

GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 3721
ANSWERED ON 03/04/2025

WEATHER FORECASTING CAPABILITIES

3721. SHRI JOSE K. MANI:

Will the Minister of **EARTH SCIENCES** be pleased to state:

- (a) the measures taken by Government to improve country's weather forecasting capabilities;
- (b) whether the Ministry has adopted any advanced technologies like Artificial Intelligence (AI) or Machine Learning (ML) to enhance the accuracy of forecasts; and
- (c) the measures being taken to extend real-time weather updates to rural farmers for better crop management?

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

- (a) The Ministry continuously enhances and upgrades meteorological observations, communications, modeling tools, and forecasting systems. The India Meteorological Department (IMD) uses the latest tools and technologies to predict severe weather events. This includes sophisticated dynamical numerical weather prediction models at higher spatial and temporal resolutions, multi-model ensemble methods, artificial intelligence, and machine learning (AI/ML) & data science methodologies, complemented with improved ground-based & upper air observations and advanced remote sensing network for real-time monitoring and predictions. IMD uses the latest dissemination tools, including Common Alert Protocol (CAP), mobile apps, websites, Application Programming Interfaces (APIs), and other social media platforms, to provide efficient, effective, and timely early warning services. IMD is constantly working to improve and adapt to the latest technologies.
- (b) Yes. The Ministry of Earth Sciences (MoES) explores integrating artificial intelligence (AI) and machine learning (ML) technologies into weather forecasting systems in addition to physics-based numerical models. This initiative is a part of the broader strategy to enhance the accuracy and efficiency of meteorological predictions, which are crucial for various sectors, including agriculture, disaster management, and urban planning. The Ministry has established a dedicated virtual center on AI/ML/Deep Learning (DL) at the Indian Institute of Tropical Meteorology (IITM) in Pune. A dedicated functional group has been established in IMD under the MoES to strengthen the research and development (R&D) activities in AI/ML. These centers focus on leveraging AI, ML, and DL techniques for advancements in Earth Sciences. It has already developed several AI/ML-based applications tailored for localized predictions and the analysis of weather and climate patterns.

- (c) Yes. The India Meteorological Department (IMD) is rendering the weather forecast-based agro-advisory services to farmers under the Gramin Krishi Mausam Sewa (GKMS) project through the existing 130 Agrometeorological Field Units (AMFUs) in collaboration with the Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs), Indian Institute of Technology (IITs), etc. The AMFUs prepare agro-advisories for their respective districts and disseminate them through various modes, including mass media, mobile Apps, SMS, etc.
