GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION No. 996
TO BE ANSWERED ON TUESDAY, FEBRUARY 11, 2020

RISE IN FREQUENCY OF NATURAL DISASTERS

996. SHRI MD. NADIMUL HAQUE:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether there has been an unexpected increase in natural disasters like cyclones and floods over the last three years, if so, details thereof; and

(b) the steps that has been taken by the Ministry to make its forecasting systems more accurate in wake of increasing climate disasters, details thereof?

ANSWER
MINISTER FOR SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(Dr. HARSH VARDHAN)

(a) Yes Sir. The country has witnessed increase in extreme weather events like extremely heavy rainfalls leading to floods, severe heat waves, cyclones etc. in the recent past.

In the changing climate scenario, central & northern India and Western Himalayas have become more prone to extreme rainfall events, whereas north, northwest and neighbouring central India are prone to expansion of semi arid regions. Indian monsoon also shows a natural variability in seasonal rainfall with epochal variations.

Even though it cannot be termed as a direct cause, events like heavy rainfall in various parts of the country have a possible linkage with global warming, since climate model simulation brings out intensification of extreme precipitation in various parts of the world due to global warming. Also several scientific studies bring out the possible linkage of Climate Change with the sudden occurrence of rainfall extreme, temperature extreme etc.

Regarding tropical Cyclones, based on the statistics during 1891-2017, on an average 5 cyclones develop over North Indian Ocean (NIO) in a year with 4 developing over Bay of Bengal (BoB) and 1 over Arabian Sea (AS). The study shows increase in frequency of severe cyclones over Arabian Sea in recent years. During 2017, only 3 systems formed, 2 over the BoB and one over the AS. During 2018, there were 7 cyclones over NIO, with 4 over BoB and 3 over AS. During the year 2019, 8 cyclonic storms formed over Indian Seas; 5 over Arabian Sea & 3 over Bay of Bengal. The occurrence of 5 cyclones over Arabian Sea in 2019 against the normal of 1 per year equals the previous record of 1902 for the highest annual cyclone frequency over Arabian Sea. Also 2019 witnessed development of more intense cyclones over Arabian Sea.

(b) **India Meteorological Department (IMD) is dedicated for monitoring, detection and forecasting of weather and climate including early warning for severe weather events such as cyclones, heavy rainfall etc. The weather forecasting and early warning systems in the country are comparable to most of the developed countries in the world in terms of accuracy, lead time and associated impact.IMD continuously expands its infrastructure for meteorological observations, data exchange, monitoring & analysis, forecasting and warning services using contemporary technology. IMD uses a suite of quality observations from satellites, radars and conventional & automatic weather stations for monitoring of cyclones and prediction of weather. It includes INSAT 3D, 3DR and SCATSAT satellites, Doppler Weather Radars (DWRs) along the coast and coastal automated weather stations (AWS), automatic rain gauges (ARGs), meteorological buoys and ships. The High Performance Computing (HPC) system have been recently upgraded with 6.8 petaflops so as to support the ongoing efforts on modelling. Operational implementation of improved suite of prediction models has enhanced the weather forecasting capability through assimilation of all available global satellite radiance & Radar data for the generation of forecast products at 12 km grid globally and 3 km grid over India/regional/mega city domains.**

Heavy rainfall events lead to floods over different river basins of the country. River basin floods are dealt by the Central Water Commission (CWC), Ministry of Water Resources. In order to meet specific requirements of flood forecasting, which is provided by CWC, IMD operates Flood Meteorological Offices (FMOs) at thirteen locations viz., Agra, Ahmedabad, Asansol, Bhubaneshwar, Guwahati, Hyderabad, Jalpaiguri, Lucknow, New Delhi, Patna, Srinagar, Bengaluru and Chennai. Apart from this, IMD also supports Damodar Valley Corporation (DVC) by providing Quantitative Precipitation Forecast (QPF) for Damodar river basin areas for their flood forecasting activities. CWC is working in close association with IMD and State Governments for timely flood forecast whenever the river water level rises above warning level. FMOs operated by IMD provide meteorological support to the CWC for issuing flood warnings well in advance in respect of the 43 rivers of India covering 146 river basins. CWC issues flood forecasts 6 hrs. to 30 hrs. in advance for 176 stations using QPF received from FMOs and in-situ hydrometeorological data.

During recent years, IMD has consistently given accurate prediction for cyclones like Phailin (2013), HudHud (2014), Vardha (2016), Mekunu (2018), Sagar (2018), Titli (2018), Luban (2018), Fani (2019), Hikaa (2019) and Bulbul (2019) thereby helping disaster managers to minimize the loss of lives to less than 100 due to tropical cyclones.

IMD has one of the best forecasting systems for predicting tropical cyclones using high resolution advanced mathematical models (including global, regional and cyclone specific models) crossing both west and east coast of India and associated adverse weather over India. IMD utilizes an array of various models including global, regional and cyclone specific models for forecasting Cyclone track, intensity and associated adverse weather like heavy rainfall, gale wind and storm surge. To improve the numerical modelling capability for forecasting cyclones, in addition to in-house efforts, collaborative efforts with various Academic and R&D Institutes have been taken up to improve early warning services.

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