GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 367
ANSWERED ON 28/11/2024

INSTALLATION OF REAL-TIME FLOOD FORECASTING SYSTEM

367.   SHRI K.R.N. RAJESHKUMAR:

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

(a)   whether Government is considering the installation of real-time flood forecasting systems in all rivers and past flood-affected water bodies in the country, and if so, the details thereof;

(b)   whether Government is considering the incorporation of Artificial Intelligence in traditional weather and climate forecast systems, and if so, the details thereof; and

(c)   the measures taken by Government to strengthen the weather research and forecasting infrastructure, such as the installation of advanced radar systems?

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

(a)   As a part of non-structural flood management, the Central Water Commission (CWC) issues station-specific flood forecasts to concerned stakeholders at identified river locations. This includes inflow forecasts at identified reservoirs for proper reservoir regulation.

Presently, flood forecasts are issued by CWC at 340 stations (140 Inflow Forecast Stations + 200 Level Forecast Stations) as per Standard Operating Procedure (SOP). The network has been established in consultation with State Government/Project authorities and also includes stations on the river passing through/nearby metropolitan cities. The dissemination of flood forecasts is done through a dedicated website: https://ffs.india-water.gov.in/.

In addition to short-range forecasts, CWC prepares 7-day advisory flood forecasts through basin-specific mathematical models using India Meteorological Department (IMD) weather forecast products and near real-time satellite rainfall estimates. These flood advisories are disseminated through the web Portal https://aff.india-water.gov.in/home.php to stakeholders.

(b)   Yes. The Ministry of Earth Sciences (MoES) explores integrating artificial intelligence (AI) technologies into weather and climate forecasting systems, in addition to physics-based numerical models. This initiative is part of a 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 key initiatives, future plans, and innovative projects are as follows:

Virtual Center on AI/Machine Learning (ML)/Deep Learning (DL) at IITM Pune: MoES has established a specialized virtual center at the Indian Institute of Tropical Meteorology (IITM) in Pune. This center focuses 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.

Collaborative Research Across Institutes: Institutions under MoES are actively working to incorporate AI/ML methodologies into their research activities and operational frameworks. This collaborative approach ensures a comprehensive application of AI technologies across Earth sciences.

(c)   The ministry has taken various steps to strengthen the observational and forecasting infrastructure across the country to improve the monitoring of extreme weather events and weather forecast accuracy. MoES adopts new technologies at various stages, including the augmentation of observational networks, numerical/AI-ML modeling, forecasting methodology, visualization, and dissemination of forecasts/warnings to various stakeholders.

Currently, 39 Doppler Weather Radars (DWRs) are installed at various locations across the country, which helps with round-the-clock weather monitoring and forecasting. Further augmentation of the observational network is envisaged to strengthen the weather research and forecasting infrastructure.

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