



## Heatwaves Early Warning Systems



*Key Consideration for  
Heatwaves EWS*

A stylized sun with a yellow circle and orange wavy rays, located in the top left corner.

# Defining a Threshold

- ✓ There is no single, universal definition for a heatwave, but heatwave implies impacts
- ✓ **Impacts are a composite effect of a number of factors** beyond just temperature.

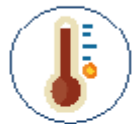


Heatwaves must be defined using **thresholds**

A threshold indicates the moment when the heat becomes extreme enough to become **dangerous to people's health and livelihoods**

# Proposed Methodology for Heatwaves Threshold

- ✓ List the factors that contribute to heat impacts
- ✓ Consider existing heatwaves definitions or indices that combine these factors and chose the one that is relevant to local context



Maximum...  
temperature



Night-time  
temperature



Humidity



- ✓ Pick a threshold when the heatwaves definition indicates that the heat has become **dangerous for health**

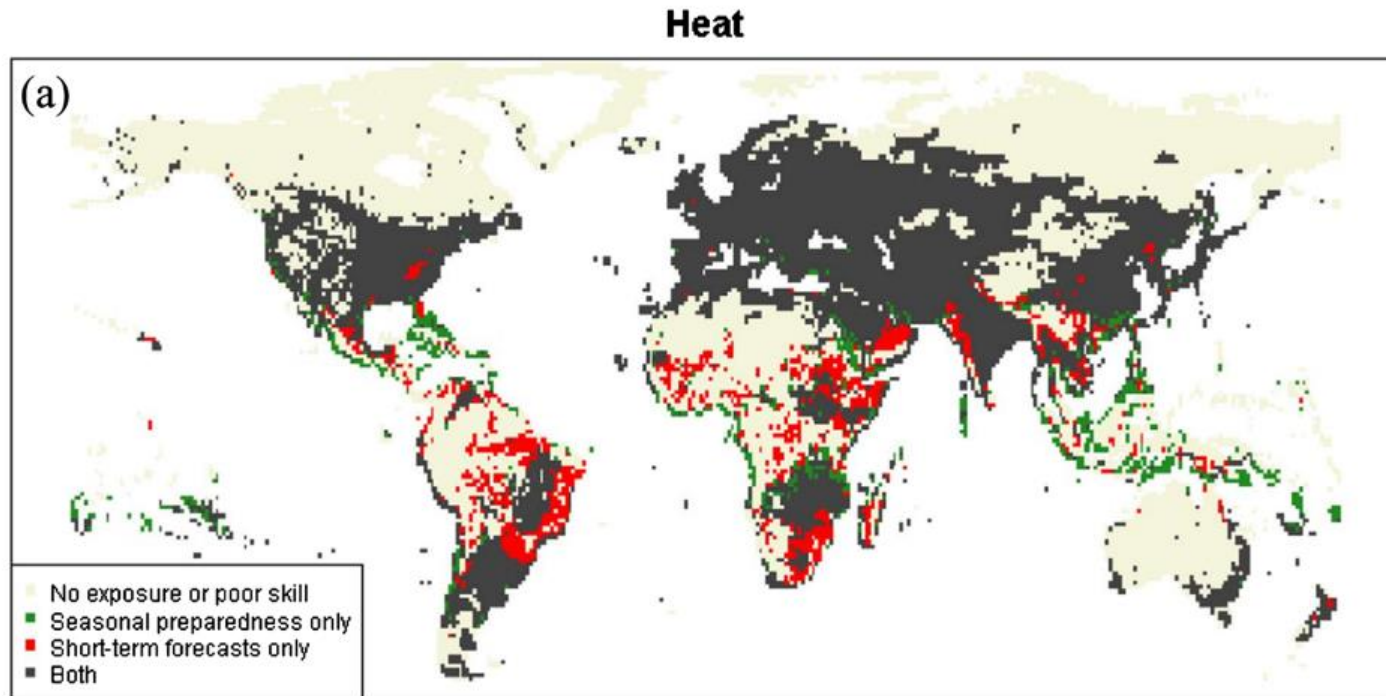


- ✓ **Historical data:**

- Spike in deaths
- Increase in hospital admissions

- ✓ **Expert judgement**

# We can forecast heatwaves!



# EWS for Heat Health : Opportunities and Limitations

## Huge potential to forecast heatwave events

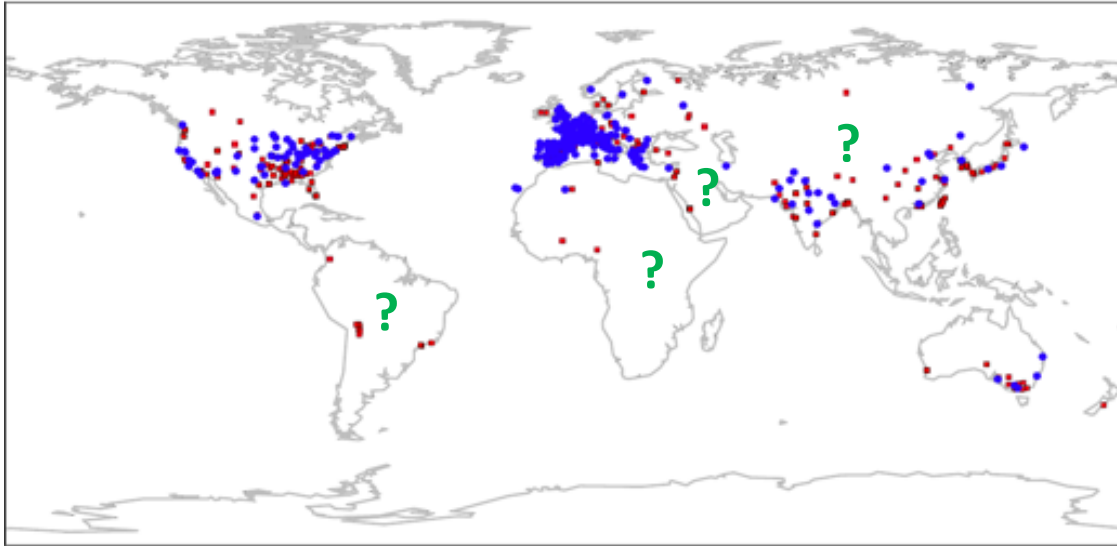
- possible to take anticipatory actions to reduce the impacts before a heatwave occurs.
- Heat-health EWS, with triggers for actions in an early action plan, can reduce heatwave impacts and ensure an effective response when a heatwave occurs

### CREATE A HEAT-HEALTH EARLY WARNING SYSTEM



# Challenges to Reducing Heat-related Deaths

## Research



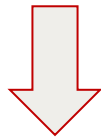
**Red** = Places where the relationship between heat & mortality have been documented

**Blue** = Places where specific extreme heat episodes have been studied

# EWS for Heat Health : Opportunities and Limitations

**Main limitation = human impact of heatwaves is notoriously difficult to quantify**

- Debatable reliability of heat-related mortality and morbidity
- excess of mortality= the main approach for measuring impact
- Those limitations make it difficult to develop an impact-based threshold for EWS



Subtropical and tropical regions rarely have appropriate heat-health warning system.

**The lack of awareness that humidity and other factors** are significant determinants of 'heat' has been **a major limitation** in the development of appropriate EWS





*Heatwaves' triggers for  
Early Actions Activation*  
Vietnam



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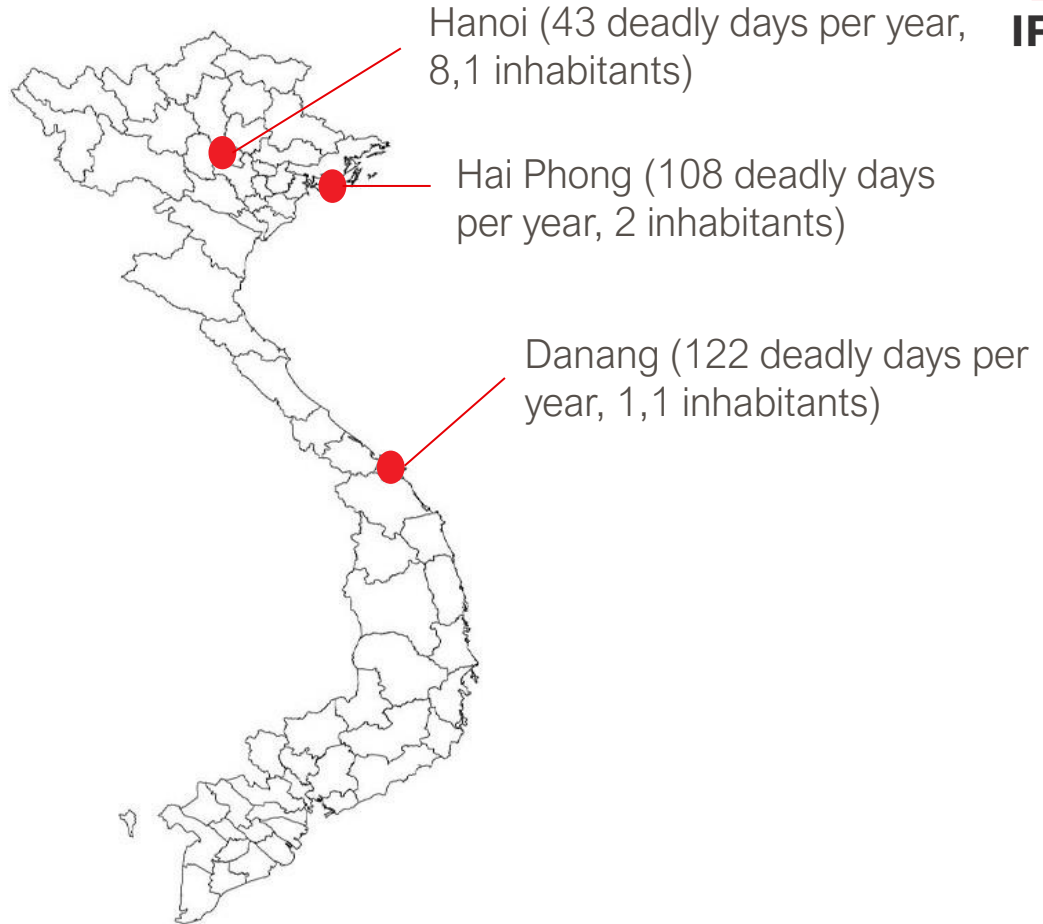
## *“Forecast-based Financing in Vietnam – Heatwaves in Urban Context”*



- 3 target cities
- Targeted activation from 15 of April until the 15th of September

### IMPACTS :

- Heatwave events are associated with 20% increase in hospitalization for all causes and 45.9% for respiratory diseases
- Outdoor workers particularly exposed: 66% experienced from 4 to 7 symptoms of heat exhaustion during a heatwave







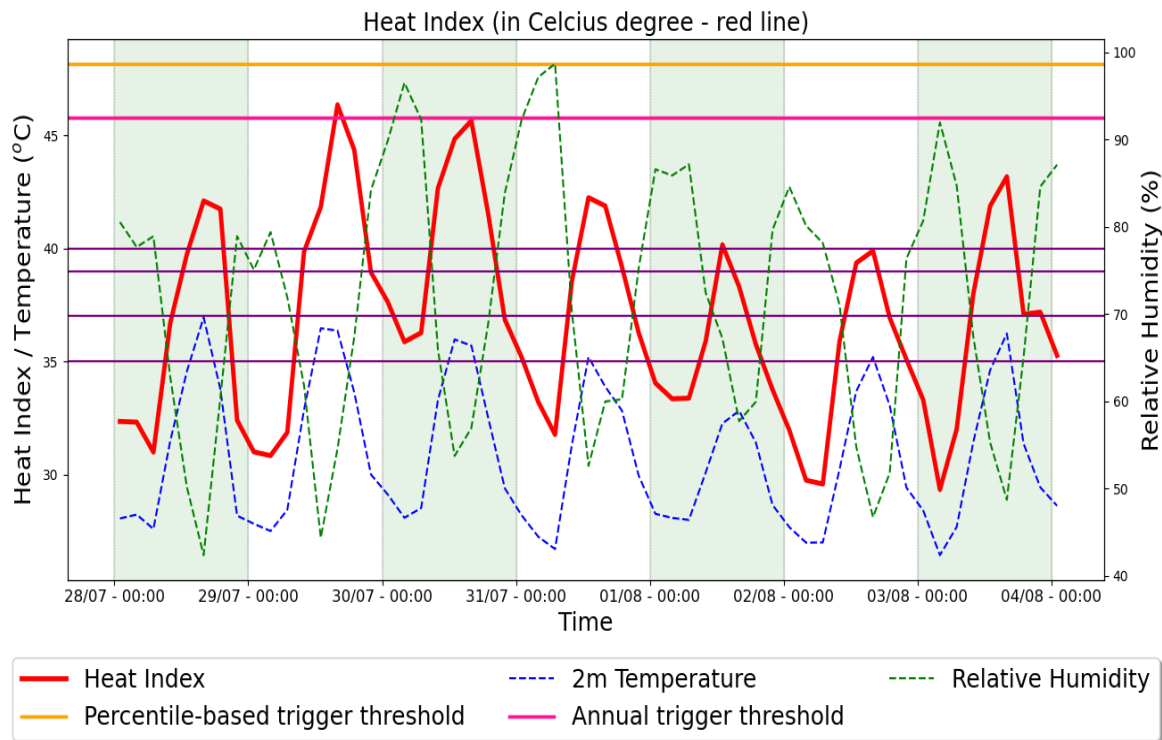
# EWS in Vietnam : Challenges & Solutions

- A heatwave is defined if the observed daily maximum temperature  $> 35$  degrees.
- **Temperature does not capture the impact of Heatwave on human health.** Heat Index (HI) can be considered to be “**impact-based**” as it is designed to relate to how the human body is impacted by the combination of temperature, humidity and wind speed. However, **National Met Office does not calculate HI.**
- **Impacts data (mortality and morbidity) are difficult to access** which greatly limits the ability to clearly demonstrate and communicate real impacts of heatwaves. This is also a **limitation for the development of impacts-based triggers.**

>>> A Heat Index methodology has been specifically developed by the Vietnam Institute of Meteorology Hydrology and climate Change (IMHEN)

>>> IMHEN has also calculated HI value for different percentiles (95th, 97th and 99th) and for each city.

# EWS – When to Act?



**TRIGGER 1 is reached (6 days lead-time)** = the red line reaches the orange line for at least 2 consecutive days



**EARLY WARNING:**  
Warning email automatically sent to VNRC Focal person



**TRIGGER 2 is reached (3 days lead-time)** = the red line still reaches the orange line for at least 2 consecutive days



**TRIGGER TO ACT:**  
Warning email automatically sent to VNRC Focal person  
Funds released  
Early Actions Implementation

## EWS – When to Act?

From the 15 of April until the 15th of September,

- when IMHEN forecasts a Heat Index exceeding the 99th percentile-based threshold for at least 2 consecutive days in Danang,
- or a Heat Index exceeding the 97th percentile-based threshold for at least 2 consecutive days in Hanoi and Hai Phong,
- then VNRC will act in the respective city(ies). We expect the lead-time to be 6 days.

**Output accessible to VNRC HQ focal person 7/7days, 24/24hours on a dedicated website:**

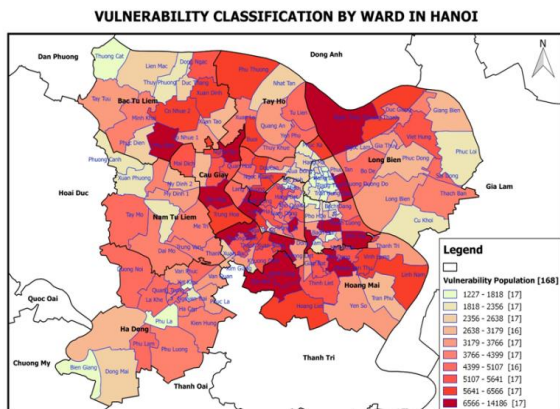
<http://222.254.32.12/~rcm/FbF/HeatIndex.html>.



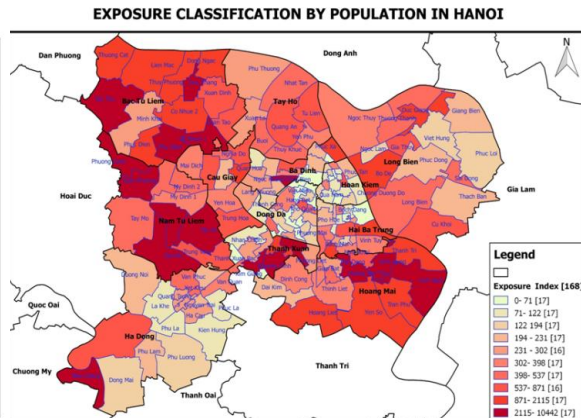
# EWS – Where to Act?

## Targeting Beneficiaries & Locations: Impact Forecast Mapping

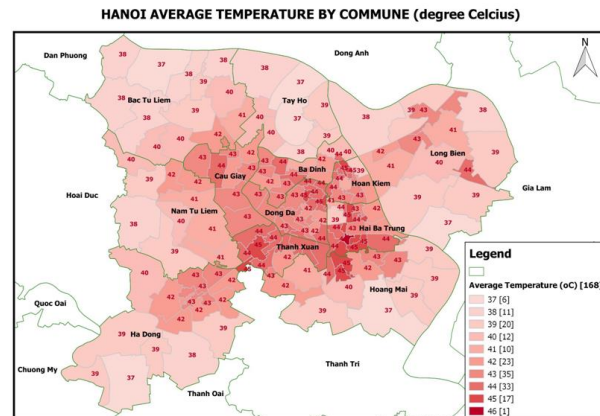
Vulnerability



Exposure



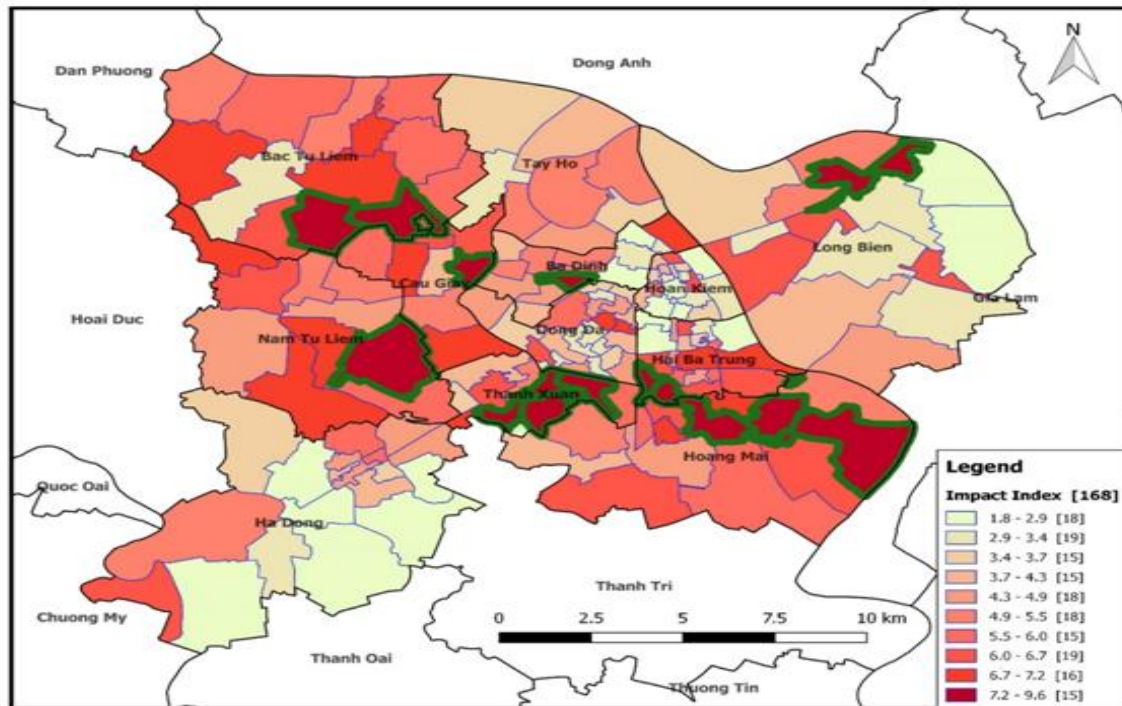
Hazard





# Targeting Beneficiaries – Impact Forecast Mapping

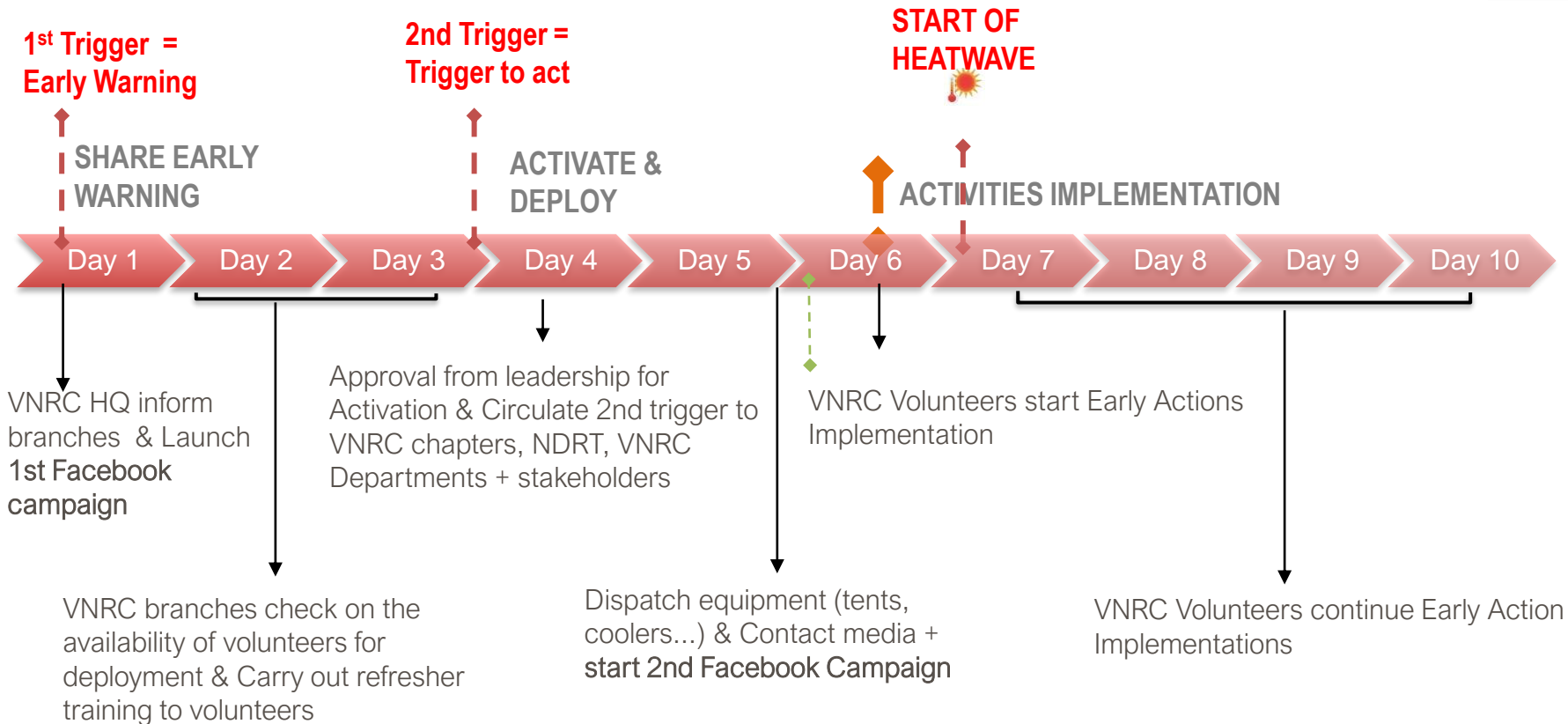
**HEATWAVE IMPACT INDEX FOR WEIGHT OPTION 2**



Hanoi's intervention map

In green the 10% most at risk wards (compilation of Exposure, Vulnerability and hazard layers)

# EW & EA implementation Process





Thank You!  
Questions?

[www.forecast-based-financing.org](http://www.forecast-based-financing.org)  
"FbF ready" Newsletter