GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 1876
TO BE ANSWERED ON WEDNESDAY, 11TH FEBRUARY, 2026

MONSOON FORECASTING AND CLIMATE RESILIENCE IN ASSAM

1876. SHRI GAURAV GOGOI:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) the details of accuracy and performance of the India Meteorological Department's monsoon forecasting models during the 2025 South-West monsoon in Assam including rainfall deviation from forecasts and the improvements proposed for the ongoing and subsequent monsoon periods, district-wise;
(b) the measures taken/being taken during the current year to strengthen climate resilience in Assam's monsoon-dependent and flood-prone agricultural regions particularly in districts affected by recurrent flooding, riverbank erosion and rainfall variability; and
(c) the role of satellite-based monitoring, real-time data integration and early-warning systems in enhancing weather prediction, flood forecasting and disaster preparedness in Assam during the 2025 monsoon season?

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

(a) The India Meteorological Department (IMD) provides seamless forecasts across time scales, ranging from seasonal forecasts to short-range and nowcasts. For the Southwest Monsoon 2025, IMD had predicted below-normal seasonal rainfall over Northeast India region (which includes Assam) as well as for the subdivision of Assam and Meghalaya. For this newly implemented Multi-Model Ensemble (MME) forecasting System was used. The realized seasonal rainfall during the 2025 southwest monsoon over both the Northeast India region and Assam and Meghalaya subdivision was also below normal, in line with the IMD's seasonal forecast. The details are provided in Annexure-1. For issuing short-range rainfall forecasts and heavy rainfall warnings, IMD primarily uses outputs from various global models. For heavy rainfall prediction during the Southwest Monsoon 2025, the skill of heavy rainfall forecasts for the Assam State as a whole is 89-94%, while at the district scale in Assam, it is 75-80% at lead time of Day 1 to Day 5.

Under the Mission Mausam, several initiatives have been taken to further improve forecast capabilities of the Multi-Model Ensemble framework like upgradation of coupled atmosphere–ocean models, assimilation of improved observational datasets, and greater use of high-resolution numerical weather prediction (NWP) models. In addition, initiatives are taken to explore the use of Artificial Intelligence and Machine Learning (AI/ML) techniques for weather forecasting, including for understanding uncertainties at sub-seasonal and regional scales.

(b) To enhance climate resilience in monsoon-dependent and flood-prone agricultural regions of Assam, the Government, through the IMD, has been increasing investment with the new Mission Mausam project to further improve its early warning system. IMD is also issuing Impact-based forecasts and agrometeorological advisories to support preparedness and risk mitigation. IMD also extends support to State agencies and the Central Water Commission (CWC) by timely sharing both observed and forecast rainfall to improve flood forecasts up to a 7-day lead time, which aids planning in districts affected by recurrent flooding, riverbank erosion, and rainfall variability. For timely dissemination to the last mile, various new digital platforms are currently in use in real time, including Common Alerting Protocol (CAP)-based alerts, and apps like MAUSAM, Meghdoot, and Damini, for the benefit of farmers, policymakers, and the general public. In addition, IMD conducts Climate Service User Forum meetings jointly with the State Government to facilitate stakeholder interaction and promote effective utilisation of weather and climate services.

(c) The role of satellite-based monitoring immensely helps in enhancing weather prediction, flood forecasting, and disaster preparedness, especially for the State of Assam, by integrating various satellite data, e.g., cloud cover, winds, etc, with surface-based observations from rain gauges, Automatic Weather Stations (AWS), and Doppler Weather Radars (DWRs). Based on these inputs, IMD issued heavy rainfall warnings, flood-related advisories, and impact-based forecasts to support timely preparedness and response by State authorities. For climate resilience, IMD provides Extended Range Forecasts (ERF) with lead times of up to two weeks to support agricultural planning and reduce exposure to extreme rainfall, which complements seasonal climate outlooks. IMD also supplies high-resolution gridded rainfall data and historical climate data to assist hydrological studies and the planning of climate-resilient infrastructure. In addition, district-level agrometeorological advisories issued under the Gramin Krishi Mausam Sewa (GKMS) support farmers in crop planning, irrigation, and other field operations under variable weather conditions.

Annexure-1

Rainfall during the Southwest Monsoon 2025 over Assam and the Northeast Region:

Region	2025 Forecast Category of the LPA	Climatological Normal in mm (1971-2020)	Observed Rainfall Percentage Departure from LPA (Actual Rainfall in mm)	Remarks
Assam and Meghalaya (sub-division)	Below Normal (<93% of the LPA)	1762.2 mm	-49% of LPA (906.4 mm)	The forecast was accurate
East & NE India (Homogenous rainfall Region)	Below Normal (<94% of the LPA)	1367.3 mm	-33% of LPA (920 mm)	The forecast was accurate

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