PARLIAMENT QUESTION: WEATHER AND CLIMATE SERVICES

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The Indian Meteorological Department (IMD) has adopted new techniques and technologies over time to detect, monitor, and provide timely early warnings for disruptive weather events. The IMD has expanded its infrastructure for observations, data exchange, monitoring & analysis, forecasting, and warning services in the country. The Ministry is continuously working to strengthen observational capabilities and R&D infrastructure to achieve greater accuracy in weather forecasting.

IMD consistently issues timely alerts and forecasts to the public and concerned stakeholders. Various steps have been taken to ensure effective dissemination of warnings to vulnerable populations.

The major new initiative undertaken by the Government is the implementation of the Mission Mausam. A couple of Doppler Weather Radars (DWRs) have already been installed under the mission. Currently, 47 radars are in operation across India, with 87% of the country's total area under radar coverage. In the coming years, DWRs will be installed as per the requirement to cover the remaining gap areas in the country, provide redundancy, and replacement of old radars in the DWR network under Mission Mausam of MoES. Under the Mission Mausam, the Bharat Forecast System (BharatFS), an advanced weather forecasting model, has been developed and is operational at a high spatial resolution of 6 km. It also has the capability to provide predictions of rainfall events up to 10 days, covering the short and medium-range forecasts. Due to its higher resolution and improved dynamics, it generates weather forecasts at the panchayat or cluster of panchayats level. Improving the accuracy of weather forecasts requires advanced observational networks, skilled human resources for research and development of numerical models, and robust infrastructure such as high-performance computing systems to run these models at the required resolution.

IMD currently is equipped with a Decision Support System (DSS) based real-time multi-hazard impact based early warning system (EWS), which integrates all types of real-time and historical data, numerical weather prediction products, etc., to effectively monitor, detect and provide timely forecasts and impact-based warnings with suggested actions up to districts and city/station levels against all types of

extreme weather events such as heavy rainfall events, droughts etc. IMD has Met Centres (MCs) in each State and also special centers like Cyclone Warning Centres available for each impacted State, which provide services during cyclones and heavy rainfall seasons round the clock, respectively. As a result of these new initiatives, the overall skill of forecasting these severe weather events has been improved by 30-40% over the last 10 years.

IMD disseminates the forecasts and warnings through the website, email, mobile apps, SMS, and Social Media Platforms such as YouTube, Facebook, X, and Instagram. The Common Alert Protocol (CAP), developed by the NDMA, is also being implemented to disseminate warnings by the IMD.

The India Meteorological Department has developed various mobile apps for the dissemination of weather-related warnings, such as

- MAUSAM App for weather forecasting and warnings
- MEGHDOOT App for agro met services
- DAMINI App (developed by IITM) for lightning warning
- UMANG App (developed by Meity) for Weather forecasting and warnings

IMD has been strengthening and modernizing its monitoring and early warning systems in order to minimize the impact of increased extreme weather events linked to climate change. These new efforts, progress, and achievements in this regard are already listed in reply (a) to (c).

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