


# Heat waves in Hanoi: how anticipatory action can help to mitigate a growing urban threat

The threats posed by rising global temperatures are increasing – and increasingly recognized. One significant challenge driven by rising temperatures is heat waves. By the middle of this century, this ‘silent killer’ is expected to affect more than 3.5 billion people globally – and 1.6 billion people in urban areas – as they increase in frequency, duration and intensity ([Adrienne Arsht-Rockefeller Foundation Resilience Center 2020](#) .

This briefing examines the role that anticipatory action can play in addressing and mitigating this growing threat. It provides an overview of the process followed to implement a forecast-based financing project, FbF Ready, for heat waves in Hanoi, Viet Nam, and outlines some of the impacts. This was the first forecast-based financing project to address heat waves, and the first to be implemented in an urban setting. As such, it offers useful lessons for practitioners in terms of the potential benefits – and challenges – of forecast-based financing in urban contexts.



A simulation exercise for heat waves held in Hanoi, 2019. © German Red Cross

## The FbF Ready project: forecast-based financing for heat waves

The FbF Ready project, launched in 2018, used forecast-based financing to establish a set of anticipatory actions to help mitigate the growing impacts of heat waves on vulnerable people in the country’s urban areas. The initial focus was on Hanoi, and it was later extended to Hai Phong and Da Nang. The project was led by the Viet Nam Red Cross Society, with support from the German Red Cross, and was guided through a collaboration with hydrometeorological and technical actors in Viet Nam.


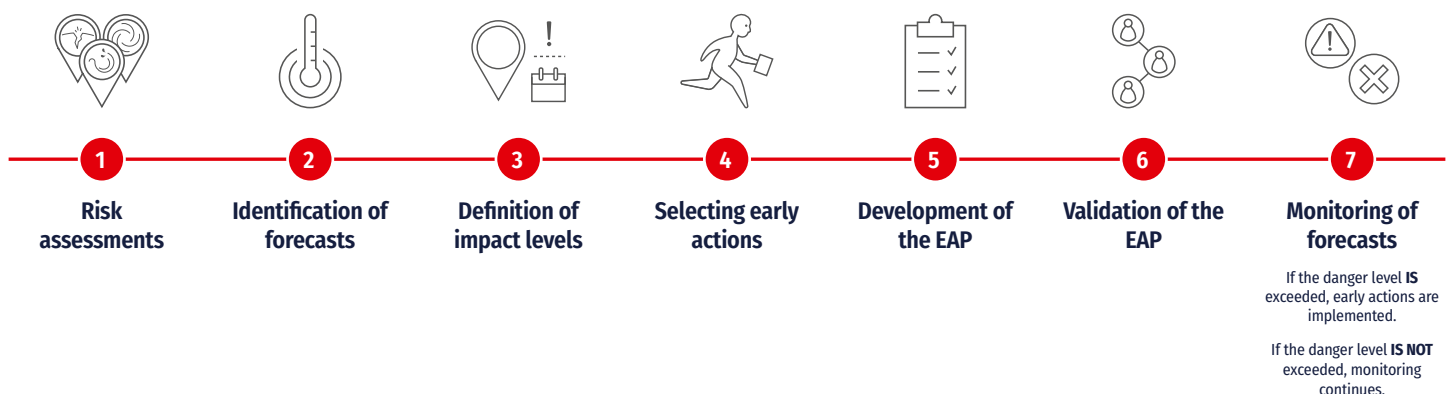
The project set out to implement the forecast-based financing approach by following the key steps outlined in the *Forecast-Based Financing Practitioners Manual* ([IFRC, Climate Centre and German Red Cross 2021](#) ) , shown in Figure 1.

Figure 1. The implementation mechanism for forecast-based financing



Ultimately, 11 steps were taken to implement this project and this section outlines the considerations, processes and iterations that were undertaken as the project sought to implement forecast-based financing for heat waves. Exploring the specifics of the process in this way provides insights into how forecast-based financing, and anticipatory action approaches more widely, can be applied, both ahead of heat waves and in urban contexts.

### Step 1: define 'why'

The project was established because heat waves are increasing in frequency and severity in Viet Nam, with urbanization and climate change both contributing to a rise in average daily temperatures. This poses an increasing threat to people; for example, it has caused an increase in hospital admissions of 20 per cent for all heat-related issues, and up to 46 per cent for respiratory issues ([Phung et al. 2016](#)). Heat waves have also led to a decline in productivity among workers who are exposed to heat, such as farmers or street traders. Increasing urbanization, an aging population and the increasing effects of climate change are creating a confluence of risk, vulnerability and exposure that are expected to further increase the impacts of heat waves in the future.

### Step 2: build capacity

Building operational capacity is a key step in anticipatory action, and a crucial consideration early in the development of Early Action Protocols (EAPs).<sup>1</sup> Together with the German Red Cross and the International Federation of Red Cross and Red Crescent Societies (IFRC), the Viet Nam Red Cross Society undertook a Preparedness for Effective Response process ([IFRC nd](#)) that helped to define its capacity gaps and align these with its strategic goals. Identifying key areas for improvement enabled the project team to elaborate their forecast-based financing ambitions strategically, and in such a way that these would complement other programme areas.

### Step 3: define the triggers

Triggers are essential for forecast-based financing, as they identify the hazard threshold at which the preagreed funds for anticipatory actions are released. The Viet Nam Red Cross Society worked closely with some of the country's hydrometeorological institutions to better understand national forecast capacity and define triggers for heat waves (Figure 2). Eventually, a '2x2' trigger protocol was established, based on two sources of forecast data ([IMHEN, Viet Nam Red Cross Society and German Red Cross nd](#)).

### Step 4: define 'who'

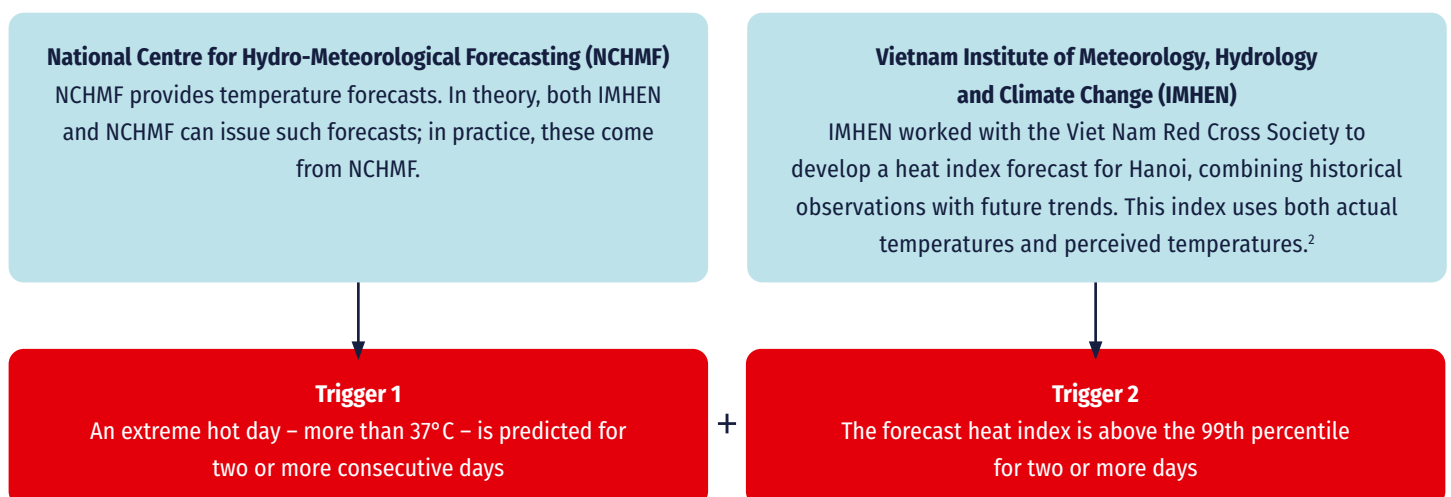
Heat waves affect people differently and in dense urban contexts, it is critical to understand who is most vulnerable. To establish this, the project team in Viet Nam:

- conducted a literature review to identify potential target populations
- tested these assumptions through extensive 'knowledge, attitudes and practice' surveys
- revised the assumptions as needed, and then tested them again.

This process helps practitioners to consider the viability of each potential target group, and to identify and revise entry points for reaching each target group. It can also help projects to identify and amplify adaptive measures already in place.

Completing this process in Viet Nam revealed many useful findings that helped to target the anticipatory actions towards the most vulnerable people. For example, the surveys revealed that most vulnerable groups already have adaptation measures for heat waves in place, but lack access to infrastructure and information about the symptoms of heat exhaustion.

**Figure 2. Triggers developed for heat waves in Viet Nam**



<sup>1</sup> EAPs are the plans used by the IFRC to set out how anticipatory actions ahead of a specific hazard will proceed, alongside the funding dedicated to these actions.


<sup>2</sup> This is the temperature perceived by humans, which may be different due to factors such as air temperature, humidity and wind speed.

Furthermore, intergenerational and cultural considerations in Viet Nam mean that children and elderly people are not actually at increased risk, as is the case in many countries; this is because most family systems remain intact. Additional research revealed other populations to be at high risk from heat waves, such as people living in poverty or in slums, people in hospitals, people working on the street, shippers and builders.

This detailed analysis of vulnerability in specific groups was supported through a survey of 1,200 street workers in Hanoi, which revealed the impacts of heat waves. Two-thirds of street workers experienced four to seven symptoms of heat exhaustion, while one-third reported reduced incomes of up to 50 per cent and heat-related healthcare costs amounting to 1.5-2.5 times their daily income.

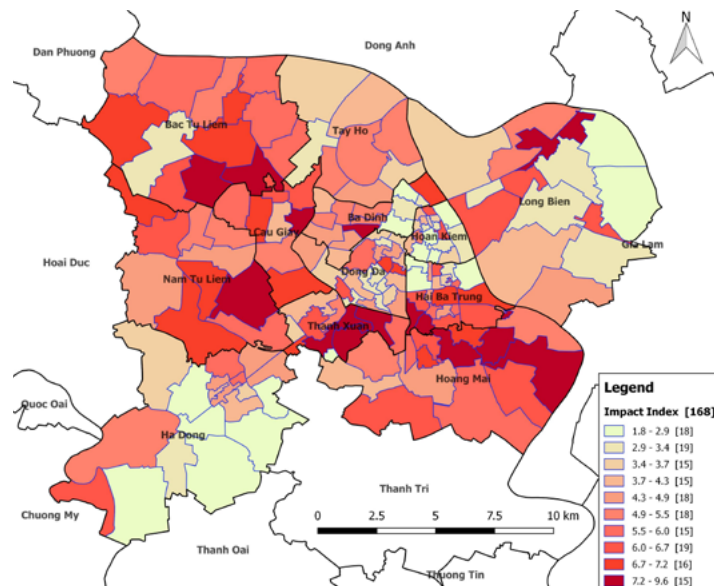
**Step 5: define 'where'**

Impact-based forecasting – identifying exactly where the impacts of a hazard will be felt, and to what extent – is a complicated process in urban areas, where risk hotspots and vulnerability vary between neighbourhoods and districts. And, as the size and density of the urban population increases, so too does the need for more refined spatial analysis. In Hanoi, the project team needed to identify which areas were most at risk in a city of more than 5 million people. They worked closely with local actors to develop a basic impact-mapping methodology that combined three layers to identify high-risk target areas:

- 1 **Vulnerability layer.** Heat waves disproportionately affect poor and vulnerable people ([PreventionWeb 2020](#) ) , who have fewer resources to protect themselves from the impacts of extreme weather events. This means it is vital to have information about the percentage of people in a ward (district) who live in poverty or have disabilities, for example. Such vulnerability data is generally robust and accessible in Viet Nam.
- 2 **Exposure layer.** The percentage of people who live in informal settlements or substandard housing can serve as a proxy indicator for the percentage of people who are unlikely to have air conditioning (which protects people from some of the impacts of heat waves).
- 3 **Hazard layer.** IMHEN and the Viet Nam Red Cross Society used satellite data from 2015–2018 to identify 'heat islands' throughout Hanoi.

Using these layers, the Viet Nam Red Cross Society and IMHEN identified the 15 highest-risk wards across the city (Figure 3). These became the target areas for implementing anticipatory actions.

**Figure 3. Heat wave impact index for Hanoi**



**Step 6: identify partners**

The Viet Nam Red Cross Society conducted extensive stakeholder analysis to better understand the landscape of relevant actors in Hanoi, as well as their potential interest in collaborating with or contribution to the forecast-based financing processes. In addition to the technical actors highlighted in Step 2, the project team reached out to national and local government actors, civil society organizations, and other humanitarian and development actors.

First, they explained what forecast-based financing is, then outlined the co-benefits that might align with the needs of the respective organizations. Making forecast-based financing relevant to potential partners' mandates and fields of interest is critical to building support.

The project team also undertook a network analysis to better understand the relationships between these actors and how they might feed into the process.

**Step 7: define 'what'**

After establishing partners, target groups and target areas, and the forecasting and impact-based capacity required to act, the project team moved on to focus on a key question in forecast-based financing: which early actions will be taken? The Viet Nam Red Cross Society worked closely with populations affected by heat waves to explore potential early actions that might help to mitigate the impacts. With these groups, it codesigned the following early actions.

- Set up cooling centres (i.e., tents) in the streets of target areas. These provide water, shelter and a safe space for affected populations to cool down and receive training on recognizing the symptoms of heat exhaustion. Importantly, people can do this while keeping their business assets (e.g., stalls, carts) within sight.
- Use buses in the target areas to raise awareness of heat waves and advise people that they could access the cooling centres.
- Retrofit houses in the target areas with cooling systems.

#### **Step 8: define 'how'**

The next step for the Viet Nam Red Cross Society was to develop and validate an EAP for heat waves. These documents outline the rationale and theory of change behind the steps for anticipatory action, as well as defining clear roles and responsibilities for the different actors in the event of an activation (i.e., when the trigger for heat waves is reached).<sup>3</sup>

#### **Step 9: test assumptions and implementations**

Simulations and pilot activations are critical to testing how anticipatory actions will work in practice. During the summer (May to September) in Viet Nam in 2019, the trigger thresholds for heat waves were reached twice. The Viet Nam Red Cross Society was able to open cooling centres both times, with 396 people taking shelter in two centres during the first activation, and 1,787 people in four centres during the second.

Although these activations occurred before the EAP was approved, they were an opportunity to test the assumptions and theory of change behind the project's design. These early results were encouraging, demonstrating that:

- setting up cooling centres was possible in the agreed lead time (six days)
- the target population used these: 79 per cent of visitors to the centres were outdoor workers
- the local population approved (95 per cent) of having cooling centres in their area
- those who used them did so for the expected reasons (e.g., to rest and mitigate or avoid the symptoms of heat exposure).

These outcomes gave the Viet Nam Red Cross Society the confidence to scale up these early actions, and it mobilized support from other actors to do so. Subsequent media engagement (see Step 10) increased awareness of, and buy-in for, these activations, with authorities giving their support more readily now that there was proof of concept. With this additional support, it was agreed: (1) to expand these early actions to a further 25,000 vulnerable street workers; (2) to implement them in all 15 at-risk wards in Hanoi; and (3) to replicate the model in other cities, including Da Nang and Haiphong.

#### **Step 10: conduct media outreach and lobbying**

At the same time as testing early actions, it is necessary to involve and inform key stakeholders, affected populations and the wider public about the process. To do this, the Viet Nam Red Cross Society set aside a portion of the project budget for media activities. For example, it invited media representatives to witness the first test activation, at which local officials and representatives from the project team highlighted their involvement in the project. Further media coverage and public support escalated from there and, during later test activations, nine television crews attended, giving the project coverage across 20 different channels. Seeing forecast-based financing in action helped to convince people of its relevance, feasibility and potential impacts.

#### **Step 11: revise and iterate**

Throughout the forecast-based financing process, it is important that practitioners create opportunities for feedback, reflection and revision. This should be a reciprocal process that incorporates inputs from, and maintains accountability to, target populations. The process should also adapt and develop as new information and limitations emerge.

One example from Hanoi is the third proposed early action: to retrofit homes. When it proved impossible to secure authorization to do so within the lead time, the team decided to focus their efforts on the other two early actions. Another example is the onset of the global Covid-19 pandemic, which required the project team to review the EAP and consider the changes needed to open the cooling shelters safely (e.g., mandatory face masks, increased ventilation).



A simulation exercise for heat waves held in Hanoi, 2019.

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<sup>3</sup> Viet Nam's EAP for Heat Waves was approved in 2021 but is not yet publicly available.



## Challenges

Drawing on experiences from the FbF Ready project, the project team identified the following challenges with implementing anticipatory action in urban settings.

**Entry points cannot be universal.** Who is targeted with early actions will vary widely across urban areas. For example, working with heat-affected street vendors who live in slums makes sense in Hanoi, as there is high exposure to heat waves and few places for people to escape from the heat. This is not true for urban areas in other parts of South-East Asia, however; for example, the Philippines and Thailand have better developed public infrastructure (e.g., shopping malls with air conditioning) and fewer street vendors who are exposed to extreme heat.

**Bureaucratic hurdles are often more complex in urban contexts.** The involvement of many stakeholders is a strength of forecast-based financing. However, getting approval for early actions from several different stakeholders can be a barrier to quick implementation. This is particularly true in urban contexts, where there are often multiple layers of governance and many different actors involved. For example, the project team in Viet Nam initially wanted to retrofit houses as an early action, but this idea was dropped due to an inability to gain permission from the relevant authorities within the short lead time.

**In urban areas, there is a higher need for more localized, high-resolution forecasts and analysis.** Robust, up to date and high-resolution data that allow for analysis at smaller geographical scales (compared to rural areas) is needed to implement anticipatory actions.



## Recommendations

Drawing on the experiences of the FbF Ready project, the project team made a series of recommendations for other projects looking to apply anticipatory action. These are relevant for projects focused on heat waves and other hazards, and those in both urban and rural settings.

### Recommendations for advocacy activities

**Advocacy is part of forecast-based financing – and should be built into the process.** This should be done with other key stakeholders (e.g., government officials, local authorities, technical partners, other humanitarian actors) and is critical to the success of a project. Furthermore, the project team in Hanoi invested time and resources to identify who they were working with and what critical needs they would address. This meant that they could advocate for support with conviction, and with a robust scientific and evidence base to support their arguments.

**Messages should be tailored to the different actors involved.** The project team deliberately explained the project according to the scope, needs and interests of each stakeholder. For example:

- with local authorities, the focus was on how acting early can reduce the impacts of heat waves
- with technical actors, the focus was demonstrating the need for new climate services, impact-based forecasts and data
- with the humanitarian community, the focus was the need to shift from reaction to anticipation to support people vulnerable to hazards.

Highlighting specific aspects to specific actors helps them understand their role in the process and why it matters. In some cases, this means leading with concrete actions (e.g., how tents in the streets protect heat-vulnerable groups) before mentioning the more conceptual elements of the process. Being specific, in terms of the language used and the potential benefits, can also help overcome some of the barriers that exist when translating the concept of forecast-based financing into a new language.

**Seeing forecast-based financing in action increases support.** In Hanoi, the authorities were reluctant to grant permission to put up cooling centres in the streets. By securing authorization to conduct a small test (in one ward and just two tents), the project team was able to demonstrate proof of concept and increase the willingness of local actors to engage.

### Recommendations for implementation

**Define the target groups carefully.** Establishing who your intervention will target (Step 4) requires a higher level of analysis than in rural areas, as cities have greater variability in terms of vulnerability and exposure, and varying districts or neighbourhoods are in closer proximity. More specific vulnerability and spatial data are needed to ascertain who to work with and where they are located. It is also important to consider not just people's needs, but also the feasibility of working with a specific population. For example, the Viet Nam Red Cross Society was not able to collaborate directly with hospital workers, but it can work with people in street settings. Establishing the first entry points for a project is crucial to its success and further development.

**Be persistent and look for creative solutions.** The project team in Hanoi initially faced resistance to the idea of putting up tents in the streets. However, by talking about the many instances where tents are already granted permission to be on the streets (e.g., weddings, funerals), as well as demonstrating proof of concept through the test activation, they were able to convince local actors about the merits of this action.

**Invest time and energy carefully.** The project team invested a lot of time in stakeholder analysis, seeking to understand who was doing what and how they could align with this. But while other actors expressed interest in forecast-based financing, following up and acting on this interest was a slow process. Conversely, the FbF Ready project gained traction when the team moved ahead with test activations. Demonstrating what early actions would look like increased interest among other actors and led to increased engagement.

**Strike a balance between the programme design and time pressures.** Though it can be tempting to move straight into actions, the success of this project was based on the project team's willingness to invest time and resources to set up the foundations for forecast-based financing. They took time – around one year – to research the context, test assumptions, and identify and select the people it would benefit. This enabled them to move forward with conviction, and with all the appropriate pieces in place.

### Recommendations for capacity building

**Use the Preparedness for Effective Response process.** This helps to shed light on the key areas where a National Red Cross Red Crescent Society can increase its capacity for disaster preparedness and early actions. Adopting this process helped to ensure that forecast-based financing contributed to the Viet Nam Red Cross Society's longer-term objectives, overall strategic pathway and capacity-building efforts.

### Recommendations for technical issues

**Involve hydrometeorological partners from the start for mutual benefits.** For project teams, this enhances their capacity, ensures their project aligns with national processes and political cultures, strengthens advocacy efforts, maximizes the use of local weather forecasts and systems, and helps to ensure a project's sustainability and longevity by embedding it in existing structures. For hydrometeorological partners, it offers an opportunity to collaborate with other technical experts, increases their contribution to real-world decision-making processes, and helps them move towards impact-based forecasting. In Viet Nam, codesigning the triggers for heat waves with climate and hydrometeorological institutions enabled the project team to draw on the necessary data, while also engaging with technical partners and strengthening their commitment to this approach.

### Recommendations for internal processes


**Establish trust and communication between national headquarters and national-level staff.** The project team in Viet Nam emphasized that staff at the Viet Nam Red Cross Society's headquarters trusted them and their processes, which was critical to the project's success. This trust was partly established thanks to the time the team invested in researching and setting up the project.


**Challenge your assumptions.** Being open to new ideas often leads to success. When the project team in Hanoi tested their assumption that elderly people and children were most vulnerable to heat waves, they found that this was wrong (see Step 4). Only by being open to challenging their assumptions were they able to identify the populations most at risk from heat waves, namely those working outdoors.




A simulation exercise for heat waves held in Hanoi, 2019.


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Forecast-based financing in Viet Nam [bit.ly/3uRf470](https://bit.ly/3uRf470) 


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