GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
STARRED QUESTION NO. *532
TO BE ANSWERED ON WEDNESDAY, 1ST APRIL, 2026

WEATHER FORECASTING AND CYCLONE WARNING IN LAKSHADWEEP

*532. SHRI MUHAMMED HAMDULLAH SAYEED:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) the details of the current mechanisms and systems put in place for weather forecasting and cyclone warning in the Union Territory of Lakshadweep;
(b) the details of frequency and accuracy of weather forecasts provided for the coastal and remote islands;
(c) the steps taken to strengthen early warning systems and ensure timely dissemination of weather alerts to residents, fishermen and maritime operators;
(d) the budget allocated and utilised for enhancing weather forecasting infrastructure in Lakshadweep during the last three years; and
(e) the measures taken/being taken to integrate modern technology, such as satellite monitoring, mobile alerts and community awareness programmes to improve weather preparedness in the islands?

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

(a) to (e): A Statement is laid on the Table of the House.

STATEMENT LAID ON THE TABLE OF THE LOK SABHA IN REPLY TO (a) to (e) OF STARRED QUESTION NO. *532 REGARDING "WEATHER FORECASTING AND CYCLONE WARNING IN LAKSHADWEEP" TO BE ANSWERED ON APRIL 1, 2026

(a) The Government has established an institutional mechanism for weather forecasting and the issuance of early warning alerts for major natural events, such as cyclones, across the country, including the Union Territory of Lakshadweep. The India Meteorological Department (IMD), under the Ministry, has established a robust mechanism for weather forecasting and cyclone warning for the Union Territory of Lakshadweep through the Meteorological Centre Thiruvananthapuram, which also acts as a Cyclone Warning Centre for this purpose. A comprehensive Multi-Hazard Early Warning System (MHEWS) consisting of observational networks, forecasting models, a GIS-based interactive Decision Support System (DSS), and dissemination mechanisms is in place for seamless monitoring and forecasting of severe weather systems, including cyclones over the Arabian Sea affecting Lakshadweep.

Forecasting services include extended range (up to two weeks) forecasts (for cyclogenesis and other severe weathers), medium-range forecasts (for 5 to 7 days) of all-weather including 5 days track & intensity forecast and 4 stages cyclone warnings (pre-cyclone watch, alert, warning and post-landfall outlook), nowcasting (up to 3 hours), sea area & coastal weather bulletins and fishermen warnings, port warnings, which provide information regarding all weather elements (wind, sea state, swell waves, visibility, rainfall, etc.) with their hazard characteristic.

Observational systems include Automatic Weather Stations (AWS), manual surface observations at Minicoy, Amini, and Agatti, upper-air observations from Minicoy and Aminidivi, satellite-based monitoring, and radar coverage from mainland systems. The Airport Meteorological Station at Agatti records Met Observations for the preparation of half-hourly weather information and meteorological reports (METARs). Additionally, ship and buoy observations, along with radar (Kochi and Thiruvananthapuram), are being utilized by the IMD for weather forecasting for the Lakshadweep Islands.

Warnings are disseminated through the Common Alerting Protocol (CAP), SMS alerts, official websites, mobile apps, media platforms, and coordination with UT administration and disaster management authorities, ensuring timely, actionable information for public safety.

(b) Weather forecasts for coastal and remote islands, including Lakshadweep, are issued by the IMD through its operational forecasting center – Meteorological Centre Thiruvananthapuram. The frequency of forecasts and accuracy of warnings for heavy rainfall are as follows:

Frequency of forecasts:

Type of forecast	Validity period	Issue frequency
Nowcast warnings	Up to 3 hours	updated every 3 hours (with additional updates as required)
Short/medium-range forecasts	Up to 7 days	updated four times daily
Extended range forecasts	Up to two weeks	Issued weekly (Thursday)
Coastal weather bulletins	12 hours	Issued twice daily, and more frequently during adverse weather
Fishermen Warnings	Next 5 days	Issued four times daily, and more frequently during adverse weather
Cyclone warnings	Stage 1 Pre-Cyclone Watch -72 Hours in advance	Issued in a four-stage format with increasing frequency
	Stage 2- Cyclone Alert- 48 Hours in advance	
	Stage 3-Cyclone Warning- -4 Hours in advance	
	Stage 4- Post-Landfall Outlook- 12 Hours in advance	
Special bulletins and impact-based forecasts	Same as above	Issued as and when required
District-Wise Weather Warnings	Up to 5 days	Issued four times daily
Local weather reports & forecasts for cities	Up to 7 days	Updated twice daily

Mausamgram: The Mausamgram platform (mausamgram.imd.gov.in) is IMD's specialized weather interface at the panchayat level, designed for farmers. It offers hourly, 3-hourly, and 6-hourly forecasts for the upcoming ten days. Users can access real-time data on temperature, wind speed, cloud cover, rainfall, and humidity specific to the Gram Panchayat level.

Accuracy of warnings for extreme weather (heavy rainfall) for five days:

Verified parameters	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Percentage Correctness	72.6	81.1	83.1	89.3	81.0
Probability of detection (POD)	1.0	0.7	0.5	0.8	0.4
Skill Score	0.7	0.6	0.4	0.7	0.2

(c)-(e) The Government has taken steps to strengthen early warning systems and to ensure the timely dissemination of weather alerts across the country, including the Union Territory of Lakshadweep. In this regard, the Ministry of Earth Sciences has developed advanced early warning systems for severe weather events, including cyclones, supported by a state-of-the-art observation network, high-resolution dynamical models, and data assimilation techniques, along with an end-to-end GIS-based DSS for the detection and monitoring of weather hazards, including in coastal and remote island regions.

These systems are integrated with modern telecommunications technologies and supported by a range of dissemination mechanisms to facilitate timely communication of alerts and warnings to all concerned stakeholders, including local authorities, State Governments, Union Territories, State Disaster Management Authorities (SDMAs), the National Disaster Management Authority (NDMA), the Ministry of Home Affairs (MHA), as well as residents, fishermen, and maritime operators, enabling them to take appropriate mitigation measures. 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 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.
- Broadcast dissemination is carried out through community radio, public broadcasting systems, and other local communication networks.
- Dissemination is also undertaken through 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.
- Forecasts are accessible through the Mausamgram portal of the India Meteorological Department.
- IMD has also released a web-based 'Climate Hazard & Vulnerability Atlas of India' prepared for the 13 most hazardous meteorological events. The same can be accessed at the following link: https://imdpune.gov.in/hazardatlas/abouthazard.html.
- A suitable colour code is used to highlight the impact of the severe weather expected and to signal disaster management on the course of action to be taken regarding an impending severe weather event.

The Ministry implements Central Sector Schemes uniformly across the country; therefore, funds are not allocated on a State/UT-wise basis. Funds under these schemes are not released directly by the MoES to the State/UT Governments for implementation. Mission Mausam has been launched by the Ministry with the objective of making Bharat a "weather-ready and climate-smart" nation, including islands. The Ministry is in continuous endeavour of augmenting the observational network comprising surface and upper-air systems, satellite monitoring, high-resolution dynamical models, data assimilation techniques, and research and development infrastructure, towards achieving better accuracy in weather and ocean-state forecasting, and strengthening timely early warning systems.

The Ministry of Earth Sciences and its institutions regularly conduct awareness programmes for State and Union Territory Governments, as well as community-based initiatives, to enhance preparedness for weather- and climate-related hazards. The Ministry regularly engages with the National Disaster Management Authority, local management authorities, and other stakeholders to discuss pre-season preparedness, safety procedures, and action plans in advance of severe weather seasons. These interactions cover tropical cyclone periods (April–June and October–November), the summer season and extreme-temperature conditions (April–June), and monsoonal heavy rainfall preparedness (June–December) each year.

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