GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 5395
TO BE ANSWERED ON WEDNESDAY, 25TH MARCH, 2026

EARTH SCIENCE INITIATIVES IN KERALA

5395. SHRI SHAFI PARAMBIL:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether the Government has conducted any recent studies on the increasing incidence of extreme weather events including floods, landslides and coastal erosion across the country particularly in the State of Kerala;
(b) the details of early warning systems, Doppler weather radars and ocean observation systems installed in the country particularly in Kerala during the last five years;
(c) whether any proposal has been received particularly from the Government of Kerala for strengthening disaster forecasting and climate resilience infrastructure and if so, the details and the status thereof;
(d) the funds allocated and released particularly to Kerala for coastal vulnerability assessment and mitigation measures during the last five years; and
(e) the steps taken by the Government to improve the accuracy and lead time of weather forecasts in high-risk districts particularly the district of Kerala?

ANSWER
THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

(a) Yes.

(b) The Ministry of Earth Sciences (MoES) has developed advanced early warning systems for severe weather events. These systems are supported by a state-of-the-art observation network comprising surface and upper-air observations, remote sensing, high-resolution dynamical models, and an end-to-end GIS-based Decision Support System (DSS) developed by MoES institutions, which serves as the front end for early warning systems to enable detection and monitoring of weather hazards across the country, including Kerala. The system is integrated with modern telecommunications technologies to ensure the timely dissemination of information. Effective dissemination methods for weather information and alerts by the MoES are as follows:

- Public alerts and information are disseminated through mobile applications such as MAUSAM, MEGHDOOT, DAMINI, and UMANG.
- Digital dissemination channels include e-mail and SMS-based nowcasting and forecasting alerts to registered users.

- Alerts are issued through the Common Alerting Protocol (CAP) and the SACHET App.
- Information is shared via social media and mass media platforms.
- District Collectors are informed through direct e-mail and WhatsApp group notifications, in coordination with the State Governments, including the Kerala State Disaster Management Authority (KSDMA), the Fisheries Department, and the Agriculture Department.
- Broadcast dissemination is carried out through community radio, public broadcasting systems, and other local communication networks.
- Dissemination is also undertaken through State Government mobile applications.
- Gram Panchayat-level weather forecasting (GPLWF) is facilitated through digital platforms such as e-Gramswaraj, Meri Panchayat App, and e-Manchitra, in collaboration with the Ministry of Panchayati Raj.
- Weather information is disseminated to Pashu Sakhi and Krishi Sakhi at the block and Panchayat levels in collaboration with the Ministry of Rural Development.
- Weather forecasts are accessible through the Mausamgram portal of the India Meteorological Department (IMD).
- Ocean-based early warning advisories for maritime hazards, such as high waves, strong currents, swell surges, storm surges, and tsunamis.
- Provides operational support during maritime emergencies through the Search and Rescue Aid Tool (SARAT) and oil-spill trajectory advisories.
- KAWACHAM (Kerala Warnings Crisis and Hazard Management System) is operated by the Government of Kerala for issuing alerts to the public.

The Central Water Commission (CWC), under the Ministry of Jal Shakti, has been mandated to issue flood forecasts. CWC issues short-range flood forecasts with a lead time of up to 24 hrs to concerned State Governments at identified locations. Further, CWC is providing a seven-day advisory flood forecast through (https://ffs.india-water.gov.in/)/FloodWatch India 2.0 App/E-mail/Whatsapp/Facebook-CWCOfficial.FF/X-CWCOfficial_FF, Youtube-CWC Flood updates.

The Geological Survey of India (GSI), under the Ministry of Mines, has been mandated to issue regional landslide forecasts/early warnings based on rainfall thresholds. Currently, GSI issues operational/experimental daily regional landslide forecast bulletins to 21 districts in 08 (eight) States, including Kerala, during the monsoon period. These bulletins forecast information on the possibility of occurrence of landslides up to the taluk/sub-divisional level daily for the next 48 hours.

The details of Doppler Weather Radars (DWRs) and Ocean Observing Systems installed in the country, including in the State of Kerala, during the last five years, are as follows:

- A total of 16 DWRs, including new installations and upgradations, have been installed across the country during the period.
- Of these, one DWR is operational in the State of Kerala, namely, one S-band (upgraded) at Kochi.
- Coastal Water Quality buoy off Kochi
- Coastal Flood Monitoring System off Azhimala, Thiruvananthapuram
- Wave Monitoring Along Nearshore (WAMAN) Buoy off Kozhikode and Kollam
- Tide gauges off Beypore, Kochi, and Kollam
- Subsurface ADCP off Kollam

(c)-(d) No. The Ministry implements Central Sector Schemes uniformly across the country; therefore, the allocation of funds is not made on a State-wise basis. Funds under these schemes are not released directly by the MoES to the State Governments for implementation.

(e) Mission Mausam has been launched by the Ministry with the objective of making Bharat a "weather-ready and climate-smart" nation, including the State of Kerala. The Ministry is in continuous endeavour of augmenting the observational and R&D infrastructure, towards achieving better accuracy in weather forecasting.

IMD has also released a web-based 'Climate Hazard & Vulnerability Atlas of India' prepared for the 13 most hazardous meteorological events, which cause extensive damage and economic, human, and animal losses. The same can be accessed at https://imdpune.gov.in/hazardatlas/abouthazard.html. The atlas provides information that may assist State Government authorities and disaster management agencies in identifying potential hotspots and planning appropriate measures to address extreme weather events across the country, including in Kerala's high-risk districts.

The Indian National Centre for Ocean Information Services (INCOIS), under the Ministry, conducts capacity-building programmes on a regular basis and, in collaboration with the KSDMA, is implementing the Tsunami Ready Program, a community-based hazard preparedness initiative in coastal villages of Kerala.

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