

**GOVERNMENT OF INDIA  
MINISTRY OF EARTH SCIENCES  
LOK SABHA  
UNSTARRED QUESTION No. 3418  
TO BE ANSWERED ON WEDNESDAY, MARCH 22, 2017**

**WEATHER FORECAST**

**3418. SHRI RAYAPATI SAMBASIVA RAO:  
SHRI PRATHAP SIMHA:  
SHRI PR. SENTHIL NATHAN:**

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

- (a) whether the Government has chalked out any new initiatives aimed to bring in scientific and technological advancement in predicting detection, monitoring natural calamities like earthquakes, floods and cyclones, abnormal weather, unseasonal rains etc.;**
- (b) if so, the details thereof and the details of States who have sought technological support in this regard along with the Government's reaction thereto;**
- (c) the details of countries and Government agencies abroad who have signed MoU with India for providing technological support in this regard;**
- (d) the priority sectors earmarked for the next 3 years for strengthening and protecting the India's agro based industries, fishing and maritime trade, transport and coastal security;**
- (e) the roles and responsibilities and other stakeholders in this regard; and**
- (f) the details of the predictions or forecast of weather, drought or flash floods, etc. that has come true during the last three years and the current year?**

**ANSWER**

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

- (a-b) Yes Madam. India Meteorological Department (IMD), Ministry of Earth Sciences (MoES) is responsible for monitoring, detection and forecasting of weather and climate extremes including severe weather events such as cyclones, heavy rainfall, extreme temperature etc. Such forecasts are issued at national, regional and state levels. In order to provide early warning of severe weather events, IMD has setup a network of state meteorological centres to have better coordination with state and district level agencies.**

**In order to meet specific requirements of flood forecasting which is provided by central water commission, IMD operates Flood Meteorological Offices (FMOs) at thirteen locations viz., Agra, Ahmedabad, Asansol, Bhubaneshwar, Guwahati, Hyderabad, Jalpaiguri, Lucknow, New Delhi, Patna, Chennai, Bengaluru and Srinagar. During the flood season, FMOs provide valuable meteorological support to the Central Water Commission (CWC) for issuing flood warnings in respect of the 43 rivers of India. CWC is working in close association with IMD and State Governments for timely flood forecast whenever the river water level rises above 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.**

**To date, there is no proven scientific technique available, anywhere in the world, to forecast/ predict the occurrence of earthquakes with reasonable degree of accuracy with regard to space, time and magnitude. However, National Centre for Seismology (NCS), Ministry of Earth Sciences (MoES) maintains a country wide seismological network, to detect and locate earthquakes occurring in and around the country. The network consists of state-of-art digital broadband seismographs, VSAT based communication systems and latest tools for dissemination of earthquake information to the concern disaster management authorities and other user agencies in least possible time. The network also includes a 17-station real time seismic monitoring system to monitor and report large magnitude earthquakes capable of generating tsunamis on the Indian coastal regions. Antsunami early warning system is also in place at Indian National Centre for Ocean Information Services (INCOIS), Hyderabad to provide early warning on tsunamis likely to be generated on the Indian Coastal areas by large magnitude under sea earthquakes.**

- (c) 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. MoES has also joined the consortium with the U. K. Met Office (UKMO), Korea Meteorological Administration (KMA), the Commonwealth Scientific Industrial and Research Organization (CSIRO) and National Institute of Water and Atmospheric Research Limited for the development of state-of-the-art seamless Unified Modelling (UM) system for weather prediction in daily/monthly/seasonal time scale.**

Ministry has signed a few important MoU's to strengthen and innovate earth science research. This includes (1) MoU with International Continental scientific Drilling Program (ICDP), GFZ German Research Centre for Geosciences, Germany, (2) MoU with China Earthquake Administration (CEA) for collaboration in the area of Earthquake Science and Earthquake Engineering, (3) MoU with Ministry of Mines/GSI on General framework for sharing of geological, geophysical and other data/information for enrichment of Geoscientific knowledge base for sustainable development.

- (d-e) India Meteorological Department (IMD), Ministry of Earth Sciences (MoES) is rendering weather forecast based District level Agro-Meteorological Advisory Service (AAS) for the benefit of farmers in the country under the "GraminKrishiMausamSewa (GKMS)" programme of the ministry in collaboration with Indian Council of Agricultural Research (ICAR) and State Agricultural Universities. These crop & locale-specific AAS are provided to the about 20.6 million farmers to enable them take appropriate actions at farm level to take benefit of favourable weather conditions and to minimize adverse impacts of unfavourable weather conditions. Recognizing the importance of the service, the establishment of the 660 District AgroMet field Units (DAMUs) in the premises of KrishiVigyanKendras (KVKs) is one the Departmental Action Plans of MoES to provide AAS services at block level by the end of 2019.

For the benefit of fisherman community, a customized application for the fishermen community of the country, called "Potential Fishing Zone (PFZ) Advisories", is operated successfully since 1999 useful for guiding the fishermen about locations of high fish grounds/aggregation/catch . In addition, the Ocean State Forecast (OSF) (wave height and direction, wind speed and direction, ocean currents, sea surface temperature, depth of mixed layer and thermo cline, sea level at major and minor ports, etc. is also provided to fisherman to have full idea of the associated ocean state conditions in those identified PFZs. By the end of 2019 it is targeted to reach all the 8-9 lakh active fishermen. The Ocean State Forecasts are provided to Indian Coast Guard (ICG) and Indian Navy who have the responsibility of coastal security.

- (f) The accuracy of the weather forecast is more than 80% qualitatively and 65-70 quantitatively for various regions in the country. The forecast of drought or flash floods are not the domain of India Meteorological Department. However, the forecast of southwest monsoon is under the domain of IMD. The verification of the operational long range forecast for 2014, 2015 & 2016 SW monsoon rainfall are given in Annexure-I.

**Annexure-I**

Verification of the operational long range forecast for **2014** south west monsoon rainfall.

Region	Period	Forecast (% of LPA)			Actual Rainfall (% of LPA)
		24 <sup>th</sup> April	9 <sup>th</sup> June (1 <sup>st</sup> Update)	12 <sup>th</sup> August (2 <sup>nd</sup> Update)	
All India	June to September	95 ± 5	93 ± 4	87 ± 4	88
Northwest India	June to September		85 ± 8	76 ± 8	79
Central India	June to September		94 ± 8	89 ± 8	90
Northeast India	June to September		99 ± 8	93 ± 8	90
South Peninsula	June to September		93 ± 8	87 ± 8	93
All India	July		93 ± 9		90
All India	August		96 ± 9		90
All India	August to September			95 ± 8	98

Verification of the operational long range forecast for **2015** south west monsoon rainfall.

Region	Period	Forecast (% of LPA)		Actual Rainfall (% of LPA)
		22 <sup>th</sup> April	2 <sup>th</sup> June (Update)	
All India	June to September	93 ± 5	88 ± 4	86
Northwest India	June to September		85 ± 8	83
Central India	June to September		90 ± 8	84
Northeast India	June to September		90 ± 8	92
South Peninsula	June to September		92 ± 8	85
All India	July		92 ± 9	84
All India	August		90 ± 9	78
All India	August to September		84 ± 8	77

Verification of the operational long range forecast for 2016 south west monsoon rainfall.

Region	Period	Forecast (% of LPA)			Actual Rainfall (% of LPA)
		22 <sup>th</sup> April	2 <sup>nd</sup> June (Update)	1 <sup>st</sup> August	
All India	June to September	106 ± 5	106 ± 4		97
Northwest India	June to September		108 ± 8		95
Central India	June to September		113 ± 8		106
Northeast India	June to September		94 ± 8		89
South Peninsula	June to September		113 ± 8		92
All India	July		107 ± 9		107
All India	August		104 ± 9		91
All India	August to September			107 ± 8	93