GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No 3759
TO BE ANSWERED ON WEDNESDAY, AUGUST, 12, 2015

MONSOON DETAILS

3759. SHRI R. P. MARUTHARAJAA:
SHRI SUSHIL KUMAR SINGH:

 Will the Minister of EARTH SCIENCES be pleased to State:

(a) whether the Indian scientists have been able to devise various models to predict accurately the onset and behaviour of monsoon in the country in particular and Asia in general;

(b) if so, the details thereof along with the extent of precision/accuracy in predicting monsoon;

(c) the modus operandi of dissemination of information regarding arrival of monsoon including minimum advance time of forecasting its intensity, spread especially to the farmers in various agro-climatic zones;

(d) the fund earmarked for undertaking research in the field during the last three Plan Periods, Plan-wise; and

(e) the current mechanism by which monsoon forecasting and expected rainfall is calculated across the country?

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

(a-b) Indian scientist have developed a dynamical framework to predict the onset of monsoon over Kerala about 7-10 days in advance. This criterion enrooted in rainfall and low level wind indices has been found to be successful in predicting the onset with great fidelity for the past 14 years. The model has an error of +/- 4 days for the onset of monsoon over Kerala. Earth System Science Organization-Indian Institute of Tropical Meteorology (ESSO-IITM), Pune, Earth System Science Organization-India Meteorological Department (ESSO-IMD), Earth System Science Organization -Indian National Centre for Ocean Information Services (ESSO-INCOIS), Hyderabad and Earth System Science Organization-National Centre for Medium Range Weather Forecasting (ESSO-NCMRWF), NOIDA, have been experimenting with coupled ocean -atmospheric climate models for a) improved prediction of monsoon rainfall on extended range to seasonal time scale (16 days to one season) and b) improved prediction of temperature, rainfall and extreme weather events on short to medium range time scale (up to 15 days) so that forecast skill gets quantitatively improved further for operational services of ESSO-IMD.

Through Indo-US collaboration, a "Monsoon Desk" has been set up for working jointly for improving seasonal forecast of Indian monsoon rainfall. Through this forum, Indian and US Scientists are exchanging their ideas and sharing their expertise. This effort has led to appreciable improvements in the efficiency of models in making better forecasts.

The success achieved in improving the accuracy of heavy rainfall warnings during the summer monsoon season is enumerated below:

1. Probability of Detection (PoD) has been assessed at 0.71.
2. False Alarm Rate (FAR) has been dipped to 0.13.
3. Missing Rate (MR) has also been reduced to 0.29.
4. Percent correct (PC) of yes/no rainfall forecast for monsoon season 2014 is 91%.

(c) Under "Gramin Krishi Mausam Sewa (GKMS)", ESSO-IMD disseminates weather based agromet advisories including arrival of monsoon with 4 days in advance (twice a week) about rainfall intensity, spread etc. to the farming community of different districts of the country through multi-mode communication channels including mass and electronic media (All India Radio, Television, Print Media), internet and also through SMS and IVR (Interactive Voice Response Technology) under PPP mode as well as through Kisan Portal launched by Ministry of Agriculture, Govt. of India for efficient crop planning and minimizing the negative impact on crop. Presently, around 11.47 million farmers are receiving the information through SMS on regular basis.

(d) After the establishment of Ministry of Earth Sciences (MoES) in 2006 structured research and development initiative involving MoES institution and research group have been launched. Details of major programs of the MoES during the XII plan include

No.	Name of the Scheme Allocation for XII Plan(2012-17)	Rs.in Crore
1	Atmospheric Observation System Network	700
2	Satellite Meteorology	70
3	Integrated Himalayan Meteorology Programme	108
4	Agrometeorology	164
5	Climate Services	55
6	Numerical Modeling of Weather &Climate	90
7	Monsoon Mission Programme	290
8	Physics and Dynamics of Tropical Clouds	120
9	Development of High Impact Severe Weather Warning System of India	89
10	Short Term Climate Prediction and Variability	90
11	Centre for Climate Change Research	100
12	High Resolution Operational Ocean Forecast and Reanalysis System	40
13	Centre for Advanced Training in Earth System Sciences and Climate	140
14	Outreach and Awareness Programme	67
15	High Performance Computing	568
	Total	2691

Allocation to ESSO-IMD, ESSO-IITM ,Pune and ESSO-NCMRWF during last three five years plans are detailed below :

Rs.in Crore

Plan Period	IMD	IITM	NCMRWF
9th Five Year Plan (1997-2002)	634.33	26.08	43.46
10th Five Year Plan (2002-2007)	924.51	47.72	71.95
11th Five Year Plan (2007-2012)	1840.07	367.25	36.36

(e)   The Seasonal forecast for the country as a whole is issued in two stages; first stage forecast in April and update for April forecast in June. The predictors used for April and June long range forecast are given in annexure-I

Annexure -I

The ESSO-IMD's Ensemble Statistical Forecasting system for the April forecast uses the following 5 predictors.

S. No	Predictor	Period
1	The Sea Surface Temperature (SST) Gradient between North Atlantic and North Pacific	December + January
2	Southeast equatorial Indian Ocean Sea Surface Temperature	February
3	East Asia Mean Sea Level Pressure	February + March
4	Northwest Europe Land Surface Air Temperature	January
5	Equatorial Pacific Warm Water Volume	February + March

ESSO-IMD's Ensemble Statistical Forecasting system for the June forecast uses the following 6 predictors.

S. No	Predictor	Period
1	The Sea Surface Temperature (SST) Gradient between North Atlantic and North Pacific	December + January
2	Southeast equatorial Indian Ocean Sea Surface Temperature	February
3	East Asia Mean Sea Level Pressure	February + March
4	Central Pacific (Nino 3.4) Sea Surface Temperature	(March to May + tendency between March to may & December to February)
5	North Atlantic Mean Sea Level pressure	May
6	North central Pacific 850 zonal wind gradient	May