

Vietnam

Heat early warning system: Current status and recommendations

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Introduction and objectives

This case study examines the current state of the heat early warning system in Vietnam, 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 heat early warning system across key pillars and identify good practices, gaps, and enabling conditions for people-centred, impact-based early warning for extreme heat.

Key messages

- **Heat risk knowledge is expanding through research and pilot programmes but remains fragmented and weakly institutionalized across Vietnam.** Research and pilot programmes have strengthened understanding of heat hazards, impacts, and vulnerable groups, particularly in major cities such as Hanoi. However, systematic vulnerability profiling, disaggregated data, and integration of heat into national risk and planning systems remain limited.
- **Vietnam has a structured national temperature-based heat monitoring and forecasting system.** The National Centre for Hydro-Meteorological Forecasting (NCHMF) issues regular heatwave bulletins using maximum temperature thresholds (35-39°C), including information on duration, humidity, and affected areas. However, warnings remain general in scope and may not fully reflect thermal or nighttime heat. Pilot initiatives use the Heat Index (HI) thresholds but remain localized and project-based.
- **Vietnam's heat warning system uses a layered communication structure, yet remains largely generic and insufficiently targeted.** Forecasts are disseminated through disaster management structures, ministries, mass media, and digital platforms such as Facebook and Zalo, complemented by commune loudspeakers and sectoral outreach. However, messaging is typically broad and not tailored to occupational, geographic, or socioeconomic vulnerability. Language diversity, low heat literacy and awareness, and limited feedback mechanisms further constrain effectiveness, particularly among ethnic minority and rural communities.
- **Heat preparedness and response are project-driven, with limited formal links between warnings and action.** Despite having a structured heat forecasting mechanism, preparedness and response measures remain weak, uneven and only partially institutionalized. Efforts such as the Early Action Protocol (EAP) pilot in Hanoi launched in 2018 by the Viet Nam Red Cross Society (VNRCS) and the German Red Cross (GRC), and forthcoming initiatives such as a heat risk management database by Institute for Social and Environmental Transition (ISET-International or ISET) and consultations with vulnerable populations by Plan International show promise but remain localized and project-based.
- **Extreme heat is an emerging but under-prioritized hazard in Vietnam.** Strong disaster risk management (DRM) structures exist in Vietnam, but extreme heat has not yet been formally recognized or mandated within the core responsibilities of national disaster management authorities. This limits coordination, institutional leadership, and scaling. Strengthening national mandates and policy recognition is therefore essential to strengthen the heat early warning system.



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 heat early warning system in Vietnam. Three interviews were conducted between October 2025 and January 2026 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:

- ISET-International Vietnam
- Plan International Vietnam
- Global Heat Health Information Network (GHHIN) Southeast Asia Hub Secretariat

List of acronyms used

AFD - Agence Française de Développement (French Development Agency)

CSS - Comprehensive School Safety

DM - Disaster Management

DRM - Disaster Risk Management

EAP - Early Action Protocol

ENSO - El Niño-Southern Oscillation

FbF - Forecast-based Financing

GESI - Gender Equality and Social Inclusion

GHHIN - Global Heat Health Information Network

GRC - German Red Cross

HI - Heat Index

IFRC - International Federation of Red Cross and Red Crescent Societies

IMHEN - Institute of Meteorology, Hydrology and Climate Change

ISSET - Institute for Social and Environmental Transition (ISSET-International)

NCHMF - National Centre for Hydro-Meteorological Forecasting

NGO - Non-Governmental Organization

SMS - Short Message Service

UHI - Urban Heat Island

UNISDR - United Nations International Strategy for Disaster Reduction

USD - United States Dollar

VND - Vietnamese Dong

VNRCS - Viet Nam Red Cross Society

WBGT - Wet-Bulb Globe Temperature



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

Extreme heat is increasingly recognized in Vietnam as a hazard but remains relatively new and underprioritized compared to other hazards. One interviewee noted that while heat is acknowledged as a relevant hazard at national level, systematic analysis and action are still limited, and efforts are mostly visible in urban contexts where organizations recently started to collect evidence. As a result, heat risk knowledge remains less developed and less institutionalized than the risk posed by other hazards, such as floods or typhoons.

A recent literature review on extreme heat in Vietnam, funded by Agence Française de Développement (AFD), found that there is an upward trend in the number of publications (Woillez, 2025; Pham-Thi et al., 2025). Most studies have focussed on the urban heat island (UHI) effect and health/work impacts, with Hanoi studied the most, and a few national studies.

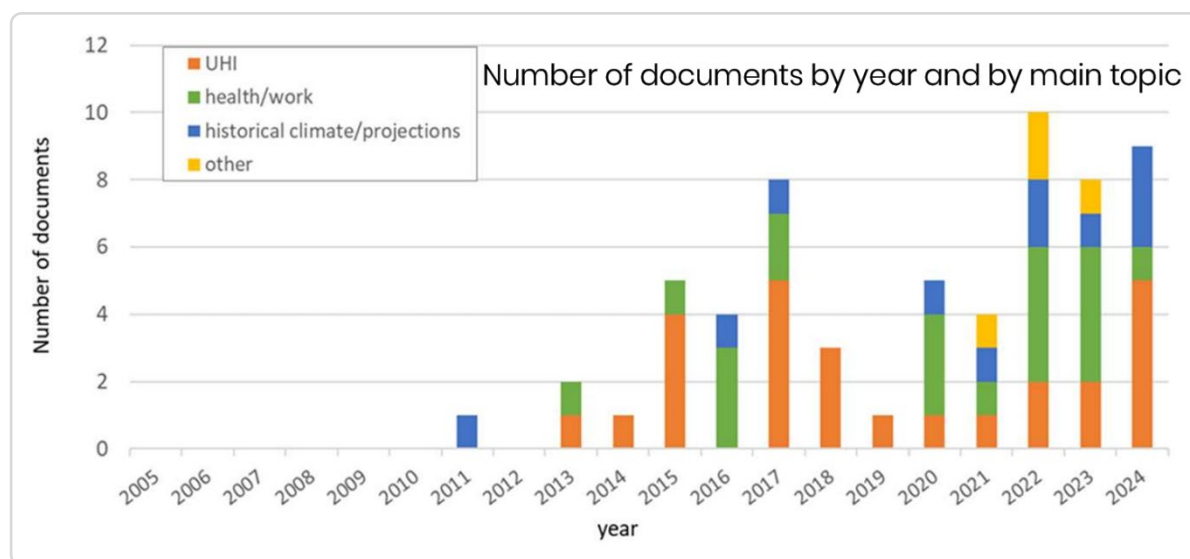


Figure 1. Number of publications on extreme heat in Vietnam from 2005 to 2024. Source: Woillez (2025)

Hazard knowledge, trends, and climate projections

Vietnam has seen an increase in temperatures over the past decades, with the southeast, central highlands, and south-central coast emerging as hotspots for heatwave impacts (Nhung et al., 2023; Tran et al., 2020). Future projections using the Wet-Bulb Globe Temperature (WBGT), a thermal stress indicator which combines temperature, humidity, wind, and solar radiation, show that significant increases are likely in the future, notably in the two most densely populated and agriculturally intensive subregions of the country, the Red River and Mekong deltas (Nguyen-Le et al., 2025).

Vietnam spans multiple climatic sub-regions, and heatwave characteristics differ by geography. Studies link heatwave occurrence to large-scale climate drivers such as the El Niño-Southern Oscillation (ENSO), a recurring pattern of ocean-atmosphere variability in the tropical Pacific that influences global weather patterns, and to regional mechanisms such as foehn (Laos) winds in north-central areas (Pham-Thanh et al., 2024; Kukowski & Garnett, 2023). Recent studies further show that heat risk is increasingly compounded by other stressors, including interactions with heavy rainfall and socioeconomic pressures such as energy poverty, which can amplify vulnerability during extreme heat periods (Nhung et al., 2023; Nguyen et al., 2023).

The UHI effect

The UHI effect is well-documented for Vietnam, especially for Hanoi and Ho Chi Minh City (Wollez, 2025). Interviews reinforce these spatial and temporal distinctions, emphasizing that risk is shaped not only by intensity but also by duration, timing within the day, and location. Urban heat was also highlighted by interviewees as a growing concern, linked to rapid urbanization and the loss of blue-green spaces, but they noted that factors such as the UHI effect and humidity are not consistently reflected in how heat risk is currently understood or communicated (Pham-Thi et al., 2025).

Health impacts and epidemiological evidence

Evidence on impacts, especially health outcomes, exists but both the literature and interviewees describe it as fragmented and weakly institutionalized. A study found that between 2003 and 2017, heatwave-related mortality in Vietnam was estimated at 34,271 deaths, corresponding to economic losses of roughly United States Dollar (USD) 11.7 billion (Nguyen et al., 2023), with higher mortality rates amongst older people and women, and in the southern provinces. Empirical studies link high temperatures to increased hospital admissions across different regions and outcomes, including respiratory and infectious disease admissions and cardiovascular impacts in specific settings (Talukder et al. 2022; Dang et al., 2019). At the national level, research shows that heatwave exposure is associated with short-term increases in all-cause and infectious disease hospitalizations across multiple provinces in Vietnam, reporting a 2-3 per cent increase in all-cause admissions and a 3-4 per cent increase in infectious disease admissions during heatwaves, with stronger effects observed in northern provinces compared to southern regions (Phung et al., 2017). Another study across eight ecological regions in Vietnam shows that a 1°C increase in daily mean temperature above 19°C is associated with a 0.8 per cent increase in all-cause hospitalizations and a 2.4 per cent increase in infectious disease admissions over a short-term exposure window (0-3 days) (Tran et al., 2023).

A study by the Viet Nam Red Cross Society (VNRCs) in Hanoi surveyed 1,027 outdoor workers and people living in informal settlements to understand perceptions of heat-health impacts, the effects of knowledge and actions, and the use of weather forecasts (more information in section “Warning communication and dissemination”) (Lohrey et al., 2021). The study suggests that even though occupation type does not predict heat illness, builders had considerably lower heat risk knowledge compared to street vendors but were twice as likely to consult a doctor compared to street vendors (Lohrey et al., 2021). Knowledge of preventive actions and taking these actions were both associated with higher reporting of symptoms, while drinking more water did not reduce symptoms. The study also found that child carers and homeowners experienced self-reported income losses during heatwaves.

Recent economic research in central Vietnam has quantified the household-level burden of heat, estimating annual per capita costs of heat-related illness at nearly Vietnamese Dong (VND) 30 million and finding an average willingness to pay of approximately VND 283,000 (+/- USD 11) per person per year for a short message service (SMS)-based heat early warning system (Kien et al., 2023).

Vulnerability and differential exposure

Risk assessments for heat remain uneven across Vietnam. While vulnerability mapping and prioritization are well established for floods and storms at sub-national and community levels, interviewees noted that equivalent practices for heat are largely absent. Existing efforts for heat are concentrated in major urban areas and within the health sector, leaving significant gaps for rural regions, informal workers, and livelihood impacts such as agriculture and labour productivity (Feeny et al., 2021; Opitz-Stapleton et al., 2016). Interviews emphasized how vulnerability differs

sharply across population groups. Outdoor workers, such as construction labourers, shippers, and street vendors, face prolonged direct exposure, often without access to cooling or rest, while older adults were described as experiencing more severe symptoms and having more difficulty recovering overnight. In dense urban areas, interviewees described how rapid urbanization, loss of blue-green space, and heat-absorbing built surfaces intensify exposure, while differences in living conditions and access to coping options mean that some population groups experience a consistently higher heat burden than others. Rural households may face additional constraints: agricultural workers often reduce working hours due to extreme heat, but interviewees observed that they lack tailored information and guidance, and the impacts on crops, livestock, and livelihoods remain poorly documented (Feeny et al., 2021; Opitz-Stapleton et al., 2016; Dally et al., 2024).



Figure 2. A woman cooling off beside a fan on a bustling Hanoi street, Hanoi, Vietnam, 2026. Source: Talha Kılıç, <https://www.pexels.com/photo/street-life-in-hanoi-local-woman-resting-38095525/>

Vietnam's Ministry of Health has labour hygiene standards that specify ambient temperature and humidity conditions for different work intensities, but evidence suggests that these protections are rarely applied in informal employment where exposure is high (Lohrey et al., 2021; Ministry of Health, 2002). Interviews also note how heat risks are often under-recognized especially among older adults or people with pre-existing conditions, making it harder to advocate for heat as a priority without better surveillance (Talukder et al., 2022; Dang et al., 2019).

Recent projects have contributed to building heat risk knowledge and assessment in Vietnam. The Forecast-based Financing (FbF) and Early Action Protocol (EAP) pilot launched in 2017 in Hanoi, led by the VNRCs, GRC, and the Vietnam Institute of Meteorology, Hydrology and Climate Change (IMHEN), combined spatial heat mapping with demographic and social data to identify hotspots and vulnerable groups to release funding for early actions (VNRCs, n.d.). In 2018, the Vietnamese government and AFD launched the GEMMES Viet Nam 2 project, funded by AFD through Facility 2050, to assess long-term climate change impacts and adaptation strategies through 2050, including research on extreme heat (AFD, n.d.). Interviewees also highlight ongoing efforts by ISET as part of their Alliance programming to build a heat risk management database that overlays spatial heat hotspots with information on different vulnerable groups with the aim of better prioritizing future heat risk management planning. Finally, Plan International noted that in 2027 it will conduct preliminary research combining a literature review with participatory consultations with vulnerable

groups, to inform Alliance extreme heat programming that will begin in 2028. While these initiatives represent important progress filling urgent gaps in reducing heat-related risks, they are often exploratory, localized, and project-based rather than fully institutionalized.

Gaps and challenges

Interviewees emphasized that heat-related impacts are still not routinely integrated into Vietnam's DRM databases, and that official systems do not currently capture heat-related morbidity or losses in the way they do for floods and typhoons. Overall, Vietnam has a growing scientific foundation for understanding heat risks, but significant gaps remain in translating this knowledge into systematic, spatially explicit risk vulnerability and risk assessments that can guide planning and early warning, particularly beyond major urban centres (Nguyen-Duy et al., 2025; Pham-Thi et al., 2025).

Observations, monitoring, analysis, and forecasting

Vietnam's heat monitoring and forecasting framework is anchored in temperature-based categories. The NCHMF is responsible for operational weather forecasting and issuing official warnings, while IMHEN leads research, climate projections, and supports national climate policy.

Information on the numerical weather prediction models used operationally in Vietnam is limited. The most detailed description available comes from hydrometeorological system documentation from 2013 (UNISDR, 2013), which reports that at the time, the national forecasting service relied on a suite of global models (including the Global Forecast System, the European Centre for Medium-Range Weather Forecasts model, and the Japan Meteorological Agency's model), ensemble prediction systems (such as multi-model and perturbed-physics ensembles), and limited-area or regional models (including regional weather research and forecasting configurations and other locally adapted models).

Extreme heat in Vietnam is classified according to both the intensity and spatial extent of maximum daily temperatures (Phuong, 2024; Hoa, 2017) (see Table 1 below). Days are classified as hot ($35 < T_x \leq 37^\circ\text{C}$), intensely hot ($37 < T_x \leq 39^\circ\text{C}$), or exceptionally intensely hot ($T_x \geq 39^\circ\text{C}$). Heat is considered widespread when at least half of monitoring stations within a forecast region record $T_x \geq 35^\circ\text{C}$, whereas exceedance at fewer than half of stations is classified as localized heat. Severe widespread heat occurs when at least two-thirds of stations record $T_x \geq 35^\circ\text{C}$ and at least half are forecasted to record $T_x \geq 37^\circ\text{C}$. A heatwave is defined as widespread heat persisting for two or more consecutive days, while a severe heatwave includes at least one day meeting the severe widespread heat criteria.

Classification	Definition
Hot	$35^\circ\text{C} \leq T_x < 37^\circ\text{C}$
Intensely hot	$37^\circ\text{C} \leq T_x < 39^\circ\text{C}$
Exceptionally intensely hot	$T_x \geq 39^\circ\text{C}$
Localized heat	$<50\%$ of monitoring stations within forecast region forecast $T_x \geq 35^\circ\text{C}$
Widespread heat	$\geq 50\%$ of monitoring stations within forecast region forecast $T_x \geq 35^\circ\text{C}$
Localized intense heat	Widespread heat but $<50\%$ of monitoring stations forecast $T_x \geq 37^\circ\text{C}$
Severe widespread heat	$\geq 2/3$ of monitoring stations forecast $T_x \geq 35^\circ\text{C}$ and $\geq 50\%$ forecast $T_x \geq 37^\circ\text{C}$
Heatwave	Widespread heat ($T_x \geq 35^\circ\text{C}$) lasting ≥ 2 consecutive days
Severe heatwave	A heatwave in which at least one day meets the criteria for severe widespread heat

Table 1. Operational heat classifications and definitions used by the Vietnam's NCHMF



These classifications are incorporated into the national heat forecast and warning products specified in Circular 25/2022/TT-BTNMT (Linh, 2024). A heat warning bulletin is issued when hot weather is detected as likely to occur within the next 48 hours. Operational heat bulletins include the expected maximum temperature, minimum relative humidity, anticipated duration and timing of the event, affected areas, and the corresponding disaster risk level (levels 1-4). Disaster risk levels (Levels 1-4) are assigned based on combinations of forecast maximum temperature ($\geq 35^{\circ}\text{C}$), event duration (3-5, 5-10, 10-25, or >25 days), and climatic region (Northern Vietnam, Central Vietnam, Central Highlands and Southern Vietnam) (Prime Minister of Vietnam, 2021). Forecasts are produced internally by reviewing different data sources and scenarios before issuing official bulletins (Linh, 2024). Bulletins are issued at fixed times, usually three times daily, with additional releases during severe or prolonged events.

Despite this structured framework, interviewees described the early warning system as relatively general in scope and suggested that it may not fully capture heat stress in Vietnam's climatic context. They emphasized that forecasts rely primarily on air temperature, without accounting for humidity or integrated heat stress metrics such as the HI, nor for factors such as land-use change and the UHI effect, which can substantially influence experienced heat.

Alongside operational temperature-based thresholds by NCHMF, a broader range of heat indicators is used in academic research and project-based initiatives in Vietnam. Academic studies frequently apply metrics that account for humidity, such as the HI and the WBGT, to capture heat stress (Nguyen-Le et al., 2025; Pham-Thi et al., 2025; Opitz-Stapleton et al., 2016). However, these indices require additional meteorological inputs (e.g., humidity, radiation, wind), which are less available and are more data-intensive to compute, which can make them more operationally demanding, and less predictable at longer forecast lead times compared to air temperature alone.

Operational use of the HI was pioneered through the FbF-Ready project (2018-2021), during which the VNRCs, GRC and IMHEN developed a HI-based trigger for Hanoi (Anticipation Hub, n.d.). This work subsequently formed the basis of the International Federation of Red Cross and Red Crescent Societies (IFRC)-approved EAP, which was implemented between 2021 and 2026 (Dinnissen et al., 2020). As part of the project, IMHEN developed a localized HI forecasting product because humidity was recognized as an important determinant of human heat stress not captured by air temperature alone. The project developed city-specific HI forecasting products and trigger thresholds for Hanoi, Hai Phong and Da Nang, where HI thresholds exceeded the 97th percentile in Hanoi and Hai Phong ($\sim 48.2^{\circ}\text{C}$) and the 99th percentile in Da Nang ($\sim 47.1^{\circ}\text{C}$) for two consecutive days (Anticipation Hub, n.d.). At the time, the HI forecast product was developed specifically for the EAP and was only available to the Red Cross, although wider dissemination was envisaged. The 2025 evaluation found that trigger conditions were approached at least twice between 2022 and 2025, but unexpected temperature fluctuations and VNRCs's internal approval procedures prevented activation of the EAP (IFRC, 2025). Subsequent programme documentation confirms continued HI monitoring in collaboration with IMHEN in Hanoi, Hai Phong and Da Nang, alongside a review of the trigger thresholds for a future iteration of the protocol, although implementation remains location-specific rather than national.

FbF Pilot in Hanoi trigger protocol

The FbF pilot in Hanoi, implemented by VNRCs and GRC in collaboration with IMHEN, used a HI forecast for the first time in Vietnam. IMHEN developed a localized HI forecasting model using temperature and relative humidity, and defined a threshold based on the 99th percentile of historical values to trigger early actions.

The **2x2 trigger protocol** combines:

- **Heat Index threshold:** forecasted HI exceeds the 99th-percentile value for 2 consecutive days
- **Temperature threshold:** forecasted maximum temperature is $\Rightarrow 37^{\circ}\text{C}$

Thresholds are assessed at two lead times:

- **6-day readiness trigger:** initiating preparedness actions
- **3-day activation trigger:** automatically releasing funding and activating early actions

If either threshold is not met at either lead time, the protocol is not activated (VNRCs & GRC, 2019).

Key challenges are identified for this pillar. First, both the literature and interviewees noted that the current focus on maximum air temperature does not fully capture important aspects of heat stress, including humidity, night-time heat, and UHI effects (Pham-Thi et al., 2025). Operational thresholds are not explicitly linked to health outcomes, limiting their ability to reflect population health risk. Additionally, there is insufficient spatial specificity, with monitoring and warnings perceived as too general to differentiate urban hotspots or diverse exposure contexts. Finally, sustainability remains a challenge; more advanced approaches, such as HI-based triggers and community-level risk assessments, have largely been developed through externally funded projects and are difficult to maintain without stable institutional resources.



Warning dissemination and communication

Heat information in Vietnam is disseminated through a layered institutional system in which the NCHMF provides the technical forecast products, and disaster management agencies and line ministries support onward communication and guidance. Interviewees described the hydrometeorological services as the primary source of information at national and provincial levels, with information then relayed to disaster management agencies that issue guidance through formal administrative channels to lower levels of government. In terms of official products, national procedures specify the content and procedures for developing and issuing heat forecast and warning bulletins, including their required content and issuance schedules (Circular 25/2022/TT-BTNMT) (Linh, 2024). Daily heatwave forecasts are issued three times per day (08:00, 14:00, 20:00), while warnings follow a process with different stages: an initial warning is issued when heatwave potential is detected, with subsequent warnings issued once per day at 14:30, and additional bulletins possible during exceptionally severe or prolonged events (Linh, 2024).

Public-facing communication relies heavily on mass and digital channels but reach and usefulness vary by audience and geography. Interviews consistently highlighted national television and radio as the most common dissemination routes; however, government agencies are increasingly also using social media, especially Facebook and *Zalo*, a widely used messaging platform in Vietnam, to share heat-related updates and warnings. Plan International Vietnam also described the use of commune loudspeakers as additional channels for local-level communication. Sectoral dissemination was described as particularly important, with ministries circulating sector-specific instructions (e.g., agriculture-related guidance on livestock, crops, and water storage, and health-related advice on hydration, protective clothing, limiting outdoor exposure, and recognizing symptoms). Finally, a study done in Hanoi found that different demographic groups rely on different information sources, with older people leaning toward TV/radio, and younger people toward social media/apps, confirming the importance of multi-channel communication matters for heat (Lohrey et al., 2021).

Interviews also emphasized that communication remains too generic and insufficiently targeted to those most at risk. Interviewees described messages as staying ‘at a general level’, with broad advice (e.g., drink more water, change working time) and little differentiation by livelihood, location, or vulnerability profile. This is the result of limited clarity on who vulnerable groups are and where they are located, which constrains the effectiveness of messages and whether they are understood and acted upon. Other interviewees mentioned that while vulnerable audiences are often known (e.g., older people, outdoor workers, children, pregnant women, factory labourers), effective targeting is limited by gaps in producing and accessing localized spatial heat information, including intra-urban variations.

Language and comprehension barriers were also highlighted: terminology such as ‘heatwave’ may not be meaningful in some communities unless translated into locally understandable language tied to symptoms and daily experiences, and Vietnam’s linguistic diversity across ethnic minority groups complicates consistent risk awareness and communication. From a health sector perspective, one interviewee perceived agriculture-related outreach as more established due to stronger networks, while general public messaging was characterized as more ‘general broadcast’.

Overall, interviewees stressed that Vietnam has not yet integrated community feedback into heat warning thresholds and messaging, which limits progress toward impact-based communication, a gap supported by the literature which calls for more targeted and actionable warning communication to better protect at-risk groups (Kien et al., 2023).

Preparedness and response capabilities

Preparedness and response for extreme heat in Vietnam remain uneven and only partially institutionalized. While national technical procedures exist for forecasting and warning (Linh, 2024), no equivalent, formalized, nationwide heat anticipatory or response protocols currently define what actions should be taken at different warning levels. As a result, operational practice is characterized by a mix of general public advice, city-level initiatives, and the project-based anticipatory action model led by the Red Cross, rather than a coherent, national, or local heat action plan. This picture aligns with the broader Vietnamese planning landscape, where heat appears in climate and disaster frameworks but remains marginal compared to hazards such as floods or typhoons (Pham-Thi, 2025; Kien et al., 2023). Interviewees across sectors consistently highlighted that response capability remains ad hoc, urban-focused, and largely dependent on external projects and funding. Interview evidence indicates the absence of a heat action plan at national or provincial levels:

‘By law, every year the government at the local level and national level has to develop the disaster risk management plan that talks about different type of hazards, like flooding, typhoons, cyclone, landslide, etc. But so far heat is not [...] visible much in that plan. So, you can say that there’s no Heat Action Plan so far in Vietnam.’

Annual DRM plans legally required for hazards such as floods, typhoons, and landslides often do not mention heat. Consequently, existing responses are ad hoc actions with limited coordination and no formal escalation pathway. Where actions exist, they are often general public-health advice (e.g., ‘drink more water’, ‘change working hours’), lacking specific responsibilities or triggers. Other interviewees similarly noted that heat only appears in high-level climate plans, and sectoral mandates remain undefined.

Urban initiatives have been developed through People’s Committees¹ in Hanoi and Ho Chi Minh City with predefined actions such as reducing school or outdoor work hours, issuing public health advisories, or preparing hospitals. Interviewees also mentioned mobile medical support implemented in collaboration with the Red Cross.

The most operational and documented heat action model in Vietnam comes from the FbF-READY, 2018-2021 initiative and the subsequent EAP, 2021-2026 (for trigger information, see section “Observation, monitoring, analysis, and forecasting”). The EAP is embedded within VNRC’s five-year FbF strategy and linked to its Disaster Response Plans, providing an institutional framework for anticipatory heat action (IFRC, 2021).

Once triggered, the protocol implements a package of anticipatory actions targeting vulnerable urban populations, particularly outdoor workers and residents of informal settlements (IFRC, 2021). Interventions include fixed and mobile cooling centres, provision of drinking water, cold tea and cooling materials, first aid, heat-health information, door-to-door outreach, loudspeaker announcements, social media campaigns, and referral to emergency medical services where required. Target areas are selected through impact mapping combining hazard, exposure, and vulnerability data to identify the highest-risk wards across Hanoi, Hai Phong, and Da Nang.

¹ In Vietnam, People’s Committees are the executive administrative bodies at provincial/municipal, district, and commune levels. The Hanoi People’s Committee is the municipal-level authority responsible for local governance and implementation of sectoral plans and programmes across the city.





Figure 3. Builders take much-needed rest in a Red Cross Cooling Centre to recover from long hours working under the sun in Hanoi, 2019. Source: https://www.forecast-based-financing.org/wp-content/uploads/2020/04/Factsheet_Vietnam.pdf

Interviewees identified the FbF/EAP as the most advanced example of structured anticipatory heat action currently operating in Vietnam. However, implementation remains geographically limited to a small number of urban areas and dependent on externally funded projects, highlighting challenges for long-term sustainability and integration into national heat early warning and response systems. Recent reductions in humanitarian funding have added uncertainty regarding the long-term sustainability and scaling of externally funded anticipatory action programmes.

Education and community engagement on heat preparedness exist but are uneven and are also strongly project dependent. Interviewees described multiple ongoing initiatives, including school-based drills, integration of heat awareness content into curricula, and dissemination through the Comprehensive School Safety (CSS)² framework. These efforts primarily target children, with the aim of building long-term risk literacy. Adult engagement was described as more challenging, particularly in ethnic minority communities, where linguistic diversity and different perceptions of heat risk may pose a challenge to effective communication. Effective timing of outreach is also difficult in areas where heat risk is seasonal.

Finally, one interviewee also highlighted efforts by non-governmental organizations (NGOs) to strengthen local ownership through participatory assessments, combining expert review with consultations with vulnerable groups. In contrast, another interviewee described community engagement on heat as still very limited. Few NGOs or civil society actors focus on heat specifically, and most community-level preparedness revolves around other hazards.

² The Comprehensive School Safety (CSS) framework is a global approach to reducing disaster risk in and through schools. It promotes safe learning facilities, school disaster management, and risk reduction/resilience education, and is widely used by governments and humanitarian/education actors to structure school-based preparedness and DRR programming.

Multi-hazard approach

Heat is present in Vietnam's climate and disaster frameworks but is rarely treated through an integrated multi-hazard lens. The hydro-meteorological service focuses primarily on daytime air temperature, while broader compounding factors such as humidity, land-use change, nighttime temperatures, and urban density are not systematically incorporated into analysis or communication:

'People don't really talk specifically about different factors that make heat worse, such as land-use change, urbanization, high humidity, and the urban heat island effect.'

At national level, heat is typically addressed with all other climate impacts rather than through hazard-specific mandates. This finding is consistent with the literature, where national climate strategies, urban plans, and sectoral guidelines acknowledge extreme heat but provide limited operational detail for compounding or cascading heat risks (Pham-Thi, 2025).

The awareness around the risk of compound events is emerging, especially in academic research, and particularly around concurrent heat-precipitation extremes in Vietnam (Nguyen-Duy et al., 2025; Dtinews, 2025), and on heat-health and heat-energy interactions in Vietnam (Feeny et al., 2021). Interviewees agreed that these linkages are not yet operationalized in early warning or preparedness planning. Interview evidence also shows that exceptions may exist in the agricultural sector, where high heat is occasionally linked to drought and moisture stress in bulletins. Interviewees saw strong potential to use Vietnam's existing DRM system to integrate heat more systematically once better evidence and institutional attention are mobilized. As noted, with stronger impact assessments, Vietnam could 'benefit a lot from the existing DM system' by embedding heat response within established structures.

Gender and social inequalities addressed inclusively

Gender equality and social inclusion (GESI) considerations are recognized in principle but remain weakly operationalized in heat risk governance. Both interviewees and research identified core vulnerable groups, including older people, children, outdoor workers, and low-income urban populations (Feeny et al., 2021; Lohrey et al., 2021; Opitz-Stapleton et al., 2016), but also stress that systematic socioeconomic vulnerability assessments are still limited. The VNRCs EAP similarly prioritizes vulnerable urban populations, including outdoor workers, older people, and residents of informal settlements, with interventions specifically designed to reduce heat exposure among these groups. Establishing formal and inclusive feedback mechanisms could further strengthen heat vulnerability awareness and action by enabling at-risk communities to contribute to the evaluation and continuous improvement of heat warnings and response measures.

Ethnic minority communities were highlighted as facing additional barriers due to language, remoteness, and limited access to information. Interviews underlined the importance of tailoring communication and dissemination to local contexts and ensuring participation 'from the beginning' to build trust. Whilst there is a school-based programme, supported through Vietnam's adoption of the CSS framework, which provides the opportunity to increase heat awareness for children, interviewees noted that adult education remains more challenging.

Local community involvement

Local community involvement in heat risk governance remains limited, concentrated mainly in project-based or sector-specific initiatives. Not many actors have been working on heat in Vietnam,



including at community level, and civil society engagement on heat is far less developed than for other hazards. One notable example is the VNRCs EAP, which was informed by a Knowledge, Attitudes and Practices survey of more than 1,000 vulnerable people, including street vendors, construction workers, motorcycle taxi drivers and residents of informal settlements, in 12 districts of Hanoi (IFRC, 2021). The survey helped identify community needs, perceptions and barriers, and informed the design of targeted anticipatory actions.

Where engagement occurs, it is largely mediated through partnerships with government agencies. Local organizations stressed that work is conducted jointly to support ownership and long-term maintenance of tools such as disaster management and vulnerability databases. Other interviewees similarly described participatory approaches starting with local needs assessments, identification of vulnerable groups, and collaboration with district authorities, particularly in urban areas where heat risks are more visible.

However, interviewees highlighted that heat remains a relatively new area of focus, requiring specialized expertise. Engagement from local authorities can be difficult to secure, limiting opportunities for co-design and sustained community participation. It was also noted that bottom-up demand, driven by lived experiences of heat, may help strengthen institutional attention.

Effective governance and institutions

Interviewees consistently described governance for heat risk in Vietnam as fragmented. Relevant institutions exist, including a relatively strong hydrometeorological service and experienced disaster management personnel, but coordination across hydro-met service, health authorities, and emergency management remains limited, often occurring informally rather than through structured mechanisms. Interviewees also noted that while heat is recognized within broader climate or disaster risk reduction strategies, it is usually embedded within sub-national DRM plans, but with no dedicated mandates for heat-specific preparedness and response.

A recurring governance barrier identified is the lack of strong evidence on heat impacts. Holistic evidence about the various impacts of heat, disaggregated by GESI factors, is still missing, making it difficult to understand the unique challenges diverse groups and sectors face, and thus making it challenging to develop evidence-based policy and action. This aligns with literature highlighting limited impact data, incomplete heat-health surveillance, and gaps in socioeconomic vulnerability assessments across Vietnam (Lohrey et al., 2021; Kien et al., 2023). Interviewees suggested that strengthening evidence and generating clearer assessments of heat impacts would allow them to integrate heatwave response into existing DRM structures, which are described as well functioning and equipped with expert staff.

Key recommendations

- **Strengthen the relevance, accessibility, and usability of heat warning products:** Vietnam has formal heat thresholds and forecasting procedures, but interviews indicate that existing products are not consistently recognized or used as a coherent heat warning system. Strengthening the relevance, accessibility, and usability of heat warning products, including consistent messaging, practical action guidance, and improved accessibility, would increase trust and uptake. Over time, Vietnam's NCHMF could further enhance the system by incorporating more representative heat-stress indicators, drawing on experience with humidity-adjusted indices such as the **HI** developed through the IMHEN/FbF/EAP initiative.
- **Institutionalize heat within DRM and clarify roles from warning to action:** Although Vietnam has well-established DRM structures, heat is not yet fully embedded within their mandates, limiting coordinated action by disaster management agencies, health services and local authorities once warnings are issued. Formally recognizing heat within national DRM and clarifying sector-specific responsibilities and trigger-action protocols (e.g., for health, labour, agriculture, etc.) would help ensure that forecasts consistently translate into timely and coordinated action. Pilot projects should actively engage Vietnam Disaster and Dyke Management Authority and other national policy institutions from the outset to support institutional uptake and long-term scaling beyond individual projects.
- **Strengthen multi-hazard and compound risk planning for heat:** Heat is acknowledged in Vietnam's climate and disaster frameworks, but operational integration with other hazards remains limited. Interviews noted emerging awareness of heat-humidity, heat-rainfall, and heat-energy stress interactions, but these links are not reflected in adjusted thresholds, triggers, or coordinated actions. Developing simple, practical protocols for key compound risks, such as heat combined with drought, power outages, or heavy rainfall, would help agencies anticipate cascading impacts and support more resilient local response.
- **Strengthen evidence and vulnerability profiling for targeted action:** Vietnam lacks systematic data on heat impacts, making it difficult to identify and reach those most at risk. Developing basic heat-impact monitoring and demographic, occupational, and spatial vulnerability profiles (i.e. disaggregated by sex, age, disability, location, etc.) would support more targeted warnings. Establishing inclusive and accessible feedback mechanisms would further strengthen the system by enabling vulnerable groups and local stakeholders to provide regular input on warning products, communication channels and response measures, supporting continuous improvement of the heat early warning system.
- **Strengthen last-mile communication and dissemination:** While Vietnam has established heat forecasts and warning products, interviews highlighted gaps in how warnings are communicated, understood, and acted upon by different communities. Developing clear dissemination protocols, strengthening coordination with local authorities, community organizations and trusted local actors, and expanding the range of communication channels would improve the accessibility and effectiveness of heat warnings. Communication should be tailored to local languages, literacy levels, and cultural contexts, and use multiple dissemination platforms, including community networks, schools, loudspeaker systems, social media and other locally appropriate channels, to ensure that remote communities, ethnic minority groups, and other vulnerable populations receive timely and actionable information.



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Front cover image: *Urban market scene, Ho Chi Minh City, Vietnam, 2025*. Source: Thien Phuoc Phuong.

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