarian and community-based structures as a last-mile bridge between national warning systems and people at risk. Establish systematic mechanisms for communities, including vulnerable groups, to inform warning design and provide feedback on whether warnings are received, understood, trusted, and acted upon.
- **Strengthen the warning-to-action link:** Establish pre-agreed trigger-action protocols that link heat warnings to specific preparedness and early actions by government, health authorities, local authorities and humanitarian actors. These should clearly define who acts when and be supported by pre-positioned resources and financing to enable timely action.
- **Strengthen institutional mandates and formal recognition of heat as a disaster risk:** Heat should be formally embedded within Bangladesh's DRM framework, with clear institutional mandates for preparedness and early action, including appropriate recognition of heatwaves within national disaster management arrangements. Coordination across national, sectoral, and local institutions should be strengthened. Formal adoption and operationalization of the NEAP could provide a pathway for scaling existing experience through nationally agreed triggers, responsibilities, financing and pre-agreed early actions.

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Front cover image: Establishing community-level shade structures to protect people from extreme heat. Photo by Concern Worldwide.

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The Zurich Climate Resilience Alliance is a collaboration between humanitarian, NGO, research and private sector partners, working to build resilience to climate hazards in rural and urban contexts.

Formerly the Zurich Flood Resilience Alliance, we have over a decade of experience in generating evidence of communities' current levels of climate resilience and identifying appropriate solutions.

Through long-term community programmes, new research and stakeholder influencing, we strive to deliver systemic change at scale and realize our vision of a world in which communities are more resilient to climate hazards, and able to thrive.

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