

## Making Decisions to Save Lives Endangered by Heat Waves

CRUISSÉ Pilot Project: Start Network working with Dr Erica Thompson, London School of Economics

### The Challenge

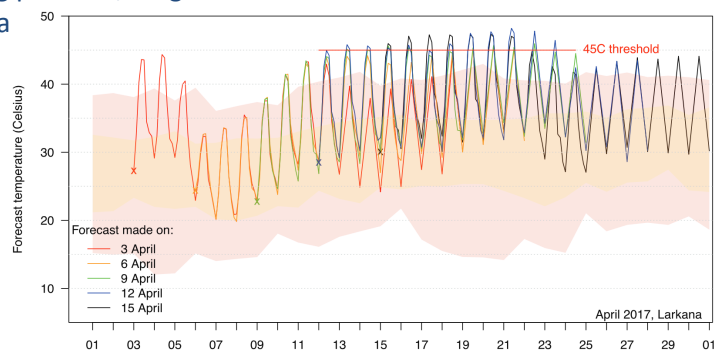
The Start Network is an international network of humanitarian NGOs, working together to connect people in crisis to the best possible solutions. The Start Network is pioneering humanitarian action in anticipation of crises caused by a range of factors from hurricanes to political conflict, based on forecasts from different experts and systems. In 2017, an Anticipation Alert (Start Alert Note #157) was raised for anticipation of a heatwave in Pakistan, but the available information and the capacity of the Network to understand, process and act on that information were insufficient to trigger activation of the alert and release funds – in part, because the event was already in progress when the alert was raised. It was frustrating for local NGO representatives then to see humanitarian impacts during the subsequent heatwave. The challenge is to work with the Start Network to implement a system for making more timely use of the available forecasts.

### Proposal

Discussions about the 2017 Alert suggested that there were several opportunities to improve the response. Weather forecast information is available for several weeks on commercial websites and for somewhat shorter periods on more official channels, but there is little indication of how reliable it may be at different lead times. There was general understanding that the longer forecasts have less value, but the raising of an Anticipation Alert is a delicate balance between alerting close enough to the event to be sure that the anticipated crisis is likely to occur, and far enough in advance to be able to take useful action. We proposed a pilot study which, for heatwave in Pakistan, would look at the available meteorological information and combine this with the timescales of potential action to define a lead time at which an Anticipation Alert could be reasonably submitted. It was clear that discussion would be needed to ensure that the most appropriate variables were considered – response agencies know that heatwave impacts are a function not just of maximum temperature and humidity but also of working patterns, religious observance and other factors. A briefing would then be prepared and a webina

### What we did

We began by canvassing opinions from Pakistan-based NGO representatives about vulnerability to heatwaves and experience in past events. There was also a lack of clarity about the reliability of forecasts at different lead times, and it seemed that many different forecasts were being used in a very ad hoc way, from commercial weather forecast websites to experimental seasonal forecast data made available by academics. Following this consultation, it was decided that the work should first summarise what information is available from different providers and give some pointers for quick interpretation. As the climate of Pakistan varies significantly from coastal areas to the inland river plains and the mountainous north, different weather conditions cause impacts on human health. In particular, central/inland areas experience the most extreme heat as well as having some of the poorest rural areas with vulnerable populations working outdoors. Karachi, on the coast, experiences lower temperatures but more humidity.



Missed opportunities for anticipating the heatwave in 2017

Given these starting points, the briefing considered three main topics:

- definitions of “extreme heat” and comparison with existing official advice or protocols;
- what forecasts are available for different lead times;
- how reliable are forecasts at different lead times?

## Achievements

During the webinar in April 2018, the partner group reached a consensus that given the available information and on-the-ground constraints, it should be possible to raise useful anticipation alerts for heatwave in Pakistan with a 7-day lead time. All members would now be looking at the same information when monitoring a developing situation, saving time in the pre-alert phase and reducing confusion or miscommunication. A “heat index” was identified as being of particular use to be able to quickly assess the likely impact of humidity accompanying extreme heat. Some examples showing temperature and humidity for recent events provided a real-world context to interpret that information. There was a particular concern about the upcoming summer of 2018 in which the heatwave would coincide with the religious observance of Ramzan/Ramadan, potentially increasing levels of vulnerability.

After the webinar, participants agreed to form a standing group for monitoring and communication in the event of a forecast heatwave. At the end of May already high temperatures were forecast to peak further at up to 49 degrees in Sindh province, with Heat Index as high as 53 degrees. Although not an unprecedented level of heat, this was during Ramadan, with other factors including loadshedding (rolling electricity blackouts) and a water shortage in some areas. The group acted quickly, preparing a well-evidenced Anticipation Alert #237 which was approved by the activation committee, releasing £70,000 for humanitarian projects. Activities were designed to complement the existing heatwave plans developed by local and national government authorities, including support to increase awareness of heatwave risks and mitigation at district level.



Heatstroke awareness messaging on vehicles

## Academic value

The pilot study considered a single hazard (heatwave) in a single geographical region (Pakistan), and has demonstrated that there is significant value in the approach if it refers to the variables of most interest, shows that there is enough predictability at a sufficient lead time to take action, and can be adequately integrated with existing systems assessing other factors such as vulnerability. There is now, of course, an interest in extending this work further to other regions and hazards, possibly even to non-weather-related forecast systems such as volcano or epidemic forecasting. The mathematical characteristics of predictability vary a great deal even across heatwave in different areas, due to the different dynamical features of local meteorology, but the principle of assessing forecast reliability based on a historical catalogue of events is general. The crucial step is the co-development of the system such that it both incorporates the local knowledge and experience of the humanitarian decision-makers, and gives results which can be integrated into their decision systems. Heatwave was chosen for the pilot partly due to the user demand but also because it was anticipated to be a reasonably tractable research question with smooth edges (a “missed” heatwave is probably still a very hot day): in our planned extension of the work to consider the use of cyclone forecasts for anticipatory humanitarian action, we expect that there will be further interesting challenges around the boundaries of the event and the consequences of a “missed” event.

*“For us this project was a huge success – the procedures around the alert were improved dramatically. We look forward to continuing our partnership with LSE to look at cyclones and other humanitarian events.”*

**Sarah Klassen, Start Network**

*“[R]elevant models can be devised those practically help communities to shield themselves from extreme weather conditions. I strongly support to continue these conversations to further deepen our understanding.”*

**Asim Jaleel, Tearfund, Pakistan**

*“I am driver and mostly expose to sun, while long waiting for customers and to negotiate the fare with them, I received the text on my number, and it was good to take preventive measures.”*

**Rashid Ali, Karachi, Pakistan**