GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
STARRED QUESTION No. *270
ANSWERED ON 19/12/2024

WEATHER FORECASTING IN ODISHA

*270. SHRI NIRANJAN BISHI:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether the Government has taken steps to enhance weather forecasting in light of increasing sudden and disruptive weather events, especially in Odisha, induced by climate change;
(b) the specific measures implemented to improve weather forecasting techniques across the country;
(c) whether the Government has considered adopting weather nowcasting techniques for live and hyperlocal weather monitoring and the manner in which these are integrated into existing systems; and
(d) whether emerging technologies like Artificial Intelligence (AI) are being used to improve weather forecasting, and if so, the details?

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

(a) to (d): A statement is laid on the table of the House.

STATEMENT REFERRED TO IN REPLY TO PARTS (a) TO (d) OF RAJYA SABHA STARRED QUESTION No. *270 REGARDING 'WEATHER FORECASTING IN ODISHA' FOR ANSWER ON 19th DECEMBER 2024

(a)– (b) Yes. The Government of India has taken many new initiatives to improve the weather forecast, including launching new "Mission Mausam". The India Meteorological Department (IMD), under the Ministry of Earth Sciences (MoES) has adopted new techniques and technology from time to time to detect, monitor, and provide timely early warnings for disruptive weather events. Initiatives and developments have been taken to improve the monitoring and forecasting of weather events by augmenting the observational network throughout the country, including Odisha. The current observational network in the State of Odisha is given in Annexure-I. Specific programs were implemented to improve the Numerical weather prediction models, and augment the High-Performance Computing (HPC) systems.

(c) Yes. IMD is implementing live current weather data and hyperlocal weather monitoring services in the category of nowcast services in real time. IMD uses all its surface and upper air observations available live across the Indian region at the highest spatial (sub-city and district levels) and temporal scale (10-15 minute intervals). IMD also continuously uses RADAR observations and satellite products at hyperlocal scales up to district levels. Monitoring systems such as dense AWS/ARG networks with additional Doppler Weather Radars (DWRs) are installed up to sub-city levels for major cities like Mumbai, Chennai, Delhi, etc. These efforts help in reporting all surface observations like temperature, wind, rainfall, etc., and monitoring cloud characteristics for nowcasting. IMD integrates all the hyperlocal observations into an advanced numerical weather prediction modeling system with sophisticated continuous data assimilation techniques to capture localized extreme weather events.

(d) Yes. Artificial Intelligence (AI) is being used to improve weather, climate, and ocean forecasting skills at various institutes under the ministry. MoES has established a dedicated AI virtual center tasked with developing and testing multiple AI techniques and capacity-building activities by conducting workshops and conferences. A computing environment and virtual workspace for training and deploying AI models have been established at IMD. Achievements and outcomes of AI and machine learning (ML) in the research and development of weather prediction are provided below:

- Improved the short-range precipitation forecast in 1-day, 2-day, and 3-day lead times with a reduction in bias.
- Developed high-resolution (300 meters) urban gridded meteorological datasets for temperature and precipitation.
- Developed high-resolution precipitation datasets for verification purposes.

Annexure-I

Weather Observational System in Odisha

Surface Monitoring system network: Odisha has 39 manned observatories. 29 Automated Weather Stations (AWS) and 136 Automated Rain Gauge (ARG) stations.

DWR network: Odisha has 2 radar stations, i.e., at Paradip and Gopalpur, which are functional around the clock.

High wind speed recorder network: Odisha currently has 6 no. of high wind speed recorders (HWSR) covering the entire coast.

Aviation Weather Observatory: It currently has 4 no. of Aerodrome Meteorological Station (AMS) and 1 Aerodrome Meteorological Office (AMO) with 4 Aviation weather automatic stations and 2 manned observatories.

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