

**GOVERNMENT OF INDIA  
MINISTRY OF EARTH SCIENCES  
LOK SABHA  
UNSTARRED QUESTION No. 626  
TO BE ANSWERED ON WEDNESDAY, DECEMBER 02, 2015**

**WEATHER FORECAST**

**626. SHRI BHARATHI MOHAN R.K.:  
SHRI BAIJAYANT JAY PANDA:  
SHRI S. RAJENDRAN:  
SHRI ABHISHEK SINGH:  
SHRI RAVNEET SINGH:  
SHRI K.N. RAMACHANDRAN:**

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

- (a) whether monsoon prediction and weather forecast system in the country is not accurate particularly in comparison to International standards and if so, the details thereof and the reasons therefor;**
- (b) the details of the initiatives taken to improve monsoon prediction and weather forecast under the National Monsoon Mission along with the technologies used in this regard;**
- (c) the details of research institutions engaged in research on monsoon and weather forecast;**
- (d) the details of funds incurred on research and development of new technology during the last three years and current year so far; and**
- (e) whether the Government proposes to set up more regional centres to improve monsoon prediction, weather forecast and other climatic phenomena and if so, the details thereof?**

**ANSWER**

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

- (a) No Madam. There is no reason to carry such impression about the performance of the Earth System Science Organization -India Meteorological Department (ESSO-IMD) that operates a dedicated weather and climate monitoring, detection and warning services useful for various sectors of economy. The weather forecasting systems in the country are comparable to most of the advanced countries in the world with respect to rainfall forecasting. Efforts are continuously made to optimize the level of efficiency of the forecasting systems. During the past few years, the ESSO-IMD has been continuously improving weather prediction services in terms of accuracy, lead time and associated impact. Manifestation of such quantitative improvement may be seen with accurate prediction of Monsoon 2015 and Very Severe Cyclonic Storms "Phailin", "Hudhud" and the heavy rainfall events during monsoon season of 2014 and 2015. The Deep depression 8-10 November, 2015 which crossed Tamilnadu coast near pudduchery were correctly predicted.**

**Verification report on the performance of long range forecast for 2015 SW monsoon Rainfall is given below:**

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

- (b) **Improvement of weather forecasting services is a continuous process. As part of its XI five year plan, Government has initiated a comprehensive modernization programme for ESSO-IMD covering upgradation of observation systems advanced data assimilation tools advanced communication and IT infrastructure (high performance computing systems and intensive/sophisticated training of ESSO-IMD personnel to facilitate the implementation of advanced global/regional/ meso-scale prediction models for improving the accuracy of weather forecasts in all temporal and spatial scales and for quick dissemination of weather forecast assessments/warnings to the users.**

**Operational implementation of improved forecast suite of models after the commissioning of the High Performance Computing (HPC) systems have enhanced the weather forecasting capacities through assimilating all available global satellite radiance data for the production of forecast products at 22Km grid globally and 9Kms/3Kms grid over India/regional/mega city domains. The performance evaluation of the updated global/meso-scale forecast systems for the past 5-7 years have demonstrated enhanced forecast skill by about 18% quantitatively as far as the track and landfall forecasts of the tropical cyclones are concerned.**

**ESSO-IMD has operationalized its location specific nowcasting weather service across the country. This service activity currently covers 150 urban centres under which nowcast of severe weather (Thunderstorms; heavy rainfall from lows/depressions over the land) in 3-6hrs. range is issued. Origin, development/movement of severe weather phenomena are regularly monitored through Doppler Weather Radars (DWRs) and with all available other observing systems (Automatic Weather Station-AWSs; Automatic Rain Gauge - ARGs; Automatic Weather Observing Systems - AWOS; satellite derived wind vectors, temperature, moisture fields etc.) During the XII Plan, under the National Monsoon Mission initiative, other institutions of ESSO, the Indian Institute of Tropical Meteorology (ESSO-ITM), Pune, Indian National Centre for Ocean Information Services (ESSO-INCOIS), Hyderabad and National Centre for Medium Range**

**Weather Forecasting (ESSO-NCMRWF), NOIDA have embarked upon to build a state-of the art coupled ocean atmospheric climate model 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.**

- (c) **The names of the research Institutions in the country engaged in forecast/research on monsoon is given below.**

<b>Sl. No.</b>	<b>Institution</b>
<b>1</b>	<b>Earth System Science Organisation (ESSO) -India Meteorological Department(IMD), New Delhi</b>
<b>2</b>	<b>ESSO-Indian Institute of Tropical Meteorology, Pune</b>
<b>3</b>	<b>ESSO-National centre of Medium Range Weather Forecasting(NCMRWF),NOIDA</b>
<b>4</b>	<b>Indian Space Research Organisation-Space Applications Centre, Ahmedabad</b>
<b>5</b>	<b>Council of Scientific and Industrial Research-FOURTH PARADIGM INSTITUTE, BENGALURU</b>
<b>6</b>	<b>Indian Institute of Technology, Bhubaneswar</b>
<b>7</b>	<b>Indian Institute of Technology, Kharagpur</b>
<b>8</b>	<b>Indian Institute of Technology, Gandhi Nagar</b>
<b>9</b>	<b>Indian Institute of Technology, Bombay</b>
<b>10</b>	<b>Indian Institute of Technology, New Delhi</b>
<b>11</b>	<b>Indian Institute of Science, Bangalore</b>
<b>12</b>	<b>Andhra University</b>
<b>13</b>	<b>Cochin University</b>
<b>14</b>	<b>University of Pune</b>
<b>15</b>	<b>Centre for Disaster Mitigation, Jain University, Bangalore</b>
<b>16</b>	<b>Center for Development of Advanced Computing, Pune</b>
<b>17</b>	<b>Skymet weather wise</b>

- (d) **The details of funds incurred to improve monsoon prediction to all time scale during last three years are given below.**

<b>S. No.</b>	<b>Year</b>	<b>Expenditure Incurred (Rupees in Crores)</b>
<b>1</b>	<b>2012-13</b>	<b>11.94</b>
<b>2</b>	<b>2013-14</b>	<b>11.65</b>
<b>3</b>	<b>2014-15</b>	<b>25.69</b>

- (e) **No Madam. In the recent few years, ESSO-IMD has established new meteorological centres at Shimla, Dehradun, Goa, Itanagar,Gangtok, Agartala for providing detailed weather information specifically to respective States.**

\*\*\*\*\*