Managing weather disasters by livelihood

Weather hazards such as droughts, floods or storms disproportionally affect the most vulnerable and are one of the leading causes of humanitarian disasters, especially when combined with growing populations, political unrest and other social barriers.

In addition, there is a significant gap between economic losses caused by weather-related disasters, and insured losses – known as the "protection gap"- making economic and social recovery even more challenging.

AXA XL, a provider of property and casualty global commercial insurance, recognises that we must better protect people affected by weather-related disasters. One of the ways we can do this is by working with, and learning from, organizations and experts across sectors that are also helping disaster-prone communities recover and rebuild.

PennState

Together with geo-statistics experts at the Pennsylvania State University, we are looking to assess how we can create more tailored solutions to inform both humanitarian response and narrow the protection gap.

The challenge

Effective humanitarian assistance for weather hazards requires an understanding of numerous types of shocks and stressors a community may face and what combination and sequence of those events can cause a wide-scale disaster. Equally, disaster response information is only useful if kept in a relevant context of who will be using the information and for what purpose. The information must also be paired with the ability to respond in a timely fashion.

But 'effectively' responding to the weather requires more than just a forecast. Meteorological information must be balanced with context specific knowledge about how a community might be affected. The meaning of 'normal weather conditions', or 'the worst drought in 10 years' vary hugely across geographical regions. Their meaning will also vary for differing livelihoods or social groups in the same location. Similarly, many communities are equipped to respond to a single weather event, but multiple 'less serious' shocks can hit disproportionately hard.

There is a large amount of weather information available to support humanitarian programming. However, current resources tend to cluster either at the raw weather data scale (weather forecasts/ observations), or are fully derived, multifaceted "disaster risk" resources, such as food security indices. There is less granular information that bridges the gap, explicitly linking livelihoods, geographies and weather conditions.

This has also been a problem for the designers of parametric weather finance products such as Forecast Based Finance or Index insurance. These products trigger financial compensation directly from a weather forecast or observation, allowing humanitarian agencies to react in advance of a weather shock, preventing one from turning into a disaster. Index insurance also plays a secondary role in providing a financial safety-net for those seeking to build resilience without fear of the financial consequences of a severe weather event. Parametric products are proving a valuable tool in the humanitarian toolkit, but it can be difficult to fully integrate local contexts or livelihoods into product design.

Our aim

We aim to assess whether a livelihood-centred approach can lead to more tailored weather advisories for the humanitarian sector, created without the need for extensive field-work campaigns.

Specifically, we suggest that humanitarian programming or response might benefit from improved mapping of livelihood specific 'weather vulnerabilities', their corresponding historical baselines and the skill of free, remotely sensed products that are able to measure them. For example, a humanitarian organisation's ability to look up the region they are working in and monitor in real-time if adequate rain had fallen for crops to fully mature, can give weeks or even months of warning ahead of a poor harvest and the food insecurity that ensues. Our initial pilot campaign is focused on Somalia, but we expect the methods to apply to other countries and humanitarian caseloads.

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Project outcome

We will:

- Build a suite of weather profiles for a range of Somali livelihoods. Each will include a summary of the specific weather vulnerabilities and geographies of that livelihood, along with an assessment of historical weather impact. We are aiming to record what "normal" means and which weather statistics are important to watch (including more complex "multi-year" scenarios). The profiles will be created through a mixed-methods approach that pairs analysis of existing literature with interviews of key humanitarian stakeholders. There will be a general focus on rainfall related hazards, but this analysis will inform the specific weather statistics on which we focus.
- Collect a large array of remote sensing data for Somalia (including rainfall, soil moisture, vegetation, and land-surface models) and create documentation on how each product can be visualised and accessed. We are also collating and including historical (livelihood delimited) annual food security profiles, such as those created by FAO Somalia's Food Security and Nutrition Analysis Unit (FSNAU).
- Develop a series of tailored weather indices using the sociological research outputs and assess the efficacy of these remotely sensed products to capture them, whilst addressing questions about spatial scale and uncertainty. The indices will be refined through additional consultation with our humanitarian partners. AXA XL will also provide expertise to assess the potential for using these indices in novel prototype weather financial products.
- Share the lessons learned and methodologies employed to allow others to reproduce this work for another region.

This project is not designed to create a new portal or decision-making tool. Instead it is designed to lay the research groundwork for making existing tools more effective. For example, project outputs will not replace the extensive in-country effort needed to design a new parametric insurance product, or the equally extensive effort needed to conduct a comprehensive food security assessment. Project outputs are designed to help provide context specific weather information that is useful in day-to-day weather risk management decisions, or to guide initial product development.

We hope this process will allow us to better tailor weather information specifically for NGO resilience and disaster programming in Somalia, building humanitarian meteorological literacy. It would also complement existing combined analyses such as Integrated Phase Classification (IPC) food security assessments, allowing more tailored local appraisals based on the intersection of weather and social context.

Furthermore, we believe that the ability to know which livelihoods and geographies are most affected by multi-year weather statistics would allow increased monitoring, or "red flagging" of vulnerable communities at a much earlier point before a disaster occurs.

From a weather insurance perspective, more tailored indices could be used as the basis of new products, or used to assess existing indices. In the same region, different communities and livelihoods might have different weather vulnerabilities and insurance products would then need to be structured in different ways to be effective. Considering livelihoods in the insurance design process has the potential for innovative new products.

The case for Somalia

We have chosen specifically to focus this pilot effort on Somalia, which is geographically and socially complex, with a large variety of communities facing a variety of weather challenges. The country continues to show hope in rebuilding its political capacity and national stability, however conflict, lack of critical infrastructure and frequent weather shocks mean that its humanitarian caseload remains unstable.

Somalia is particularly at risk from rainfall related hazards and has suffered from multiple famines and humanitarian disasters, including those driven by droughts that were well forecast by meteorologists. Rainfall related shocks are often complex multi-season hazards, with a varied impact across different livelihoods.

In addition, the political situation means that, in many of the country's regions, it is currently impossible to conduct the long-term fieldwork campaigns underpinning many successful weather risk management programmes.

Why are we reaching out?

The aim of this work is to conduct meaningful research for the humanitarian sector, especially organisations making granular weather influenced decisions, or those focused on Somalia or East Africa. We would like to incorporate your views as part of this process through a telephone interview with a Penn State University researcher. For example, which livelihood zones should be prioritized, your opinions on which weather products are important to your work and where you see the gaps. In return, we would be able to provide project results and a guide to effective livelihood weather statistics that are directly tailored to your needs.

We anticipate the telephone interview would take an hour maximum and we would not request any information considered sensitive to your organization's work.

For more details, please reach out to the project's principle investigator,
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