

MAPPING TO BUILD RESILIENCE IN KATHMANDU

Mapping local communities to reduce disaster risk

AT A GLANCE

Country Nepal

Risks Data and information gaps exacerbating seismic hazards

Area of Engagement Promoting open access to risk information

In earthquake-prone Nepal, citizens trained to map local areas are helping in the government's effort to build seismic resilience.

DATA AND INFORMATION GAPS HEIGHTENING RISKS

As in many developing nations, maps of Nepal have been often outdated, frequently missing data, and sometimes only accessible on a pay-per-view basis. The dearth of reliable geographical information may erase the names of villages, prevent governments from accessing their assets, and create confusion about where to provide aid after a natural disaster.

In Nepal, these data and information gaps only heighten the earthquake-prone country's high seismic hazards. Kathmandu, the Nepali capital, is the world's most seismically at-risk urban area. The city's residents face the highest mortality threat from earthquakes of any urban population.

The threat of a large earthquake in Nepal spurred the government to implement the Open Cities Project, a program supported by GFDRR's Open Data for Resilience Initiative (OpenDRI). Initiated in November 2012, the project aimed to build the seismic resilience of the Kathmandu Valley's education and health infrastructure by training civilians to map their local areas.

An area of Kathmandu mapped under Open Cities



LEVERAGING CITIZEN PARTICIPATION TO THE CITY

Under the project, volunteers used the open-source OpenStreetMap (OSM) platform to map road networks, schools, and health facilities. Over two years, Open Cities Kathmandu (comprising members of the local chapter of OSM) trained more than 1,500 people in Kathmandu to use OSM. In that time, residents mapped over 130,000 buildings. The remote mapping was combined with extensive on-the-ground verification.

Mappers collected data that included building type and incorporated construction characteristics, which helped reveal vulnerability to hazards. They also gathered helpful information on road networks, village names, and boundaries.

Mapping activities in the Kathmandu Valley were aimed at preparedness and risk reduction, with the knowledge that any data would be valuable when the next earthquake struck. When two high-magnitude earthquakes with an epicenter near Kathmandu struck Nepal in April and May 2015, causing the deaths of nearly 9,000 people and destroying over a half a million homes, the information gathered during this project

proved crucial to informing response and recovery efforts.

The project brought together stakeholders from the Department of Education, the National Society of Earthquake Technology, donor agencies, and civil society. Together, they helped generate usable information through community mapping techniques, and developed applications and tools that inform decision making. The project also helped launch a local innovation lab, the non-profit Kathmandu Living Labs (KLL).

The Open Cities Kathmandu project concluded in the fall of 2013. However, multiple organizations, including KLL, remain on the ground to pioneer additional mapping efforts. KLL is now a permanent organization and has received funding from the U.S. Embassy in Nepal and ICIMOD, a local technical organization, to continue OSM trainings and mapping activities. In addition to its mapping efforts, KLL has since been involved in several data-collection projects designed to reduce disaster risk in Nepal, including damage assessments, relief-distribution tracking, and reconstruction monitoring. Building on the success of the Open Cities Kathmandu project, efforts targeting urban areas under OpenDRI have been scaled up globally, including to cities in Bangladesh, Indonesia, and the Philippines, as well as to rural Malawi.

LESSONS LEARNED

Government involvement can provide legitimacy for disaster risk management and urban planning projects.

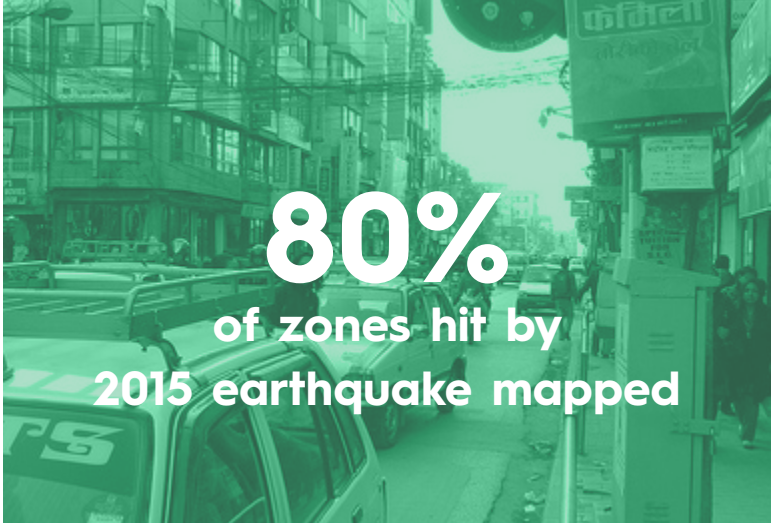
To ensure the success of mapping and other disaster risk management efforts, implementers must cultivate support at all levels of government. As a result of its involvement in Open Cities Kathmandu, the city's Department of Education felt more confident about using the mapping data to prioritize seismic retrofitting projects. As part of this process, the mapping team had an official letter of support that allowed them to gain access to schools and health facilities.

Technology and data projects must be long-term endeavors.

Field verification tests performed following the first map training yielded only a 50 percent accuracy rating. However, over time, after surveyors attended additional trainings, the accuracy of the structural data collected by the mappers rose to 100 percent.

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80%

of zones hit by
2015 earthquake mapped

EARTHQUAKE-HIT ZONES MAPPED

In response to the 2015 earthquakes, over 6,000 volunteers participated in adding data to OpenStreetMap (OSM), helping map up to 80 percent of the affected zones. The project helped create base maps of the Kathmandu Valley by digitizing footprints for 126,105 buildings, mapping 3,716 kilometers of road network, and surveying 2,256 schools and 350 health facilities.

EMERGENCY RESPONSE AND PREPAREDNESS PLANNING NOW DATA-INFORMED

The Nepal military, the Red Cross, and many other organizations used the OSM data to provide on-the-ground emergency assistance. Further, organizations like USAID now incorporate the data collected through OSM Kathmandu into long-term disaster preparedness planning exercises.

OPEN DATA FOR RESILIENCE MOVEMENT CATALYZED

The project has been credited with catalyzing an open-data-for-resilience movement in Nepal. Drawing on its pioneering mapping efforts, Kathmandu Living Labs (KLL) has since been involved in several data-collection projects designed to reduce disaster risk. UNDP, DFID, UNOPS, the Swiss government, and USAID have conducted follow-up mapping activities. Meanwhile, project participants who have joined the Nepali government have also trained other government employees on OSM.

"The Open Cities Project gave us lots of opportunities to explore, innovate, and create a foundation to advance the OSM movement in Nepal. We invested a lot of time in learning, and connecting technology and data to people. Technology is useful only if we can connect it to the everyday lives of people."

-- Dr. Nama Budhathaki, Founder and Executive Director of Kathmandu Living Labs