GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION No 1933
TO BE ANSWERED ON THURSDAY, AUGUST, 06, 2015

IMPROVEMENT IN LATE WEATHER FORECASTING

1933. SHRI RAJ KUMAR DHOOT:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether it is a fact that though weather forecasting has improved in the country but it is still not at par with international standards, if so, the details thereof; and

(b) the remedial measures that Government propose to take in this regard?

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

(a)-(b) No Sir. 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 countries in the world with respect to weather 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 Very Severe Cyclonic Storms "Phailin", "Hudhud" and the heavy rainfall events during monsoon season of 2013 and 2014. However to improve further following steps are taken by ESSO-IMD:

(i) 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 (i) observation systems (ii) advanced data assimilation tools (iii) advanced communication and IT infrastructure (iv) high performance computing systems and (v) 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 9km/3km grid over India/regional/mega city domains. The HPC systems have been recently up-scaled to 1.2petaflops to support the ongoing efforts.

The performance evaluation of the updated global/meso-scale forecast systems for the past 5 years have demonstrated enhanced forecast skill. 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%.**

The success achieved in improving the accuracy of cyclone warnings is enumerated below:

1. **The landfall point error at present has been 60 and 90km for 24, 48 h lead period, respectively.**
2. **The landfall time error has been 3.4 and 4.4 h for 24, 48 h lead period, respectively.**
3. **The track forecast error has been 110, 165, 230km for 24, 48 and 72 h lead period, respectively.**

ESSO-IMD has operationalized its location specific now-casting (up to 6h forecasts) weather service across the country. Such service activity currently covers 156 urban centres on experimental basis under which nowcast of severe weather (Thunderstorms; heavy rainfall from lows/depressions over the land) 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-IITM), 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 weather & 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.

(ii) ESSO-IMD is a member of World Meteorological Organisation (WMO) which is a specialised agency of United Nation wherein collaborative mechanism with international organisations like U K Meteorological Office (UKMO), National Centre for Environmental prediction (NCEP), USA etc. exists for exchange of operational forecasts.

Through Indo-US collaboration, a "Monsoon Desk" has been set up for working jointly for improving seasonal forecast of the 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.

******