

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 660
TO BE ANSWERED ON WEDNESDAY, JULY 19, 2017**

MONSOON FORECAST

**660. SHRI.T. RADHAKRISHNAN:
SHRI.BIDYUT BARAN MAHATO:
SHRI.GAJANAN KIRTIKAR:
SHRI. S.P. MUDDAHANUME GOWDA:
SHRI.S.R. VIJAYAKUMAR:
SHRI.SUDHEER GUPTA:
SHRI.HUKUM SINGH:**

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether Indian Meteorological Department (IMD) has predicted above normal monsoon and threat of El-Nino phenomenon during the current season and if so, the details thereof, region-wise;**
- (b) whether the Government is aware that the several foreign agencies including Japanese Meteorological Department have predicted weak monsoon during June to August and if so, the details thereof and the reaction of the Government thereto. Agency-wise;**
- (c) whether average error in IMD's monsoon forecasts has come down during each of the last three years and if so, the details thereof;**
- (d) the measures taken/being taken by the Government to update the IMD system as well as to avoid inaccurate predictions;**
- (e) whether IMD has also warned on heavy to very heavy rains in some parts of the country and if so, the details thereof; and**
- (f) the details of the Government preparedness to face such a situation?**

ANSWER

**MINISTER OF STATE FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(SHRI Y. S. CHOWDARY)**

- (a) No Madam. India Meteorological Department (IMD) has not predicted above normal monsoon rainfall for 2017. In the first stage forecast issued on 18th April as well as second stage forecast issued on 6th June IMD had predicted normal rainfall (96% to 104%) over the country as a whole.**

In the June forecast, IMD had clearly indicated that El-Nino Southern Oscillation (ENSO) neutral conditions are most likely till the end of 2017.

- (b) Yes Madam. IMD keeps track of forecasts issued by various foreign climate agencies including that of Japan Meteorological Agency (JMA). Inferences derived from forecasts from various centers for the 3 months periods of June, July & August (JJA) and July, August & September (JAS) are given in Annexure-I. The forecasts were issued in April/May 2017. JMA predicted below normal rainfall over some parts of south Peninsula, neighboring central India and northwest India and normal rainfall over the remaining areas for June, July and August months.**
- (c) Yes Madam, there has been noticeable improvement in the IMD seasonal forecast for the southwest monsoon season rainfall over the country as a whole. The average absolute error (difference between forecast and actual rainfall) during the last 3 years (2014 -2016) was 5.3% of Long Period Average (LPA) compared to the average absolute error of 6.97% of LPA during 2007-2013. In 2015, IMD correctly predicted the deficient monsoon.**
- (d) Under the National Monsoon Mission initiative, the Indian Institute of Tropical Meteorology (IITM), Pune, Indian National Centre for Ocean Information Services (INCOIS), Hyderabad and National Centre for Medium Range Weather Forecasting (NCMRWF), NOIDA have embarked upon to build a state-of-the-art coupled ocean atmospheric model for i) improved prediction of monsoon rainfall on extended range to seasonal time scale (11 days to one season) and ii) improved prediction of temperature, rainfall and extreme weather events on short to medium range time scale (up to 10 days) so that forecast skill gets quantitatively improved further for operational services of India Meteorological Department (IMD).**

In order to overcome the limitations of the statistical models used so far, the above dynamical coupled ocean-atmospheric model framework is put under exhaustive performance evaluation under the National Monsoon Mission. This state of the art dynamical prediction system was implemented for generating operational forecasts in 2017 by Ministry of Earth Sciences (MoES).

(e-f) India Meteorological Department provides necessary warnings for areas which are likely to receive heavy/very heavy/extremely heavy rainfall for 3 days in advance with two days outlook. The warnings are being provided on daily basis for expected heavy rainfall events in meteorological sub-division scale by National Weather Forecasting Centre (NWFC) at New Delhi and in district scale by the state Meteorological centres and Regional Meteorological Centres. The meteorological sub-divisions under warning are assigned colour code (yellow, orange, red) for the purpose of disaster management and the same is updated four times in a day by NWFC, New Delhi. These warnings are disseminated by email/fax to disaster management agencies at national and state level upto districts and also to press and electronic media. These warnings are made available in IMD website also for the information of all concerned including general public.

Special forecasts are also issued along with press release in case of expected heavy rainfall events. For example such special warnings were issued for Assam and other north eastern states in connection with the recent flood and landslide over the region.

Special forecasts are also issued for Char Dham Yatra, Amarnath Yatra, Kailash Mansarovar Yatra etc. to the concerned authorities. The same are also being updated in the IMD website on regular basis during the yatra period.

Seasonal forecasts from various climate centers for the 2017 southwest monsoon season.

S. No	Global Centre	Model used	Inference for 2017 monsoon rainfall
1.	Met Office, UK	Glo Sea 5	JJA & JAS (May 2017): Normal to above normal rainfall over most parts of the country
2.	ECMWF, UK	ECMWF	JJA & JAS (May 2017): Below normal rainfall over some parts of northwest India and northeast India. Normal to above normal rainfall is most likely over remaining areas.
		EUROSIP MME of 4 Coupled Models:	JJA & JAS (May 2017): Below normal rainfall over some parts of northwest India and northeast India. Normal rainfall is most likely over remaining areas.
3.	WMO LC-LRF MME, South Korea	AGCM and CGCM Forecasts from 11 GPCs	JJAS (May 2017): Below normal rainfall along the Himalayas and neighboring plains. Normal rainfall is most likely over remaining areas.
4.	International Research Institute for Climate and Society, USA	7 Models (AGCM & CGCM)	JJA & JAS (May 2017): Above normal rainfall over some parts of central India. Below normal to normal rainfall is most likely over remaining areas.
5.	APEC Climate Centre, South Korea	15 Models from the APEC region	JJA and Sep (May 2017): Above normal rainfall is most likely over northwest India, neighboring central India and western parts of Peninsular India. Below normal rainfall is mostly likely over NE India. Climatological probabilities over remaining parts of the country
6.	Japan Agency for Marine-Earth Science and Technology	Coupled Model	JJA (May 2017): Above normal rainfall is most likely over southernmost parts of Peninsula, east coast and some parts of northeast India. Below normal to normal rainfall is likely over remaining areas.

7	NWS/NCEP/ CPC	CFSv2	JJAS (May 2017): Below normal rainfall is likely over some parts along the Himalayas and neighbouring plains. Above normal rainfall is likely over most parts of central India. Normal rainfall is likely over remaining areas. All India season rainfall is likely to be normal (105 % of LPMA).
8	ESSIC, University of Maryland	Empirical model based on antecedent SST (HadISST)	JJAS: GPCC based forecast April forecast: 97% of LPA May forecast: 97% of LPA
9	Japan Meteorologi cal Agency	Coupled Model	JJA (April 2017): Below normal rainfall over some parts of south Peninsula, neighboring central India and northwest India. Normal rainfall is likely over remaining areas.

****Initial conditions used for the forecast is given in bracket.***