GOVERNMENT OF INDIA
MINISTRY OF MINES
LOK SABHA
UNSTARRED QUESTION NO.664
ANSWERED ON 22.07.2026

LANDSLIDE EARLY WARNING SYSTEM

664. SMT. PRIYANKA GANDHI VADRA:

Will the Minister of MINES be pleased to state:

(a) whether the Government proposes to implement a pan-India Landslide Early Warning System (LEWS) in land-slide vulnerable regions and if so, the details thereof;
(b) whether prototype of the regional LEWS for the country being developed by Geological Survey of India (GSI) has proven effective in timely prediction of landslides and if so, the details thereof;
(c) the details of experimental landslide forecast bulletins issued by GSI during the last two years and its accuracy, district-wise;
(d) whether the Government has evaluated the gaps in existing Landslide Early Warning Systems and if so, the details thereof along with the action taken to address the same;
(e) whether the Government proposes to establish a Landslide Early Warning System in Wayanad Lok Sabha Constituency and if so, the details thereof; and
(f) whether the Government has taken initiatives to involve local communities & NGOs in data collection for landslide/landslip prediction and evaluated the increased efficacy of such systems wherever in use and if so, the details thereof?

ANSWER

THE MINISTER OF STATE FOR COAL AND MINES
(SHRI SATISH CHANDRA DUBEY)

(a) and (b): Geological Survey of India (GSI) has developed a prototype model and has implemented Regional Landslide Forecasting System (RLFS) based on empirical rainfall thresholds, for the landslide-prone States in a phased manner since 2020. GSI has extended the RLFS coverage to 28 districts (4 operational stage and 24 experimental stage) in 10 landslide prone States viz. Assam, Himachal Pradesh, Karnataka, Kerala, Mizoram, Nagaland, Sikkim, Uttarakhand, Tamil Nadu and West Bengal.

GSI’s landslide forecast model is mainly based on rainfall thresholds derived from past rainfall and landslide occurrence data, in conjunction with the rainfall forecast model

data received from different national agencies. This model forecasts the landslide probability of the area with four forecast levels viz. Low, Moderate, High and Very High with 24hrs and 48hrs lead time and has demonstrated fairly high reliability, with forecast showing strong correlation with ground realities during critical weather events. The landslide forecast accuracy evaluation shows the critical success index (CSI) more than 70% across the forecasting zones of operational districts viz. Darjeeling, Kalimpong, the Nilgiris and Rudraprayag.

(c) & (d): GSI has provided operational/experimental landslide forecast bulletins to 16 districts since the 2024 monsoon, and also extended the same to a total of 21 districts in eight landslide-prone States during the 2025 monsoon. The district-wise varied accuracy parameters, that is, the Critical Success Index (CSI) is given at Annexure-I. GSI has taken measures to address a few constraints in the RLFS which warranted further improvement in accuracy, granularity, and robustness with additional site-specific high-resolution inputs.

(e): GSI initiated ground work for the regional landslide forecasting for rainfall induced landslides in Kerala since 2021 and started sharing the experimental landslide forecast bulletin for Wayanad district, from 25/06/2024 with the respective State Disaster Management Authority (SDMA) and District Disaster Management Authority (DDMA) for ground testing, feedback and validation during the monsoon period. The experimental forecast bulletins have been issued for 204 and 241 days during monsoon of 2024 and 2025 respectively.

(f): GSI engages with local communities in landslide-prone areas. The Community-based volunteers and Gram Panchayat representatives are involved through coordination with SDMA/DDMA. At district and sub-divisional levels, GSI partners with DDMA, involving Tehsil and Block-level officials to cascade knowledge to grassroot communities. In 2025-26, landslide awareness programmes and use of the Bhooskhalan mobile app, developed by GSI for crowd-sourcing landslide data and visualizing forecast bulletins, were carried out in various landslide prone districts.

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Annexure-I

District-wise varied accuracy parameters viz. the Critical Success Index (CSI)

State	District	Total Bulletin Issued (Days)		Critical Success Index (CSI)	
		2024-25	2025-26	2024-25	2025-26
Operational Districts					
Uttarakhand	Rudraprayag	134	164	0.87	0.74
Tamil Nadu	The Nilgiris	218	240	0.89	0.89
West Bengal	Darjeeling	156	166	0.59	0.92
	Kalimpong	156	166	0.69	0.90
Experimental Districts					
Uttarakhand	Chamoli	126	164	0.89	0.84
	Tehri-Garhwal	126	164	0.91	0.73
	Uttarkashi	126	164	0.94	0.73
Himachal Pradesh	Kinnaur	126	164	0.96	0.90
	Shimla	126	164	0.97	0.91
Nagaland	Dimapur	-	164	-	0.36
	Peren		164		0.70
	Kohima		164		0.51
Kerala	Wayanad	204	241	1.0	0.94
	Idukki	-	233	-	1.0
Karnataka	Kodagu	-	233	-	1.0
Sikkim	Mangan	147	165	0.67	0.93
	Gyalshing	147	165	0.76	0.86
	Soreng	147	165	0.70	0.88
	Namchi	147	165	0.75	0.91
	Gangtok	147	165	0.76	0.89
	Pakyong	147	165	0.76	0.88