CF Challenge Fund

Deltares

Participatory terrain data and modeling

CONTEXT

As cities across the globe become more vulnerable to devastating floods due to climate change, sea level rise, soil subsidence, and increased development in flood-prone areas, there is a global need for better information on flood risk and response measures amidst considerable uncertainty. New technologies can simulate water flowing at street-level detail, allowing decision makers to assess which buildings and assets are at risk and what interventions will reduce risk. In many regions of the world, however, terrain data and exposure data are not accurate enough for these breakthroughs in risk identification techniques.

Deltares worked to combine global data with participatory mapping to create high resolution digital terrain models accurate enough for flood risk modelling at the street level. This unprecedented level of precision, available in an open access format, will allow decision-makers to better incorporate flood risk into urban planning as well as efforts to build resilience to climate and disaster risk.
CLICK TO SEE THE MAPS ONLINE
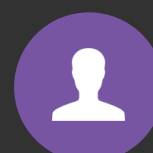
HIGHLIGHTS

A first-of-its-kind method using community-collected data to establish highly detailed elevation datasets was developed.
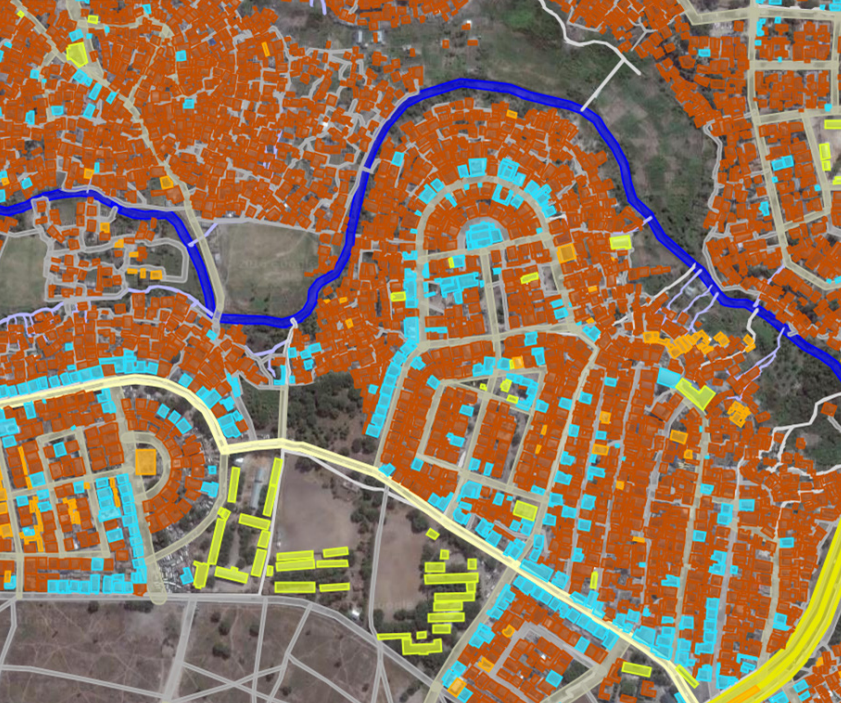
Applying this methodology with stakeholders in Dar es Salaam resulted in a highly detailed flood model.
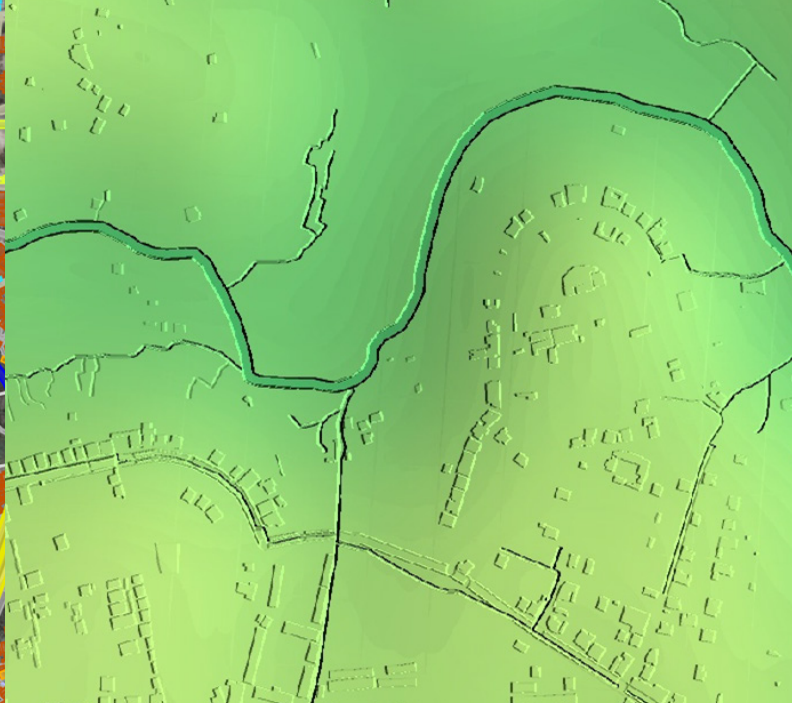
These high-resolution models will allow local and national agencies to make targeted interventions to reduce risk.

A user friendly user interface and flood model training is being developed in a phase 2 of this project.

OpenStreetMap vector data

Digital terrain model suitable for flood modeling

APPROACH

Deltares, a leading independent water research institute, was awarded Challenge Fund financing to fuse globally available data and participatory knowledge from on-the-ground stakeholders to move towards high-resolution risk models in vulnerable but data-poor regions that enable risk-informed decision making.

The project relied heavily on OpenStreetMap (OSM) data collected within the ongoing "Ramani Huria" and "Zuia Mafuriko" projects in Dar es Salaam. These projects were aimed at mapping the most flood prone wards in the city to have a baseline dataset to enable future development efforts to be more flood resilient.

A first set of terrain maps based upon the tool were used to build a two-dimensional flood inundation model of the target wards, and further refined the models during an extensive workshop with key stakeholders. These highly detailed maps will provide crucial information for effective flood risk management, inlcuding levees and nature-based risk-reduction strategies.

"The Challenge Fund project has proved critical to raising awareness of how to combat flooding in Dar es Salaam and has innovated in the application of harmonizing crowdsourced data with traditional hydrological modelling techniques."

– Mark Iliffe, Geospatial Innovation Specialist, the World Bank

NEXT STEPS

This project highlighted the importance of high-resolution flood data, but also revealed a need for easier ways to access and visualize the data and models produced. Based upon positive stakeholder feedback, the Deltares team established a mockup for a simple user interface to be implemented in the second phase of the project. The team is also developing extensive training processes for these new tools, which can also be adapted for other regions.

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