

# Darjeeling Himalayas gets a people-centric early warning system for landslides

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- A community driven early warning system for landslides has been put in place by the Geological Survey of India in the Darjeeling Himalayas. In a bottom-up approach, the system relies on rainfall threshold measurement by members of the local community that is then shared with the administration for timely action.
- **It is backed by a body of long-term research by GSI on rainfall threshold, landslide vulnerability mapping and on surface deformation using a radar-based technique.**
- Information from a pre-trained set of volunteers can easily be combined with data extracted from social media for disaster relief.

[In landslide-prone Giddapahar, a small hamlet nestled in the Darjeeling Himalayas known for its fragrant black tea, Bikash Thapa has become his community's very own rain man.](#)

[Aided by his faithful rain gauge, Thapa unflinchingly measures the level of rainfall every day at regular intervals. And when the threshold is breached, he whistles and sends off a message, alerting the rest of the village and district administration to a potential landslide.](#)

[Empowered by science, Thapa, responsible for rainfall threshold estimation, is in fact, a key resource person in India's first community-based early warning system for landslides, according to the](#)

[Geological Survey of India](#)

[. A rain gauge installed at Giddapahar village for people-centric landslide early warning system. Photo by Darjeeling district administration. Called the "People-centric Landslide Early Warning System" \(L-EWS\), the system was deployed on September 7 in Giddapahar by Geological Survey of India, the nodal department for landslide-hazard management in India, in partnership with the Darjeeling district administration in northern West Bengal. Launched on an experimental basis, the bottom-up approach empowers and relies on the community to manage the landslide warning system.](#)

["The set-up empowers the people in the village to take decisions so they can take steps in the right time. The simple and low cost system lets members of the community in the landslide-susceptible areas apply and interpret rainfall data to reduce risk to life," Pankaj Jaiswal, director, Landslide Studies Division, Geohazards Research and Management Centre \(GHRM\) at GSI, told Mongabay- India. The effort is an outcome of the project "Development of rainfall threshold based Landslide Early Warning System for landslide hazards in Darjeeling district, West Bengal" undertaken by the Landslide Studies Division, GHRM Centre, GSI. In this system, the community monitors the rainfall, analyses its threshold value and exceedance, generates warning and communicates to the local community and block administration, and takes decisions on evacuation, if required.](#)

["Early warning is very important to all of us, not only in this village but also to people in neighbouring villages. Lives have been lost and our properties damaged. With the training we received to monitor rainfall and landslide signs, we hope that we can save many lives in the ongoing rainy season," Thapa told Mongabay-India. Early warning system deployed at Kurseong in the Darjeeling Himalayas. May by Mongabay-India. The Darjeeling hills are hemmed in by the Sikkim Himalayas in the north, the Bhutan Himalayas in the east and the Nepal Himalayas in the west. The average annual rainfall in the district is 3092 mm. Giddapahar village is in Kurseong subdivision of Darjeeling district that has a history of landslides with records going back to 1899. Data from the National Landslide Susceptibility Mapping \(NLSM\) programme for northern West Bengal shows that almost a sixth of Darjeeling and Kalimpong districts, or 17 percent, are in the high risk zone. In Giddapahar, which lies in the Paglajhora catchment, land-slips have been reported since 2003. The village with around 60 households is located on the crown of an active rock slide which reactivated several times in the two decades. The houses and grounds have developed cracks and show signs of active mass movement, a GSI statement said. This stretch along National Highway 55 also sees frequent road connectivity disruptions due to landslide events.](#)

["People have been living with landslides but we are increasing their coping capacity and resilience with the help of this system. Landslides can strike at any hour and sometimes it is not possible for district officials to reach in time. By strengthening community participation we can ensure timely help," said Tirthankar Sanyal, district disaster management officer \(DDMO\) . A people-centric landslide early warning system deployed by Geological Survey of India in collaboration with the Darjeeling district administration. Photo by Geological Survey of India. District officials and experts highlighted that all it takes for the system to work is a tipping bucket rain gauge, a rainfall threshold chart, whistle, mobile/internet messenger and a billboard. Discussing details of the mock drills and training sessions conducted by GSI, Arpan Golay, the block disaster management officer for Kurseong, elaborated on the mechanism of action.](#)

["When we get an IMD alert for heavy rainfall, the person in-charge of the rain gauge intensifies measurements \(at frequent intervals\). He or she compares the rainfall of the previous three days with the measured event day rainfall to take decision on threshold crossover for the warning," said Golay. Thapa said he usually maps rainfall every four hours but steps it up to two-hour intervals following heavy rainfall forecast. The resource person, depending on the threshold chart, sets off three continuous whistles with a pause \(in addition to a Whatsapp text\) to signal an "alert." If the threshold is crossed, then he fires up the "alarm" \(continuous whistling and texts\).](#)

["When the alert is sounded, we encourage the community at risk to be ready and prepared with their essentials. At this time they also keep regular vigil at night and look for signs for potential landslide such as boulder falling, groundwater movement, any rumbling sounds or cracks appearing on ground," said Golay. On the "alarm" signal, villagers are evacuated to safe shelters at strategic points.](#)

["We sound off the whistle as well as keep alerting the block officials via messages and Whatsapp texts," Thapa said. A billboard installed at a vantage point in the village depicts the key elements of the system so that the community is familiarised of its utility.](#)

[GSI experts training community in collaboration with district administration for the early warning system. Photo by GSI. BANNER View of the active 14-mile landslide in the Darjeeling Himalayas. Photo by Geological Survey of India. First published by \*\*Mongabay\*\* on 19 Sep. 2018](#)