GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION No. 1954
TO BE ANSWERED ON MONDAY, DECEMBER 31, 2018

MECHANISM FOR RAINFALL PREDICTION

1954. DR. BANDA PRAKASH:

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 step to devise an intelligent prediction / expectation system with modern analytic tools by using local weather information for prediction of rainfall;**
(c) **if so, the details thereof and if not, the reasons therefor;**
(d) **the details of the current flood warning system being used in country; and**
(e) **whether Government is taking any step to improve the system, if so, the details thereof and if not, the reasons therefor?**

ANSWER
MINISTER FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND MINISTRY OF EARTH SCIENCES
(Dr. HARSH VARDHAN)

(a) **India Meteorological Department (IMD) issues three types of rainfall forecasts i.e., seasonal forecast (for the whole season), extended range forecast (10- 30 days), short-medium range forecast (0-10 days). These forecasts are prepared using dynamical prediction models. Under the National Monsoon Mission, MoES has implemented two state-of-the-art dynamical prediction systems for short range to medium, extended range and seasonal forecasts. All these initiatives have helped to improve the skill of 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 run at National Centre For Medium Range Weather Forecast (NCMRWF) operationally every day to generate deterministic forecasts at 12 km horizontal resolution in the short to medium range (Up to 10 days). The GFS model assimilates global conventional atmospheric data as well data from the data from satellites and 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) was commissioned on 01 June 2018 for generating operational probabilistic weather forecasts for 10 days. The EPS will enhance the weather information being provided by the current models by quantifying the uncertainties in the weather forecasts. The above mentioned forecast systems will be improved further for better accuracy.

(b) & (c) Yes Sir. The above mentioned forecast systems are in continuous up gradation to improve the accuracy of prediction based on the advancement in modeling of weather and climate variability.

(d) & (e) IMD has a shared mandate with Central Water Commission (CWC) for flood forecasts. River basin floods are dealt by the CWC. Flood Meteorological Offices (FMOs) operated by 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 quantitative precipitation forecasts (QPF) received from FMOs of IMD and in-situ hydro-meteorological data.

India Meteorological Department (IMD) operates Flood Meteorological Offices (FMOs) at thirteen locations viz., Agra, Ahmedabad, Asansol, Bhubaneshwar, 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 forecasts whenever the river water level rises above the warning level. To meet the requirement of State Governments, IMD Officers invariably attend all the meetings called by the State Governments for reviewing the preparedness on floods by various agencies and provide required inputs.

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