

DISRUPTIVE TECHNOLOGIES FOR DISASTER RISK MANAGEMENT IN AFRICA

Mitigating risks with technological innovations

AT A GLANCE

Region: Sub-Saharan Africa

Risks: Urban risks, flooding, landslides

GFDRR Areas of Engagement: Promoting open access to risk information; Scaling up the resilience of cities

Innovations in mapping technologies are unlocking data on risk and exposure identification in Africa's fastest growing cities.

DATA GAPS LEAVE URBAN COMMUNITIES IN THE DARK ON DISASTER RISKS

Cities across Africa are experiencing rapid demographic expansion. By 2050, it is estimated that an additional 950 million people will be joining the 451 million already living in these cities. This rapid expansion poses a significant challenge for urban planners and policymakers who are assessing their cities' vulnerability and resilience to disaster risks. Significant data gaps have developed as city planners have not been able to keep up with the growing population and identify which communities or what critical infrastructure are most exposed to natural hazards.

Furthermore, the data collection and analysis resources that are available are not evenly distributed, as these have usually benefited larger megacities. This is even though smaller and mid-sized cities often have higher growth rates, leaving these secondary and tertiary urban centers more vulnerable to unidentified hazards as a result of limited data, political power, and human and financial resources. Addressing this gap in quality, actionable data is necessary for national and municipal institutions to have a clear understanding of the hazards faced by their communities so they can build resilience through informed policies and strategies. The Africa Caribbean Pacific – European Union Natural Disaster Risk Reduction (ACP-EU NDRR) Program is supporting efforts that address these information gaps, with an eye for informing



Participants learn how to fly drones at a workshop in the Seychelles.
Photo: Drones for Development / World Bank

disaster risk management in the continent's fastest-growing cities. The ACP-EU NDRR Program is an initiative of the ACP Group of States, funded by the EU and managed by the Global Facility for Disaster Reduction and Recovery (GFDRR).

TECHNOLOGICAL IMPROVEMENTS BOLSTER ACCESSIBILITY AND QUALITY OF DATA

In order to address technological gaps and the quality and accessibility of data, the project is empowering urban communities and institutions by directly providing them with the tools and expertise to collect data and carry out risk assessments. Urban stakeholders are learning to master technologies that will improve their data collection capacities, such as satellite image acquisition, drone-based mapping, survey applications and artificial intelligence.

Furthermore, civil society organizations specializing in geospatial data collection are playing a key role in providing citizen feedback on prioritizing risk assessment interventions and validating observations made by researchers, thanks to the project's engagement with local communities and in particular with youth and student groups to teach skills such as data validation using phones and laptops. Several metrics are being measured with these new technologies that provide a detailed picture on the level and type of disaster risk faced by communities, such as the analysis of population build-up and densities, spatial urban indicators, estimates of population



Community members using technology for vulnerability mapping activities. Photo: World Bank

levels and percentage of people at risk from hazards. 3-D data is also being collected to provide a precise image of geographic surroundings that will prove valuable when conducting flood risk assessments.

RESULTS AND ACHIEVEMENTS

- Analyses of risk exposure in cities were produced in 118 prioritized cities, up from an initial list of 23 prioritized cities. Each of these studies included a different list of metrics to be studied in each of the selected cities, ranging from an analysis of population build-up and density, spatial urban indicators, population estimates and growth-rates, and population at risk of hazards. The studies were also expanded to include the collection of 3-D data.
- The use of drone technology for risk mapping has engendered significant interest. For instance, over 1,000 participants from across Africa participated in the Africa Drone Forum, an opportunity for knowledge exchange on the use of drones for geodata collection. The ACP-EU NDRR Program was a partner of the forum which was held in Kigali, Rwanda in February 2020.
- The benefits of the technologies espoused by the project have demonstrated considerable benefits in responding to the COVID-19 pandemic in urban settings. Satellite imagery, artificial intelligence, and drone surveys have been used to identify COVID-19 outbreaks and hotspots in cities, resulting in demands for additional investments in digitalizing urban data using remote and satellite-based tools.

LESSONS LEARNED

Promoting the use of new technologies improves the understanding of risks and facilitates decision-making by policymakers

In order to help policymakers address information gaps at the national and sub-national level, it is critical to promote the use of new technologies that yield detailed, actionable data for urban policymakers to identify and mitigate vulnerabilities. Based on the most recent improvements in satellite imagery, survey applications, the accessibility of drones, and artificial intelligence for image classification and analysis, these technological innovations will significantly enhance the quality of risk mapping in urban areas and provide a detailed understanding of exposure levels for urban planning.

Grassroots data validation is key for accurate risk assessments

The focus on youth participation as a means of community engagement has produced very positive feedback. Youth participants have been actively engaged in data validation activities, taking on activities such as geotagging images and classifying building types on mobile devices.

Building networks facilitates open participation and knowledge exchanges

Encouraging participation of stakeholders in capacity-building or training events such as the Africa Drone Forum ensures that stakeholders from a wide variety of backgrounds are able to connect with their peers and learn from their experiences and best practices. Establishing relationships between local experts and established NGOs and private sector firms specializing in data collection technologies can form productive partnerships that further facilitate data and knowledge sharing.