GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 610
TO BE ANSWERED ON WEDNESDAY, DECEMBER 02, 2015

FORECAST OF WEATHER PHENOMENA

610. SHRI K.R.P. PRABAKARAN:
SHRI ALOK SANJAR:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) the details of centres set up for forecasting natural calamities such as earthquakes, tsunami, cyclone, etc. and providing such information to fishermen, tourists and general public, location and State-wise;
(b) whether the Government proposes to expand its infrastructure or open new centres in this regard;
(c) if so, the details thereof and the centres likely to be set up, location and State-wise;
(d) the details of technology used so far for the accuracy of climate predictions, weather and natural hazards across the country; and
(e) the details of activities carried out by the organisation, Earth System Science Organization (ESSO) in this regard?

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

(a) The details of centres set up for forecasting natural calamities such as earthquakes, tsunami, cyclone, etc. are given below.

Earthquake Monitoring Centre- Earth System Science Organization-National Center for Seismology (ESSO-NCS) is monitoring earthquake activity in and around the county round the clock through its national seismological network. There is no accepted proven scientific technique worldwide so far to predict/forecast the occurrence of earthquakes with reasonable degree of accuracy in space, time and magnitude.

Tsunami Warning Centre-The Government has established a state-of-the-art Tsunami Warning Centre at Indian National Centre for Ocean Information Services (INCOIS), Hyderabad. This centre has been made fully operational since September 2007 and is equipped to provide timely tsunami warnings for India and the countries in the Indian Ocean region on 24 x7 basis. The Indian Tsunami Warning System comprises various real time monitoring networks, seismic monitoring network; bottom pressure recorders; tide gauges etc., to monitor tsunami waves. These real time observing networks are backed up by a hierarchical database of pre-run tsunami travel time and inundation scenarios; robust standard operational procedures (SOPs) and communication facilities for generation and dissemination of different categories of warnings. The three critical steps involved in generation of tsunami warnings include i) detection of earthquakes and estimation of earthquake parameters; ii) estimation of travel time and run -up height of tsunami; iii) confirmation of tsunami by monitoring sea level.

Potential Fishing Zone (PFZ) Advisories- For the benefit of fisherman community, ESSO- *INCOIS Hyderabad* has set up a satellite-based application for the fishermen community of the country, called "Potential Fishing Zone (PFZ) Advisories". The advisories is being generated and provided on using the satellite data and Geographic Information System (GIS) tools since 1999 useful for location of fish grounds/aggregation . 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 being provided to fisherman.

Monitoring, detection and forecasting of weather including severe weather events such as cyclones, heavy rainfall, extreme temperature etc. - ESSO-India Meteorological Department (IMD) is responsible for monitoring, detection and forecasting of weather including severe weather events such as cyclones, heavy rainfall, extreme temperature etc. It provides forecast of these events at national, regional and state levels through its tree tier structure. In order to provide early warning of severe weather events, ESSO-IMD has setup a network of state meteorological centres to have better coordination with a state and other agencies.

(b) No Madam.

(c) Does not arise.

(d-e) 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.

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 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.

ESSO-IMD has operationalized its location specific nowcasting weather service across the country. This service activity currently covers 155 urban centres under which nowcast of severe weather (Thunderstorms; heavy rainfall from lows/depressions over the land) in 3-6h range is issued. The weather information (Maximum, Minimum temperatures, Rainfall and Sky condition, etc.) and forecast for next 7 days for 310 important cities and towns in all the states and union

territories of India issued by the ESSO-IMD and they are available on the National and Regional websites of ESSO-IMD. ESSO-IMD, in coordination with State Governments, is generating forecasts for major pilgrimages such as Amarnath Yatra, Mansarovar Yatra, Chardham Yatra, Kumbhmela,etc. and also various mountaineering expeditions launched by the Armed Forces for Mount Everest and several other Himalayan mountains.

ESSO-IMD also provides Quantitative Precipitation Forecast (QPF) up to 72 h at sub-basin scale through Flood Meteorological Offices (FMOs). FMOs provide meteorological support to the Central Water Commission (CWC) for issuing flood warnings in respect of the 43 rivers of India covering 137 sub-basins. CWC issues flood forecasts 6 h to 30 h in advance for 176 stations using QPF received from FMOs of ESSO-IMD and in-situ hydro-meteorological data.

The Gramin Krishi Mausam Seva (GKMS) of ESSO-IMD has been successful in providing the crop specific advisories to the farmers at the district level twice weekly through different print/visual/Radio/ IT based wider dissemination media including short message service (SMS) and Integrated Voice Response System (IVRS).

******