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Death by landslides in God's Own Country

Jinoy Jose P   Updated on August 24, 2020

The devastating landslide in Kerala's Munnar region signals the dire need for ramping up disaster alert systems while enhancing climate change mitigation efforts, Jinoy Jose P reports

Last year's Onam was special for Joshua. During the festivities at Chinnakanal's Fathima Matha school where the 13-year-old from Idukki's Pettimudy studied, Joshua played 'Maveli' - the Asura King Malayalees fondly remember during the harvest festival. "He had so much fun," remembers Sojan Munnar, who teaches at the school. "We'd miss our Maveli this year." Joshua is among the 19 children who were killed in the landslide that devastated Pettimudy, a hilly hamlet in Kerala's idyllic Munnar region at 10.45 pm on August 6.

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Kanan Devan Hills Plantations Company, which produces and sells one of the most popular brands of tea in the country. Pettimudy lies near Rajamala, home to the Eravikulam National Park. On August 6, a shola forest in the national park gave in during the torrential downpour, triggering the massive landslide that during its wild course downhill wiped out shelters of hapless plantation workers, almost all of them belonging to low-income families.

Floods and after

The landslide came just when Kerala was in the throes of yet another episode of widespread waterlogging, much like the infamous 2018 floods which claimed more than 500 lives, prompting the evacuation of over a million people. The floods and the massive spell of landslides that came along with them had set off a debate in the State and across the country over the immediate need to have a relook at the way such disasters are predicted and managed, especially over the urgency with which governments and the public at large should respond to climate change that introduces erratic changes in weather patterns.

Considering this, the Pettimudy landslide came as a giant shocker. Clearly, the landslide was initiated by the heavy rains that visited the region in the first

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indiscriminate land use and planning as it occurred deep inside the pristine forests. "No landslide was reported in this area for decades. No quarries or resorts operate nearby."

The preliminary assessment of Kerala's Disaster Management Authority (KDMA) shows that on August 6, the Pettimudy estate division recorded an unprecedented 22.6 cm rainfall.

The week saw massive spells of rains, raising concerns of landslides in Idukki district, which is prone to them. Pettimudy does not technocally fall under KDMA's High Hazard Zones and the region is not known for landslides of alarming magnitude. The area was not listed on the landslide susceptibility maps prepared by the National Centre for Earth Science Studies, which government agencies follow. Naturally, there was a lack of institutional wisdom to necessitate evacuation of the plantation workers in August.

That said, data from Kerala's Geology Department suggests that Pettimudy can be prone to landslides given that the area has a 40-degree slope. "Any area that has a slope of above 20 degrees can trigger a landslide during heavy rains," says Gopakumar Cholayil, scientific officer at the Academy of Climate Change Education and Research of the Kerala Agricultural University in Thrissur.

"Given that Kerala has been witnessing extreme and erratic spells of rains in the past few years, due to, mainly, climate change, these slopes have become extremely vulnerable."

Cholayil says, this year, a few areas in the Western Ghats region of Kerala had reportedly seen rainfall that crossed 60 cm. "Last year, the Nilgiris region had received over 90 cm of rainfall, setting off massive avalanches." He added that trends reveal Kerala's highlands, midlands and coasts have been receiving

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Green miles

Nearly half of Kerala's terrain has 'orographic' features (hills and mountains). Interestingly, Kerala stands third in terms of population density in the country. A 2008 paper — *History of landslide susceptibility and a chorology of landslide-prone areas in the Western Ghats of Kerala, India* — by Sekhar L Kuriakose, G Sankar and C Muraleedharan shows Kerala's highlands experience myriad forms of landslides. Of these, debris flows (Urul Pottal) is the most common. The paper shows that 13 of Kerala's 14 districts are prone to landslides. Scientists suggest that the processes leading to landslides have been accelerated by "anthropogenic disturbances" such as deforestation since the early 18th century, "terracing and obstruction of ephemeral streams" and cultivation of crops that lack "root cohesion" in steep slopes.

Environmentalists say that Kerala has seen dramatic changes in land-use courtesy unbridled real-estate development and agriculture expansion at the cost of forest cover. Kerala State Planning Board's *Economic Review 2019* shows that the State has witnessed major changes in its land-use pattern over the years. A key change is an increase in area under non-agricultural use. Of a total area of about 39 lakh ha, the cultivated area stands at about 26 lakh ha (66 per cent). Land put to non-agricultural use stands at 12 per cent and the forest area is 28 per cent. Over-exploitation of forests for farming has impacted Kerala's ecosystems. Primary forest cover fell drastically over the year, 5,000 ha a year between 1940 and 1970 and the process has been exacerbated in the recent decades. Today, Kerala's forest cover stands at a shocking 11.5 lakh ha.

Kerala's hills and mountains have seen massive land exploitation in the past few decades, observes Harish Vasudevan, lawyer and environmentalist. According to Vasudevan, who was a consultant to the UNDP's Kerala: Post Disaster Needs Assessment (Floods and Landslides) - August 2018, one can't

pristine mountainous regions such as Munnar and Wayanad (both regions now witness frequent natural disasters), pedalled by various lobby groups backed by powerful religions and political parties.

Vasudevan says most areas where landslides occurred during the 2018 floods and even in 2019 were surrounded by quarries and crushers. Such activities leave the soil vulnerable to slides, he notes.

As observed by the now-famous Western Ghats Ecology Expert Panel, popularly known as the Gadgil Commission report, headed by ecologist Madhav Gadgil, forest encroachment for farming and non-farming needs have left the Western Ghats extremely vulnerable, aggravating natural disasters. The Gadgil report, which had stirred a long chain of protests in Kerala, backed by a few political parties and pressure groups of encroachers and migrant farmers, was followed by the much-diluted Kasturirangan Panel report, which suggested just 37 per cent of the Western Ghats region should be classified as ecologically sensitive areas, against Gadgil's 64 per cent.

Lack of political will

Unfortunately, there has been a lack of political will to implement these suggestions, laments Vasudevan. "The people of the State, especially the poor and vulnerable communities such as workers, tribal people and farmers, are paying a heavy price for myopic policymaking." Vasudevan suggests that Kerala should immediately introduce a land-use policy with stringent regulations to control misuse of land. Following the 2018 floods, the Geological Survey of India had suggested that Kerala should focus on land-use planning and introduce zoning regulations to tackle landslides and strengthen disaster preparedness.

forest encroachments, civil society groups and environmentalists cry foul saying reclaiming forests and relocating people who had been living in such fragile zones is not done fast enough. Revenue Secretary Jayatilak says reclaiming forestland by relocating people is impractical given the scarcity of land. "The people in the lowlands and the highlands cannot be relocated to the midlands (which are relatively safe) considering the huge number of people to be relocated. "If we go by the maps, only about 30 per cent of the land is habitable. This is in the midlands."

Jayatilak says that there is a lack of data. "For any landslide susceptibility to be updated, the terrain data needs to be updated. This is not done by Survey of India and no other agency can do it across the State," he explains. "The best hazard map that's available now is that prepared by the National Centre for Earth Science Studies (NCESS) in 2010 and legalised by the government in 2016. It is available in the public domain."

Jayatilak informs that the GSI is working with the same terrain data as part of the National Landslide Susceptibility Mapping Project, of which all regions except Idukki have been given.

In such a scenario, to avoid tragedies such as Pettimudy is to have an integrated early warning system for landslides and floods, according to Roxy Mathew Koll of Indian Institute of Tropical Meteorology (IITM), Pune. Unless there is real-time monitoring and warning, such disasters cannot be easily averted, says Mathew Koll. The UNDP assessment after the 2018 floods had highlighted the need for developing multi-hazard early warning, communication and decision support systems must be put in place with urgency.

Warning is the key

floods — and the fatalities and social costs cannot be measured by traditional yardsticks, it makes immense sense to focus on and invest in technologies and research that help develop and implement efficient early-warning systems, says DS Pai, a senior scientist with the Indian Meteorological Department in Pune.

One of the most effective methods that help avert fatalities is to use a rainfall threshold to foresee landslides and evacuate people, suggests Minu Treesa Abraham and Neelima Satyam, researchers with the Discipline of Civil Engineering, Indian Institute of Technology Indore. The team published the paper — *Rainfall Thresholds for Prediction of Landslides in Idukki, India: An Empirical Approach* — which found that the landslides are more influenced by "antecedent rainfall conditions" rather than the amount of rainfall on the day when the landslide happens.

This means a realistic assessment of a rainfall threshold can tell us of possible landslides. If such data can be integrated with critical information on short-term and long-term land-use changes, real-time and recorded data from automatic weather stations (AWS), slope monitoring sensors and more, it can make a great difference, said Satyam, Associate Professor, IIT-Indore, who co-wrote the paper. The scientists cite successful warning systems such as Italy's SIGMA, a regional landslide warning system based on statistical rainfall thresholds, as a model to emulate. SIGMA has been functional since the 1990s. Abraham says that using artificial intelligence and machine learning with big data analytics tools can also make early warning of earthquakes, landslides and floods much easier and accessible.

If the government, businesses and civil society can join hands in this effort and find resources, time and manpower to collect, collate and share data and fund cutting-edge research in disaster warning, states such as Kerala can leapfrog in its fight against climate change-induced natural calamities, say the scientists.

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must ensure that our children enjoy a better future," says Sojan Munnar. "That's how we ensure the sacrifice of Joshua, his friends and their families doesn't go waste."

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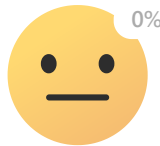Self-governance, the key to conservation
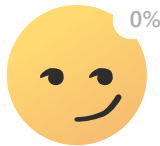
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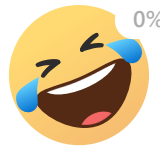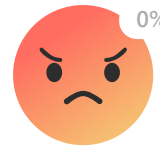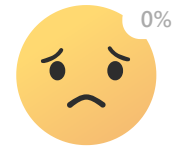| 😄 0%	😐 0%	😏 0%	😂 0%	😠 0%	😟 0%
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