

**GOVERNMENT OF INDIA  
MINISTRY OF EARTH SCIENCES  
LOK SABHA  
UNSTARRED QUESTION No. 567  
TO BE ANSWERED ON WEDNESDAY, FEBRUARY 6, 2019**

**PREDICTION OF RAINFALL**

**567 SHRI FEROZE VARUN GANDHI:**

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

- (a) the details of the current mechanism being followed to predict the rainfall;**
- (b) whether the Ministry is considering to take any steps to devise an intelligent prediction system with modern analytic tools by using local weather information for rainfall prediction;**
- (c) if so, the details thereof and if not, the reasons therefor;**
- (d) the details of current flood warning system being used in country; and**
- (e) whether the Government is taking any steps to improve the system, if so, the details thereof and if not, the reasons thereof?**

**ANSWER**

**MINISTER FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND  
MINISTRY OF EARTH SCIENCES  
(DR. HARSH VARDHAN)**

**(a) to (c) India Meteorological Department (IMD) issues three types of forecasts during the monsoon season i.e., seasonal forecast (for the whole season), extended range forecast (10- 30 days), short to medium range forecast (0-10 days). Under the National Monsoon Mission, MoES has implemented two state-of-the-art dynamical prediction systems for short range, medium range, extended range and seasonal forecasts. All these initiatives have helped to improve the skill of monsoon rainfall forecasts over the country.**

**An improved suite of prediction models has already been implemented operationally at India Meteorological Department (IMD) for enhanced short range weather forecasting through assimilation of all available Indian and global satellite data in real time.**

**Since December 2016 India Meteorological Department is using the Global Forecast System (GFS) and Unified Model (UM) to generate deterministic forecasts at 12 km horizontal resolution in the short to medium range (Up to 10 days). The GFS and UM assimilate global conventional atmospheric data as well as data from the satellites and Doppler Weather Radars. There is also high resolution meso-scale model with 3 km resolution to provide location specific forecast.**

**In addition, a high resolution (12 km grid scale) state of the art Global Ensemble Prediction System (EPS) namely Global Ensemble Forecasting System (GEFS) and Unified Model Ensemble Prediction System (UMEPS) were commissioned on 01 June 2018 for generating operational probabilistic weather forecasts for 10 days for intensity probabilistic heavy rainfall forecast at district level. Research & Development groups at IITM, Pune and NCMRWF, Noida are already making efforts to improve the system on continuous basis based on the performance evaluation**

**(d) & (e)**

**Heavy rainfall events lead to floods over different river basins of the country. River basin floods are dealt by the Central Water Commission (CWC), Ministry of Water Resources. In order to meet specific requirements of flood forecasting, which is provided by CWC, Ministry of Water Resources, India Meteorological Department (IMD) operates Flood Meteorological Offices (FMOs) at thirteen locations viz., Agra, Ahmedabad, Asansol, Bhubaneswar, Guwahati, Hyderabad, Jalpaiguri, Lucknow, New Delhi, Patna, Srinagar, Bengaluru and Chennai. Apart from this, IMD also supports Damodar Valley Corporation (DVC) by providing Quantitative Precipitation Forecast (QPF) for Damodar river basin areas for their flood forecasting activities. Central Water Commission is working in close association with IMD and State Governments for timely flood forecast whenever the river water level rises above warning level.**

**Flood Meteorological Offices (FMO) operated by the IMD provide meteorological support to the CWC for issuing flood warnings in respect of the 43 rivers of India covering 146 river basins. CWC issues flood forecasts 6 hrs. to 30 hrs. in advance for 176 stations using QPF received from FMOs of ESSO-IMD and in-situ hydro-meteorological data.**

**At present Weather Research and Forecasting (WRF) model forecast for QPF at river basin level is generated at 9 km grid scale. Research efforts are currently made to asses 3 km scale WRF based rainfall at sub basin level on experimental mode.**

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