PARLIAMENT QUESTION: WEATHER-BASED AGRO-ADVISOR SERVICES

प्रविष्टि तिथि: 05 AUG 2026 1:56PM by PIB Delhi

The Government has undertaken several measures to strengthen the country's weather forecasting system through the India Meteorological Department (IMD) under the Ministry of Earth Sciences (MoES). It has adopted advanced, state-of-the-art technologies, including high-performance computing (HPC) facilities to support high-resolution Numerical Weather Prediction (NWP) models, modern observational networks, and artificial intelligence (AI)-enabled weather forecasting tools. These advancements have significantly enhanced the accuracy and reliability of weather monitoring, forecasting, and early warning services across the country. Currently, the Ministry has a weather observation network comprising manual observatories, Automatic Weather Stations (AWSs), Automated Rain Gauges (ARGs), Agro-AWS, Doppler Weather Radars (DWRs), upper-air observatories, and weather monitoring satellites.

Under Mission Mausam, various global and regional NWP modeling systems have been implemented and operationalized to generate seamless short-, medium-, and extended-range forecasts for all, including farmers. The Bharat Forecasting System (BharatFS), with a spatial resolution of 6 km, generates forecasts at the cluster of Panchayat level, enabling the capture of localized weather features and improving the accuracy of weather forecasts.

India Meteorological Department, in collaboration with the Ministry of Panchayati Raj (MoPR), has launched Panchayat-level weather forecasts covering nearly all Gram Panchayats in India. These forecasts are accessible through digital platforms such as e-Gramswaraj (https://egramswaraj.gov.in), Meri Panchayat app, e-Manchitra of MoPR, and Mausamgram of IMD, MoES (https://mausamgram.imd.gov.in). Currently, three AI-based global models (e.g., Pangu Weather, FourCastNet, GraphCast) are operational to provide guidance to the forecaster to predict severe weather. Artificial Intelligence (AI) and Machine Learning (ML) applications and tools have been developed indigenously by weather scientists of the MoES institutions for various aspects of monitoring and observational processing, such as the Nowcasting tool and downscaled urban forecasting.

IMD implements the Gramin Krishi Mausam Sewa (GKMS) in collaboration with 55 Host Institutes, including the Indian Council of Agricultural Research (ICAR) institutes, State Agricultural Universities (SAUs), Indian Institutes of Technology (IITs), and other institutions. Under this, 130 Agrometeorological Field Units (AMFUs) covering 127 agro-climatic zones issue district-specific agro-meteorological advisories twice (Tuesday and Friday) a week ahead, based on IMD's medium-range weather forecasts, and communicate to the farmers. Under the GKMS scheme, all agriculturally important districts are covered across the country, including Uttar Pradesh, for providing real-time weather forecasts, agro-meteorological advisories, and early warnings directly to the farmers. In addition, IMD issues district-level impact-based weather forecast & risk-based warning valid up to 7 days through Regional Meteorological Centres & Meteorological Centres for their concerned States, including Uttar Pradesh twice daily. These warnings are issued more frequently in case of severe weather. Dissemination of

weather forecasts and warnings through multiple communication platforms, including mobile applications, APIs, web portals, SMS, television, radio, and social media, in coordination with Central and State Government agencies.

IMD developed a public-friendly website (https://mausam.imd.gov.in/) and mobile apps for the dissemination of weather-related warnings, such as the MAUSAM App for weather forecasting and warnings, MEGHDOOT App for agro-meteorological services, the DAMINI App for lightning warnings, UMANG App for weather forecasting and warnings across the country, including Baghpat, Western Uttar Pradesh. Further, IMD regularly conducts the survey to assess the usefulness of the products for specific sectors like agro-advisory services to farmers and nowcast services for the general public. Based on the survey findings, a report has been prepared and released. The report is publicly available at the following links: https://mausam.imd.gov.in/imd_latest/contents/agromet/kalp/voices.pdf & https://mausam.imd.gov.in/imd_latest/contents/agromet/states/States.pdf.

This information was given by the Minister of State (Independent Charge) for Earth Sciences Dr. Jitendra Singh in a written reply in Lok Sabha today.

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