Climate Resilience Alliance

Philippines

Heat early warning system: Current status and recommendations

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PLAN INTERNATIONAL

Practical ACTION

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Introduction and objectives

This case study examines the current state of the heat early warning system (HEWS) in the Philippines, 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, which applies a common analytical framework to assess heat early warning systems across key pillars and identify good practices, gaps, and enabling conditions for people-centred, impact-based early warning for extreme heat.

Key messages

- **There is growing heat risk knowledge in the Philippines around heat as a hazard, mortality impacts, and city-level assessments,** but these are not yet consolidated into a comprehensive, national, impact-oriented heat risk assessment. Evidence gaps remain.
- **Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) operates a national Heat Index-based monitoring system**, with daily information communicated through the interactive high-resolution iHeatMap and advisories during the dry-season (March-June). However, thresholds are not yet fully calibrated to local impacts, and heat risk may extend beyond the seasonal monitoring window.
- **Communication is institutionalized and delivered through multiple channels**, but greater attention is needed to ensure warnings are understood, trusted, and translated into protective actions by vulnerable populations, particularly in remote and underserved communities.
- **Preparedness measures are active but remain fragmented across sectors rather than unified under a national Heat Action Plan**. Schools suspend classes at danger-level heat index (HI) thresholds, the Department of Health (DOH) mandates cooling stations and clinical guidance, and labour advisories encourage workplace heat protections. Humanitarian actors implement anticipatory cash and awareness campaigns. However, cross-sector coordination remains limited, response is often discretionary at the local government level, and equity trade-offs (e.g., school closures affecting low-income students) are not systematically addressed.
- **Heat governance is emerging but not yet institutionalized within the national Disaster Risk Reduction and Management (DRRM) system.** While the Philippines has strong disaster management legislation and institutional framework, heat is not fully embedded as a core hazard within DRRM planning or financing. Compared to cyclones and floods, heat preparedness and early action remain underfunded, seasonally framed, and implemented 'piece by piece', rather than through a unified national strategy aligned with escalating climate risks.

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 the Philippines. Three interviews were conducted between October and January 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:

- Plan International
- Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)
- Global Heat Health Information Network (GHHIN), Southeast Asia Hub Secretariat

List of acronyms used

AA - Anticipatory Action

CCC - Climate Change Commission

DepEd - Department of Education

DOH - Department of Health

DOLE - Department of Labor and Employment

DRRM - Disaster Risk Reduction and Management

ECMWF - European Centre for Medium-Range Weather Forecasts

GESI - Gender Equality and Social Inclusion

HI - Heat Index

LGU - Local Government Unit

NGO - Non-governmental Organization

NOAA - National Oceanic and Atmospheric Administration

PAGASA - Philippine Atmospheric, Geophysical and Astronomical Services Administration

PRC - Philippine Red Cross

PWD - Persons with Disabilities

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

Heat hazard and future projections

Extreme heat is an increasingly significant climate hazard in the Philippines, with national temperature trends showing a long-term rise of 0.1°C per decade and an overall 0.75°C increase in annual mean temperature over the past decades (Republic of the Philippines, 2023). Climate projections anticipate increases in heat exposure, with up to 11 million people in the Philippines affected by heat above 42°C by 2030, rising to 74 million by 2050 under high-emissions scenarios (Climate Change Commission, 2024). Event attribution studies provide further evidence that climate change is exacerbating extreme heat in the Philippines. For example, the April 2024 heat event, which caused widespread impacts across the country, was found to have been substantially more intense and more likely because of climate change (Pereira Marghidan et al., 2024).

Heat exposure is highest during the hot dry season (March–May), where HI values can reach 42-51°C, classified as danger or extreme danger levels by PAGASA, the national weather forecasting centre (De Vera-Ruiz, 2025). Urban areas, such as Metro Manila, experience amplified heat stress due to the urban heat island effect, with increases of 0.3-2.4°C in daytime temperatures and 2-3°C at night, and heatwave durations extended by 1-7 days compared to rural surroundings (Magnaye and Kusaka, 2024). Barangay-level analyses in Quezon City show 81 percent of units falling under high-risk categories when combining land surface temperature, vegetation loss, built-up density, and socioeconomic vulnerability (Treyes, 2025).

Vulnerability and impacts

Sector-specific evidence from literature and interviewees show that heat vulnerability in the Philippines is highly differentiated across demographic, socioeconomic, and spatial groups. Empirical research shows substantial heat-related health impacts. One interviewee emphasized that the Philippines now has documented heat-related illness cases, noting that '*they have on record there were 513 heat-related illness cases in 2023,'* which made the scale of the problem visible and difficult to ignore (Climate Change Commission, 2024). Mortality studies show heightened sensitivity among children, older adults, and men, with significant associations between high temperatures and mortality in Manila, Cebu, Davao, and Quezon City (Seposo, Dang and Honda, 2017). In Mindanao, future projections estimate year-long heatwaves by 2050 under worst-case scenarios (Guadalupe, Ozaki and Tanimoto, 2018), potentially exacerbating regional disparities. A 2018 large-scale survey confirmed that 91 per cent of urban residents already experience severe heat stress, a number strongly correlated with population density and limited cooling access (Zander et al., 2018).

Other studies identify children and older adults as particularly sensitive to high temperatures, with mortality analyses showing statistically significant heat mortality relationships for ages 0-14 and for men in Manila, Cebu, Davao, and Quezon City, where cardiovascular deaths are twice as common as respiratory cases during heat extremes (Seposo, Dang and Honda, 2017). Interviewees also highlighted severe impacts on schoolchildren, referencing pilot studies where cities in the National Capital Region were selected due to high numbers of recorded heat-related illnesses among students. This aligns with evidence that poor ventilation and overcrowding in classrooms intensify heat impacts, prompting schools in several cities to be selected for pilot monitoring due to high numbers of recorded heat-related illnesses among students:

'We identified those that had a significant number of heat-related cases among their students during the warm season. So, we selected that as a pilot city, and then we collected the data from them on heat-related illnesses that were recorded.'

Outdoor workers are also recognized as a high-risk group, particularly those engaged in labour-intensive work under direct sun exposure (Seposo, Dang and Honda, 2017), and interviewees reiterated that informal workers remain highly exposed while commuting and other daily movement due to long travel times and widespread reliance on non-air-conditioned public transport, such as jeepneys, buses, and tricycles (Zander et al., 2018).

Heat exposure in urban centres is also intensified by population density and limited access to cooling. Vulnerability also reflects socioeconomic and environmental conditions. City-level assessments show that while the highest heat hazard levels are concentrated in Metro Manila, the most vulnerable cities are located outside the capital region due to higher poverty incidence, younger and older population shares, lower per capita incomes, and limited green space (Estoque et al., 2020).

Gaps and challenges

Several interviewees pointed to the heat events of 2023-2025 as a clear turning point. One interviewee reflected that awareness has '*definitely increased in the past three years, because the heat waves in 2023 and 2024 were really substantial*,' adding that these events were '*beyond what people have normally encountered*' and '*jolted people a little bit awake that this is something to tackle*'. Health evidence was described as instrumental in shifting perceptions. Still, interviewees emphasized that public understanding of heat risk remains uneven, and heat is also often perceived as normal during the dry season. In addition, heat is also often discussed indirectly, particularly in relation to drought and agriculture. Interviewees stressed the absence of a national heat risk assessment, limited access to health data, and a lack of vulnerability mapping beyond some local studies. Literature confirms this, noting that the most vulnerable cities are often outside Metro Manila, have high poverty incidence, limited green space, and low adaptive capacity (Estoque et al., 2020). Heat-related evidence on health and educational impacts seems stronger than, for example, agricultural productivity. Finally, interviewees highlighted prioritization gaps driven by competing hazards. Interviews highlighted that local governments understandably prioritize typhoons, floods, and earthquakes in contingency planning due to their large and visible societal impacts, but also that heat remains comparatively under-recognized.

Observations, monitoring, analysis, and forecasting

Heat monitoring through the HI and the iHeatMap

PAGASA is responsible for the operational monitoring, forecasting, and communication of extreme heat in the Philippines. PAGASA's operational heat information service is based on the HI, which combines air temperature and relative humidity observations from 73 synoptic weather stations across the country (PAGASA, n.d.; PAGASA, 2026). Heat conditions are communicated using four categories based on the National Oceanic and Atmospheric Administration (NOAA) classification and are nearly the same as used in the United States: Caution (27–32°C), Extreme Caution (33–41°C), Danger (42–51°C), and Extreme Danger (≥52°C) (PAGASA, n.d.). Each category is accompanied by descriptions of the expected health impacts and recommended protective actions. For example, the Caution category warns that fatigue is possible with prolonged exposure and physical activity, while Extreme Caution indicates that heat cramps and heat exhaustion are possible. Simple recommended actions are also mentioned such as take water breaks, rest in shaded or cooler areas, and slow down heavy outdoor activity. These thresholds are used for the public but are also used by humanitarian organizations such as Plan International, which use the Danger category as a trigger for anticipatory action (AA) (see more information in section “Preparedness and response capabilities”).

Heat monitoring through the HI went through a gradual evolution, from internal monitoring starting in 2010 to public HI advisories for selected cities in 2013, followed by nationwide operational expansion, integration of numerical weather prediction into forecasting, and increasing automation of the service by 2022 (Estrebillo, 2024). In April 2025, to further strengthen heat monitoring, PAGASA launched the Interactive Heat Index Mapping and Prediction (iHeatMap) (Figure 1). The platform provides nationwide access to current and forecast HI information by combining observations from the national weather station network with high-resolution gridded HI forecasts derived from the European Centre for Medium-Range Weather Forecasts (ECMWF). Key features include interactive maps, colour-coded HI categories, historical observations, forecast summaries, and forecasts for up to four days in advance, while also displaying HI observations from the previous five days (PAGASA, n.d.). The platform additionally incorporates a user feedback component, allowing users to evaluate perceived outdoor heat conditions, forecast accuracy, timeliness and frequency of information, completeness, accessibility, relevance, and usability, as well as submit comments. This provides an opportunity to incorporate user experiences into future service evaluation and improvement.

Interviewees highlighted that the current seasonal operation of the HI advisories may become increasingly misaligned with evolving seasonal patterns. They observed that some locations experience Danger-level HI conditions outside the March–June advisory period, for example in September 2023. Several interviewees therefore expressed interest in extending the service to year-round operation as climate change alters seasonal patterns. At the same time, PAGASA notes that HI observations and forecasts through the iHeatMap remain publicly accessible throughout the year. It advises the public to continue monitoring official announcements from relevant local authorities and to take appropriate precautions when hot conditions occur outside the advisory period (PAGASA, n.d.). PAGASA further notes that, outside the hot season, operational efforts are prioritized towards providing accurate and timely information on hazards associated with the rainy season.

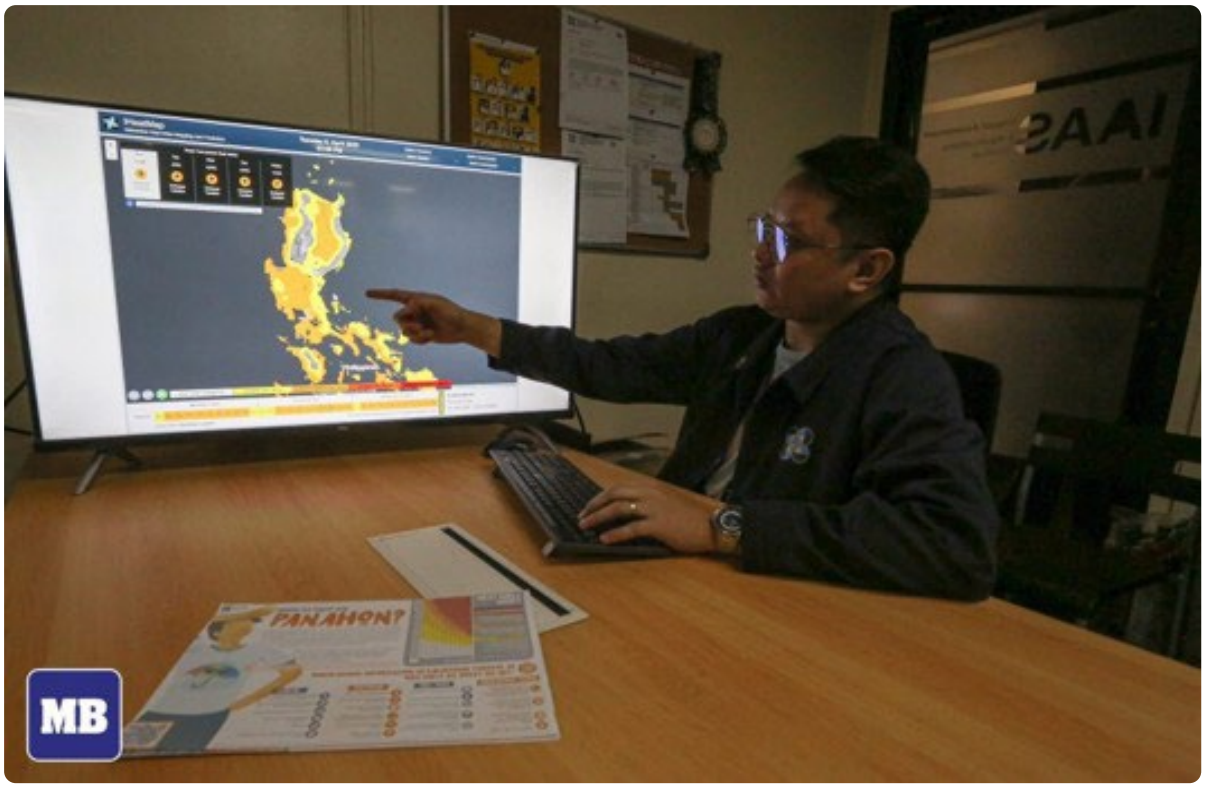

Figure 1. Charlie Pascua, the developer of PAGASA's new Interactive Heat Index Mapping and Prediction (iHeatMap), demonstrates the platform's interface on Monday, April 7, 2025. Source: https://mb.com.ph/2025/4/7/pagasa-launches-i-heat-map-for-real-time-heat-index-monitoring

Forecasting capabilities

Interviewees described a dedicated forecasting unit responsible for producing HI forecasts and advisories, organized through five Regional Services Divisions (Northern Luzon, Southern Luzon, the National Capital Region, Visayas, and Mindanao). Forecast preparation has gradually become more decentralized, with regional offices developing locally tailored forecasts that are subsequently consolidated into a national product. Interviewees emphasized that this regional approach is particularly important in the Philippines, where the archipelagic geography results in considerable spatial variation in climate, humidity, and seasonal timing.

Operationally, PAGASA produces HI forecasts up to four days ahead, while interviewees also referred to seasonal climate outlooks extending up to six months into the future. However, these longer-range products currently appear to play a more limited role in operational heat decision-making than the routine HI service.

Interviewees described forecasting as combining observations from the national weather station network with global numerical weather prediction guidance. ECMWF forecasts (10 km resolution) currently underpin the gridded HI products available through iHeatMap, while regional forecasters adjust forecasts according to local climatic conditions. Interviewees also described the use of persistence-based forecasting that uses recent station history. Forecasters use the HI conditions of the past four days of a particular station applying a persistence method where the next two days are expected not to vary substantially from recent conditions, with an allowance of about one to two degrees.

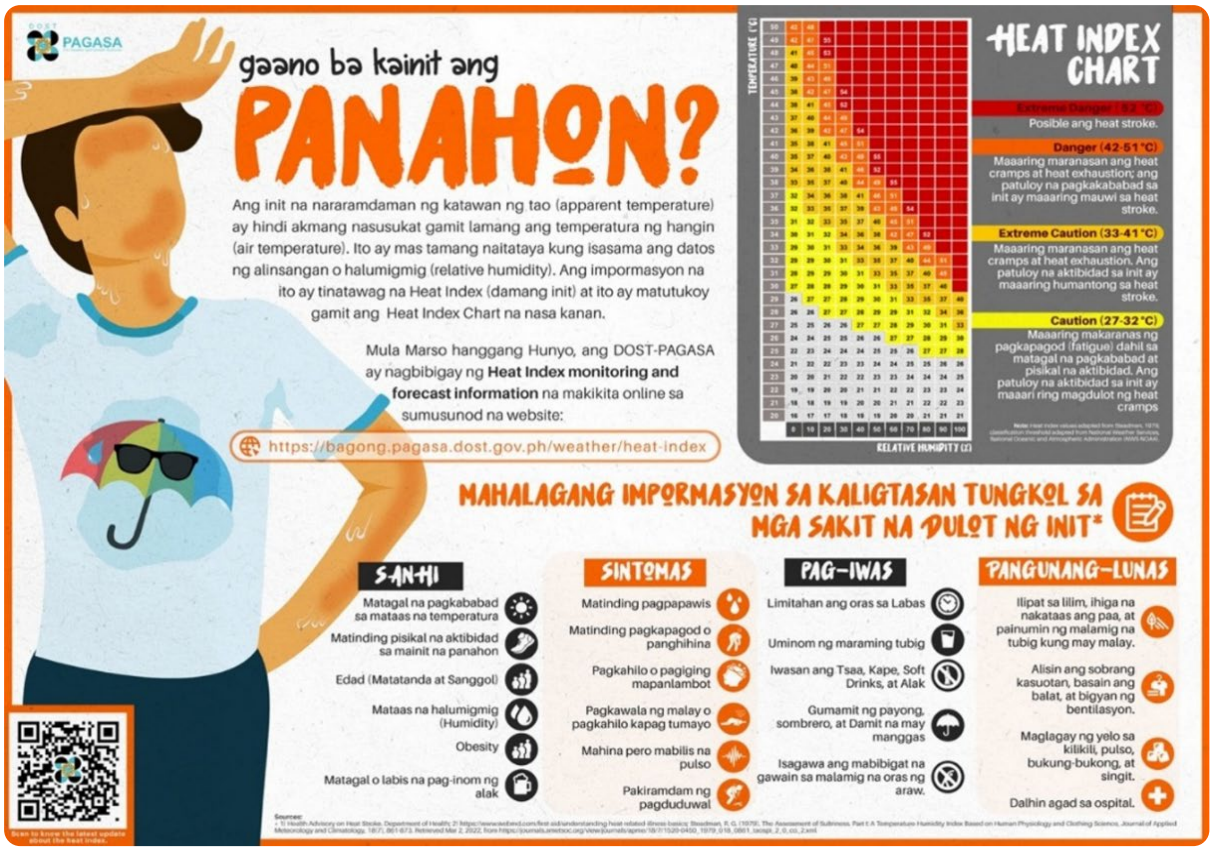

Figure 2. PAGASA public information poster explaining the HI and associated health impacts. Source: https://www.pagasa.dost.gov.ph/weather/heat-index

Heat terminology

The definition of the heat hazard is shaped by the climate of the country. Interviews also clarify that hazard terminology in the Philippines differs from that of temperate-climate countries, particularly definitions of “heatwaves”. In the Philippines, the term “heatwave” is replaced by “extreme heat event” or “extreme heat condition”, using absolute heat stress thresholds rather than multi-day anomaly-based definitions. This is consistent with the broader challenge of defining extreme heat for warning systems in tropical climates where baseline heat is already high and where the most actionable concern for public health is the heat stress level rather than anomalies from historical values.

Exploration of alternative heat indices

Interviews also describe active exploration of alternative indices, especially the Wet-Bulb Globe Temperature (WBGT), which combines air temperature, relative humidity, wind speed, and solar radiation:

‘We understand the limitation of the heat index, because the heat index really is just based on relative humidity and air temperature, so it doesn’t consider the effect of […] reflected and direct solar radiation. So, we’ve decided to consider using a different index, which is the WBGT.’

At the same time, WBGT requires additional meteorological input data and may introduce greater uncertainty into operational forecasting. Supporting this exploration, a study in Metro Manila comparing four heat stress indices found that HI and WBGT best matched observed heat-related hospital admissions (Aragon et al., 2023). Interviewees described this work as running in parallel with a Japan International Cooperation Agency-supported initiative to develop a WBGT-based heat stress information system for the Philippines. Most recently, in 2026, PAGASA has begun piloting

portable WBGT sensors in selected schools in Makati City as part of a Japan Project On Weather 3-supported heat stress monitoring project (PAGASA, 2026).

Gaps and challenges

Interviewees describe several challenges that currently constrain the operational heat service. First, the Philippines' diverse geography and microclimatic complexity make it difficult to develop nationally applicable heat stress thresholds while maintaining sufficient local relevance. Second, resource limitations constrain expansion of the monitoring network, validation of thresholds, and development of year-round services. Interviewees noted that heat remains a lower operational priority than typhoons, resulting in fewer monitoring instruments, limited financial investment, and continued reliance on external technical support for initiatives such as WBGT development. Third, restricting official HI advisories to the March–June hot season creates temporal blind spots as dangerous heat conditions increasingly occur outside the traditional operational window. Finally, current HI thresholds are based on NOAA’s classification and have not yet been validated against Philippine health outcomes. However, interviewees described ongoing efforts to strengthen the evidence base by linking meteorological thresholds with locally observed impacts, particularly among schoolchildren.

Warning dissemination and communication

Heat warning dissemination in the Philippines operates through a multi-layered institutional system starting with PAGASA, which issues the official daily HI forecast and temperature advisories. These are published at 5 p.m. through the PAGASA website, and are then used by national media, government agencies, and local government units for onward dissemination. This structure reflects the broader early warning responsibilities defined under Republic Act 10121, which mandates multi-hazard early warning dissemination via radio, television, and digital channels, and requires agencies to raise public awareness and convey actionable information (Republic of the Philippines, 2010). Under Republic Act 10639, mobile network providers are legally obliged to send free mobile alerts for natural hazards, and while heat is not explicitly specified, the document forms an additional backbone for official communication (Republic of the Philippines, 2014).

Dissemination of warnings relies heavily on digital channels. Interviewees mentioned several channels used, particularly Facebook pages, SMS groups, and local radio. One interviewee described the breadth of dissemination tools, including the PAGASA app, radio, TV, and SMS. Media analysis confirms this pattern. A recent study shows that since 2020, the Philippine Daily Inquirer has increasingly highlighted Danger-level heat forecasts issued by PAGASA and has shifted reporting from individual coping tips toward institutional responsibility and public alerts (Castro & Delina, 2025).

The DOH plays an important role in public-facing communication, issuing advisories when Danger-level heat is forecasted. Statements from the DOH in 2024 warned of increasing cases of heat exhaustion and heat stroke, outlining symptoms, emergency actions, and preventive measures (Montemayor, 2024). DOH also disseminates guidance for medical staff through the Climate Resilience Toolkit, along with issuing memoranda requiring the establishment of cooling stations in accessible public buildings with adequate ventilation, restrooms, water, and clear signage (Department of Health, 2022; 2024a).

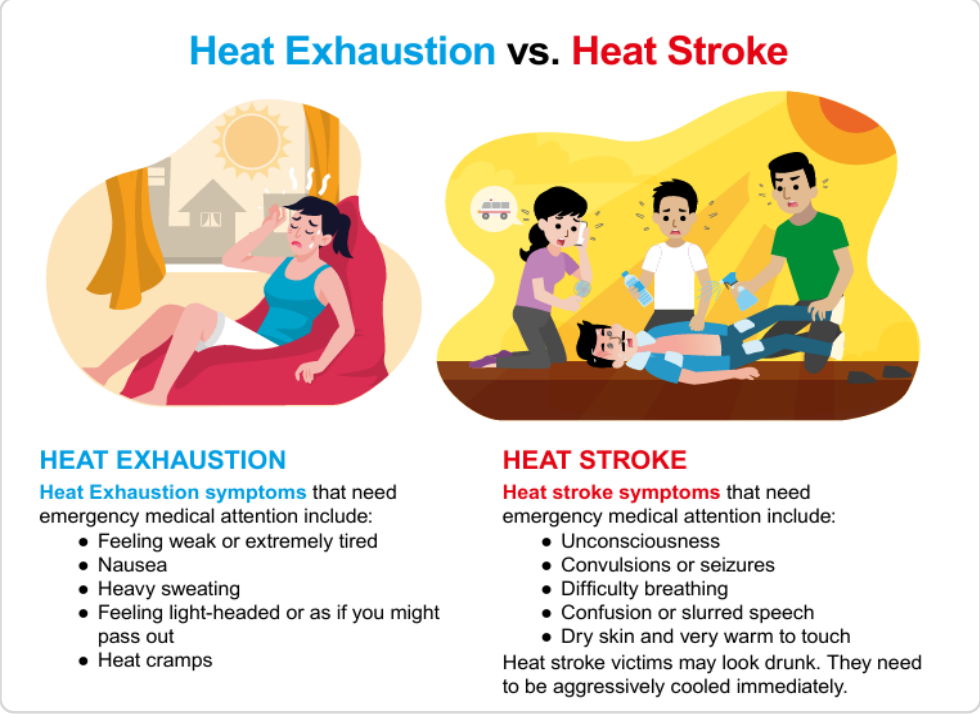

Figure 3. Infographic on heat exhaustion vs. heat stroke from the Climate Resilience Toolkit for Health Centres in the Philippines. Source: DOH, 2022

Humanitarian actors complement formal government channels. The Philippine Red Cross (PRC) disseminates warnings and protective messages through community outreach, Heat Action Day events, posters, hand fans, umbrellas, first-aid demonstrations and materials in English and Tagalog (Ligutan et al., 2025). Studies in six Metro Manila communities using the Climate Resilience Measurement for Communities framework showed that although residents perceive rising temperatures, they do not always see extreme heat as a severe threat, which shows the importance of localized awareness and sector-specific communication (Ligutan et al., 2025).

Interviews consistently highlighted last-mile challenges. While dissemination through websites and social media is strong in urban areas, interviewees stressed that it is not really effective in remote areas due to limited connectivity and uneven access to radio or TV. They described gaps when information fails to reach municipal levels and barangays. Although PAGASA's forecasts are broadly trusted, interviewees felt that the actionable guidance accompanying warnings could be further strengthened, particularly by making the information more impact-oriented and easier for communities to understand.

Overall, warning dissemination in the Philippines is broad and multi-channel, supported by legal mandates, strong media uptake, and sector-specific communication. However, both interviewees and literature mention challenges in reaching remote communities, uneven institutional cascade to barangays, limited impact-based guidance and communication, and a strong dependence on digital platforms that may not fully cover the most vulnerable populations. Given the country's linguistic diversity, with more than 180 languages spoken nationwide, local adaptation of communication is also important. While many official products are issued in English and/or Tagalog, it is important that messages are adapted into locally understood languages to improve accessibility.

Preparedness and response capabilities

Preparedness and response for extreme heat in the Philippines appears to be advancing through sector-specific protocols, agency memoranda, and project-based anticipatory action, rather than through a single national Heat Action Plan. One interviewee noted that initiatives have been assembled *'piece by piece'* and that each department implements actions independently. This gap is linked by interviewees to the lack of recognition of heat in policy documents, remaining less institutionalized than cyclones or floods, even if it is discussed in adaptation planning. As a result, preparedness and response are often triggered through discretionary decisions and informal standard operational procedures, especially at local levels, rather than a unified national protocol.

Education

Despite this, multiple concrete actions have been taken to reduce exposure and manage impacts. Due to severe impacts on schoolchildren, PAGASA is working together with the education sector, with targeted collaboration in selected cities on heat-related illnesses in schools. In the education sector, class suspension and modality shifts have become a primary response. Physical school closures are a common response, and, in the absence of national guidelines, the Department of Education (DepEd) has empowered school heads to suspend in-person classes and shift to alternative delivery modes when needed (Garcia, 2024). Some Local Government Units (LGUs) have formalized this through local ordinances, suspending classes when the HI reaches 42°C and above, corresponding to the Danger category (Garcia, 2024). In many cases these decisions also remain based on expert judgement and local circumstances rather than being automatically triggered by HI thresholds. For example, in April 2025, face-to-face classes were suspended following a 43°C heat index forecast, with explicit instructions on mediated learning and exceptions for clinical or lab training (Radyo Pilipinas Iloilo, 2025). An interviewee stated that following HI advisories, schools close, and work schedules and modality are adjusted. Literature and media also point to these measures, while noting trade-offs with measures such as school closures. School closures can exacerbate inequities, since students from lower socioeconomic backgrounds may lack reliable internet, devices, or cooling at home, widening attainment gaps (Garcia, 2024).

Health and labour

The health and labour sectors also demonstrate increasingly formalized response measures for heat. The DOH has issued operational guidance requiring facilities and local health systems to prepare for heat-related illness, maintain service continuity, and strengthen surveillance and reporting (DOH, 2024b). DOH guidance specifies both clinical and preventive actions and explicitly includes the establishment of cooling stations or cooling centres, recommending that they be air-conditioned or well ventilated, accessible to high-risk populations, near transport routes, and include water, restrooms, seating, and clear signage that can be translated into local languages (DOH, 2024b; 2025). The DOH also provides immediate recommended actions tied to the HI classifications, including cancelling strenuous outdoor activities at Extreme Danger levels and increasing rest and hydration breaks as conditions intensify (DOH, 2024b). For workers, responses are supported through Department of Labor and Employment (DOLE) Labor Advisory No. 08-2023, which encourages workplace risk assessment, ventilation and insulation, rest breaks, free water, emergency procedures, flexible work arrangements, and advocacy campaigns, while informal workers remain less protected due to limited coverage and enforcement in informal settings (DOLE, 2023).

Humanitarian and anticipatory action

Humanitarian and city-level initiatives complement these governmental actions, often filling gaps where national coordination is limited. Plan International has an AA protocol for extreme heat. Interviewees explain that activation decisions rely on PAGASA forecasts and can be triggered when forecasts reach more than 42°C (Danger). When activated, the protocol can include unrestricted, unconditional cash assistance, enabling families to prioritize their most urgent needs, with reported delivery to 171 families during the 2024 extreme heat in the Occidental Mindoro. Interviewees also described preparedness work through awareness raising and capacity building with LGUs and community members, targeting vulnerable groups including women, children, persons with disabilities (PWDs), and Indigenous Peoples, providing guidance on coping mechanisms and how to reduce impacts. Plan International noted that a future cycle of a climate resilience programme would focus on heat in 2028 to 2031 in Mindoro and Tacloban City, following an earlier phase focused on flooding from 2024 to 2027.

The PRC similarly works on expanding resilience through education and community engagement, including Heat Action Day activities using videos, posters, hand fans, umbrellas, and first aid training to improve recognition and response to heat illness (Ligutan et al., 2025). The PRC is also conducting awareness sessions for the community, organizing a multi-stakeholder forum to advocate for and address the risks associated with emerging extreme heat hazards, and will support the local government and communities in developing or updating their disaster risk reduction and climate change adaptation plans.

Figure 4. Poster on sharing tips to protect yourself during extreme heat events produced by Plan International, IFRC and Philippine Red Cross. Source: Zurich Climate Resilience Alliance - Philippines

Local government initiatives

At the city level, Quezon City's participation in the C40 Cities Climate Leadership Group's Cool Cities Accelerator includes commitments to establish clear heat action leadership, strengthen the early warning system, and expand access to cooling solutions during heat emergencies within two years, alongside longer-term urban planning measures such as updating building codes to reduce indoor heat, increasing shade and tree canopy in public spaces, and future-proof critical infrastructure (Quezon City Government, 2025).

Multi-hazard approach

Heat is increasingly recognized as interconnected with agriculture, energy demand, and urbanization. However, integration remains conceptual rather than institutionalized within DRRM planning. Interviewees also described early sectoral integration, particularly with the energy sector, but noted that much of this work remains exploratory. Literature on compound heat and drought dynamics aligns with this, with national assessments emphasizing rising dry season temperatures, increasing consecutive dry days in Visayas and Mindanao, and strong El Niño-Southern Oscillation-driven variability (Republic of the Philippines, 2023). Urban heat island research further highlights interactions between urbanization, anthropogenic heat, and prolonged heat events, where land cover change can increase heatwave frequency and duration in dense urban centres (Magnaye & Kusaka, 2024).

Gender and social inequalities addressed inclusively

Interview evidence shows that Gender and social inequality (GESI) considerations are present primarily through targeting practices in non-governmental organization (NGO) and community programming, rather than through systematically embedded, group-specific protocols in warning and response. Plan International explicitly prioritizes women, children, PWDs, pregnant people, and adolescents in awareness raising and AA activities. Despite efforts by NGOs, delays and service gaps are pronounced in remote areas, meaning that groups exposed and least able to access cooling, healthcare, or digital warnings face heightened risk. This resonates with PRC findings that informal workers, older adults, PWDs, and low-income households experience disproportionate exposure because they cannot afford cooling or cannot stop work even under Danger level heat in the Philippines (Ligutan et al., 2025).

The broader literature strongly reinforces this differentiated vulnerability. Heat stress in urban areas correlates with poverty, density, poor housing quality, and lack of access to air conditioning (Zander et al., 2018). Children experience higher heat-related mortality risk (Seposo et al., 2017), and school closures meant to protect them can exacerbate inequalities due to uneven access to digital learning (Garcia, 2024). Climate projections indicate that by 2030, up to 11 million Filipinos may be exposed to heat indices above 42°C, rising to 74 million by 2050, with the poorest regions most affected (Climate Change Commission, 2024). Despite this evidence, interviews suggest that national systems do not integrate GESI systematically in heat governance. Equity therefore remains largely reliant on NGOs, local actors, and individual LGU initiatives.

Local community involvement

Local community involvement currently appears to be driven mainly by NGO-led AA and community awareness initiatives. Plan International carried out work in areas such as Occidental Mindoro and Tacloban, combining anticipatory cash with awareness raising and local capacity building on extreme heat. Interviews emphasize that communities are effectively the first responders and that strengthening local knowledge on what to do before and during high heat episodes is crucial. PRC programmes echo this, with Heat Action Day activities engaging communities through posters, videos, umbrellas, hand fans, and first aid training to support recognition and management of heat illness (Ligutan et al., 2025). These initiatives demonstrate ongoing bottom-up engagement but remain dependent on external actors and funding for sustainability. Beyond these initiatives, PAGASA's recently launched iHeatMap also incorporates a user feedback function, allowing users to provide feedback on perceived outdoor heat conditions, forecast accuracy, timeliness, accessibility,

and overall usability. This represents an emerging mechanism to incorporate user perspectives into future service evaluation and improvement.

Interviewees also highlighted that bottom-up pressure from local communities can accelerate national prioritization. Community experience and mobilization may drive policy attention faster than top-down policies alone. Together, the interviews and literature suggest that while local actors have strong potential to drive implementation, systematic mechanisms for community participation and feedback remain underdeveloped.

Effective governance and institutions

Interviews describe a governance landscape where the Philippines has strong disaster management structures, but heat is not yet institutionalized as a core hazard within national DRRM and sectoral planning. While significant components exist particularly through PAGASA, DOH, DepEd, DOLE, and NGO AA, these remain sector-driven rather than governed by a unified national framework. Compared to cyclones and floods, heat is not fully recognized in policy and planning, and while advisories and forecasts are issued, wider cross-sector action requires stronger coordination and leadership (Zander et al., 2018).

Although formal DRRM mechanisms exist under Republic Act 10121, including mandates to operate multi-hazard early warning systems and raise public awareness (Republic of the Philippines, 2010), interviewees highlighted that these structures are not leveraged for heat. While interviews mention that LGUs must allocate at least 5 per cent of their budgets for DRRM activities, funding gaps for heat response persist, especially in remote areas. Evidence from the Climate Change Commission shows that extreme heat already has large socio-economic and health implications and will rapidly intensify without stronger governance frameworks (Climate Change Commission, 2024). Overall, both interviews and literature describe a system where the institutional foundations exist, but heat governance remains emerging and underfunded.

Figure 5. Plan International, IFRC and Philippine Red Cross convened a multi-stakeholder forum on climate resilience bringing together partners from government, private sector and civil society to increase coordination and collaboration. Source: IFRC

Key recommendations

- **Strengthen national heat risk assessments and impact evidence:** The Philippines has growing evidence on heat hazards, health impacts, and city-level vulnerability, but these remain fragmented and are not yet consolidated into a national, impact-oriented heat risk assessment. Strengthening national heat risk assessments by integrating hazard, exposure, vulnerability, and observed impacts would provide a stronger evidence base for impact-based warning thresholds and targeted preparedness. This may require attention to improved collection, sharing, and integration of impact data across sectors, particularly health, education, and labour, while recognizing that impact data remain limited in many areas. Developing vulnerability profiles disaggregated by factors such as age, sex, disability, occupation, income, and location would further support equitable warning dissemination and response.
- **Strengthen towards impact-based heat warning services:** PAGASA operates a well-established national HI service. However, current HI thresholds are based on NOAA classifications and have not yet been validated against Philippine health, education, or livelihood impacts, nor do they account for regional differences in climate, exposure, and vulnerability. In addition, while heat information remains available year-round through station observations and the interactive iHeatMap, daily HI advisories are currently limited to the March-June hot season, while Danger-level HI conditions have occurred outside this period. Strengthening efforts to validate thresholds using local impact data and explore region-specific thresholds, progressively moving towards a year-round, risk-based warning service, could improve the relevance and effectiveness of the system, while also recognizing competing operational priorities. Ongoing exploration of alternative heat stress indicators, such as WBGT, should continue alongside evaluations of operational feasibility and user needs.
- **Strengthen community-centred communication and last-mile dissemination:** The Philippines has a strong multi-channel dissemination system supported by media, government agencies, and humanitarian organizations. However, interviews highlighted persistent challenges in reaching remote barangays and populations with limited digital access. Strengthening dissemination through trusted local networks, civil society organizations, and community leaders, expanding low-technology communication channels, and tailoring messages to different languages, literacy levels, and local contexts would improve accessibility and effectiveness. Greater emphasis on impact-based, action-oriented messaging, alongside institutionalized user feedback and community participation mechanisms, would further strengthen warning uptake and continuous service improvement.
- **Institutionalize heat within disaster risk management and strengthen multi-sector preparedness:** The Philippines has strong disaster risk management legislation and well-established institutional structures, yet heat remains insufficiently embedded within national DRRM planning and financing. Preparedness currently relies on sector-specific actions, including school closures, cooling stations, labour advisories, and humanitarian AA, rather than a coordinated national Heat Action Plan. Embedding heat within national DRRM mechanisms, clarifying sector-specific roles and trigger-action protocols, and strengthening coordination across PAGASA, the DOH, DepEd, DOLE, LGUs, and humanitarian organizations would help ensure that warnings consistently translate into timely and coordinated action.

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This case study complements our global report: Understanding the Global Landscape of Heat Early Warning Systems. You can view the full report here.

Front cover image: *Street vendors serving food to locals in the bustling area of Cebu City, Central Visayas, Philippines*. Photo: Ramius Aquiler

About the Zurich Climate Resilience Alliance

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.

The Alliance is powered by the Z Zurich Foundation. Find out more: www.ZCRAlliance.org. You can find out more about the Alliance's work in the Philippines here: https://zcralliance.org/where-we-work/our-impact/the-philippines/

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