



## It will rain: The effect of information on flood preparedness in urban Mozambique

---

Stefan Leeffers

- Floods are among the costliest and most recurring natural disasters, especially in urban centres around the equator.
- Evidence about how to influence precautionary behaviour in this context is limited.
- A study from Mozambique looks at one strategy to address this problem: information campaigns.

POLICY BRIEF MOZ-21180

DECEMBER 2022

This project was funded  
by IGC Mozambique

[theigc.org](http://theigc.org)

DIRECTED BY



FUNDED BY



## Policy motivation for research

Floods are among the costliest and most recurring natural disasters, especially in urban centres. Urban floods occur mainly around the equator in South and East Asia, sub-Saharan Africa, and the Americas (Kocornik-Mina et al., 2020). According to the International Disaster Database, floods affected 758 million people worldwide from 2010 to 2021, resulting in total estimated damages of USD 583 billion (EM-DAT, CRED, 2022). Urban flood risk will likely increase in sub-Saharan Africa due to rapid urbanisation, overcrowding of vulnerable residential areas, and climate change trends (IPCC, 2021).

While there has been a focus on mitigating and adapting to future risks, relatively little is known about how to influence behaviour in this context. Many governments provide some form of disaster preparedness information, but there is limited evidence of the efficacy of such policies on real-life behaviour, especially in developing countries.

This project studies the effectiveness of low-cost, easily scalable information interventions. The study takes place in Quelimane, Mozambique's sixth-largest city, which is highly vulnerable to flooding and has limited capacity to mitigate its effects. The project provides crucial insights into how policymakers can use information campaigns to increase the resilience of urban households to natural disasters cost-effectively.

## Overview of the research

These findings are based on surveys collected before and after Mozambique's 2021-2022 wet season and observational data, including photographs. In total, the field team interviewed 3,000 households and took 25,235 photos. The data are used to evaluate the impact of information about mitigation strategies, such as making home improvements and removing trash from streets and drainage canals. Three hundred urban communities are randomly assigned to control and treatment groups. Across the treatment groups, households and community leaders watch an informational video, receive informational text messages, or both. There are two types of treatment videos between which the identity of the speakers varies, using either i) local public officials or ii) residents with recent flooding experiences. The number of households targeted within a city block depends on the assigned treatment, varying between two families and 30% of the households.

An important innovation of this project is the way the removal of trash is measured. Before and during the wet season, it is crucial to keep streets and drainage canals clean to avoid having trash block the canals and cause floods (see, for example, World Bank, 2017). Photographs taken by the field team at

the city block level and along the drainage canals are classified and turned into data using a machine learning-based algorithm. The employed Vision-Language model enables the user to ask questions about any image, such as “Is there trash?”

## Key findings

Providing information significantly impacts households that receive information, including increases in protective action-taking and perceived resilience. No meaningful differences were observed between the information mediums and the speakers' identities. Non-targeted households in treatment communities also experienced positive treatment effects. At the community level, the interventions reduced the presence of flood hazards. Drainage canals and their surroundings were cleaner, and 8-15% less trash was present in treated communities.

## Policy recommendations

Lessons learned from this experiment support future messaging efforts by informing strategies to build resilience to natural disasters. Below are four recommendations targeted at policymakers, departments responsible for disaster risk management, and local governments, particularly in developing countries highly vulnerable to extreme climate events.

### **Providing risk information bundled with examples of mitigation strategies can be a powerful and cost-effective way of improving the resilience of low-income urban residents**

Regularly providing contextualised information about flood risk to at-risk households can support local efforts to promote sustainable development.

### **The study's results suggest that while carefully designed informational content positively influenced behaviour, the medium and sender's identity did not make a difference**

Ensuring households at risk of being impacted by floods have access to easy-to-understand information is more important than the channel and sender of the information.

### **Neighbors talk**

The non-targeted fellow community members of households that received the information also experienced positive effects. This important finding could help policymakers decide to use technologies (such as television and cell phones) to disseminate messaging, even though they might not cover 100% of the population, instead of employing costly and time-consuming door-to-door visits

and megaphones. Note that 85% of urban households in sub-Saharan Africa own a television, and 89% use a cell phone daily.

**Digital tools, such as smartphone pictures, can be used by policymakers to identify vulnerabilities and improve resilience to climate shocks**

This study's photo analysis shows that recent artificial intelligence and machine learning innovations can be leveraged to obtain accurate and timely information about important climate risk-related topics.

## References

- Centre for Research on the Epidemiology of Disasters (CRED). (2022). EM-DAT: The International Disaster Database. Retrieved from <https://www.emdat.be/>
- Intergovernmental Panel on Climate Change (IPCC). (2021). *Climate Change 2021: The Physical Science Basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. <https://www.ipcc.ch/report/ar6/wg1/>
- Kocornik-Mina, A., McDermott, T. K. J., Michaels, G., & Rauch, F. (2020). Flooded cities. *American Economic Journal: Applied Economics*, 12(2), 35-66. <https://doi.org/10.1257/app.20170066>
- World Bank. (2017). *Kitakyushu Model: Subsector Approach for Promoting Green City Development*. Retrieved from <https://documents1.worldbank.org/curated/en/455461541693968319/pdf/131903-WP-PUBLIC-KitakyushuModelSubsectorWBFinalEN.pdf>