IMPROVING RISK INFORMATION IN TANZANIA

Mapping future floods

AT A GLANCE

Country Tanzania

Risks Flooding in under-serviced informal settlements

Area of Engagement Promoting open access to risk information

In Dar es Salaam, an open-source mapping project enables communities to map flood risk, share the data, and protect their city and their livelihoods against future weather disasters.

GROWING POPULATION AND GROWING DANGERS

With a population of more than 5 million, and hundreds of thousands of new residents arriving each year, Dar es Salaam is East Africa's largest and fastest-growing city. This burgeoning growth presents tremendous opportunities for poverty alleviation and economic expansion. However, it also brings challenges.

Chief among these are the effects of flooding. With average annual rainfall of 1,150 mm, around half of which occurs between March and May, the risk of flooding is high, and is increasing due to climate change. Dar es Salaam's rapid growth has exacerbated this problem: 70% of the city is unplanned, largely in the form of informal settlements which often lack adequate drainage, and many new structures are built in harm's way.

This has put considerable strain on the people of Dar es Salaam. In recent years, floods have claimed hundreds of lives, left thousands homeless and threatened the livelihoods of thousands more. However, community/civic leaders are taking action. Recognizing that they cannot stop the rain, they have set out to identify the areas of greatest risk, and better equip their city for rainy seasons to come.

Map information and accuracy, before and after Ramani Huria

BEFORE

AFTER
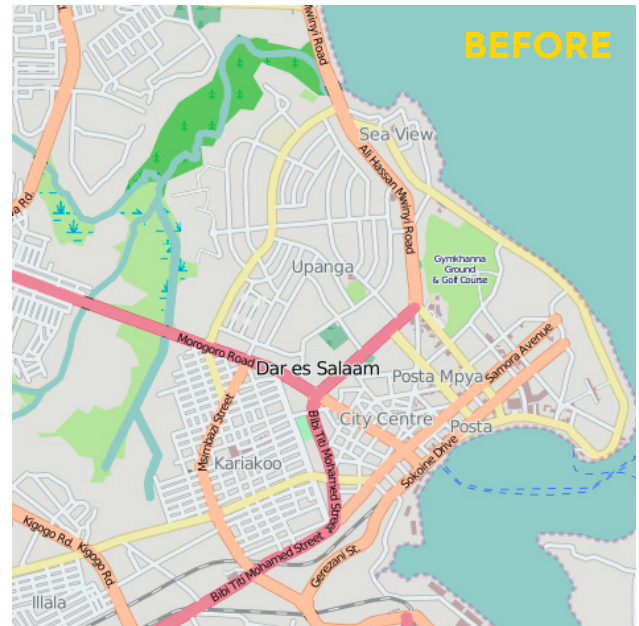
A CITY MAPS ITS FUTURE

Community leaders set out to map the city, starting with a 2014 pilot project in the Dar es Salaam's Tandale ward in 2011. Then in March 2015, with support from GFDRR and the World Bank, a broad coalition from across Tanzania – including government officials, students, and local community members – formalized the project as Ramani Huria (Swahili for "open map").

▸ The Ramani Huria program trains participants to identify and document roads, drainage systems, floodplains, and other important features to create highly accurate maps of their neighborhoods, using a wide variety of data collection methods. For example, the project team has employed the use of drones to capture high-resolution images of hard-to-reach areas.

▸ Through the project, mappers are also trained to digitize and openly share the information on OpenStreetMap, a free, open-source online mapping platform, which Ward Executive Officers can then use to plan future development and disaster response routes.

▸ Some of the resulting data also gets uploaded to InaSAFE, free software developed by GFDRR and partners that produces realistic natural hazard impact scenarios. This helps model Dar es Salaam's flood risk and improve disaster preparedness.

LESSONS LEARNED

Involving the community is important for building capacity and accessing local knowledge.

By training volunteers from around Dar es Salaam, Ramani Huria has enabled ward leaders to deliver services and plan their communities considerably more quickly and inexpensively than if they had hired outside help. Furthermore, it has helped motivate ownership of local disaster risk management among citizens.

Making data freely and openly available scales up its impact.

From the outset, Ramani Huria trained mappers to digitize their map content on OpenStreetMap. This allows free access to the content for wider use and distribution, and reduces the duplication of efforts. It also gives users the opportunity to fix errors or make updates on their own, reducing maintenance costs.

Risks mapped for
1.3 MILLION citizens

DISASTER RISKS IDENTIFIED
Through a combination of aerial and street-level imagery and data collection by GPS and mobile apps, Ramani Huria has mapped 29 wards – home to 1.3 million citizens – and 1,254 km of waterways and 3,396 km of roads. The maps generated provide valuable information about likely flood risk in vulnerable areas.

LOCAL CAPACITY BUILT
In partnership with the Humanitarian OpenStreetMap Team (HOT), 300 students from Ardhi University were trained to help with the project, building local capacity that will serve the city for years to come. This cohort will focus on mapping drainage, health care services, toilets, water sources, and building infrastructure.

COMMUNITIES ENGAGED
By engaging with city residents, Ramani Huria has gathered data on the historical extents of flooding and causes of flooding in Dar es Salaam's communities. Combining these data with traditional hydraulic surveying techniques and outputs from UAVs such as Digital Terrain Models enables the identification of ephemeral issues such as blocked drains. Community volunteers are then trained to identify and act on these issues in collaboration with the Red Cross, under their Zuia Mafuriko "Stop Flooding" project.

"By looking at the map, it is easy to be prepared in case of disasters, and can help to prevent disasters that might happen."
-- Julianna Letara, City Planner, Kinondoni Ward