

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 2945
TO BE ANSWERED ON WEDNESDAY, 3RD AUGUST, 2022**

ADVANCE WARNING SYSTEM TO CHECK DISASTERS

+2945. SHRI MOHAN MANDAVI:
SHRI CHUNNI LAL SAHU:

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether the Government has made an assessment of impact of environmental and climate change on the remote and hilly areas of Chhattisgarh;
- (b) if so, the details thereof;
- (c) whether the Government has installed any advance warning system to prevent the devastation which might be caused by calamities as a result thereof;
- (d) if so, the details in this regard;
- (e) whether any concrete steps have been taken in this regard;
- (f) if so, the details thereof; and
- (g) if not, the reasons therefor?

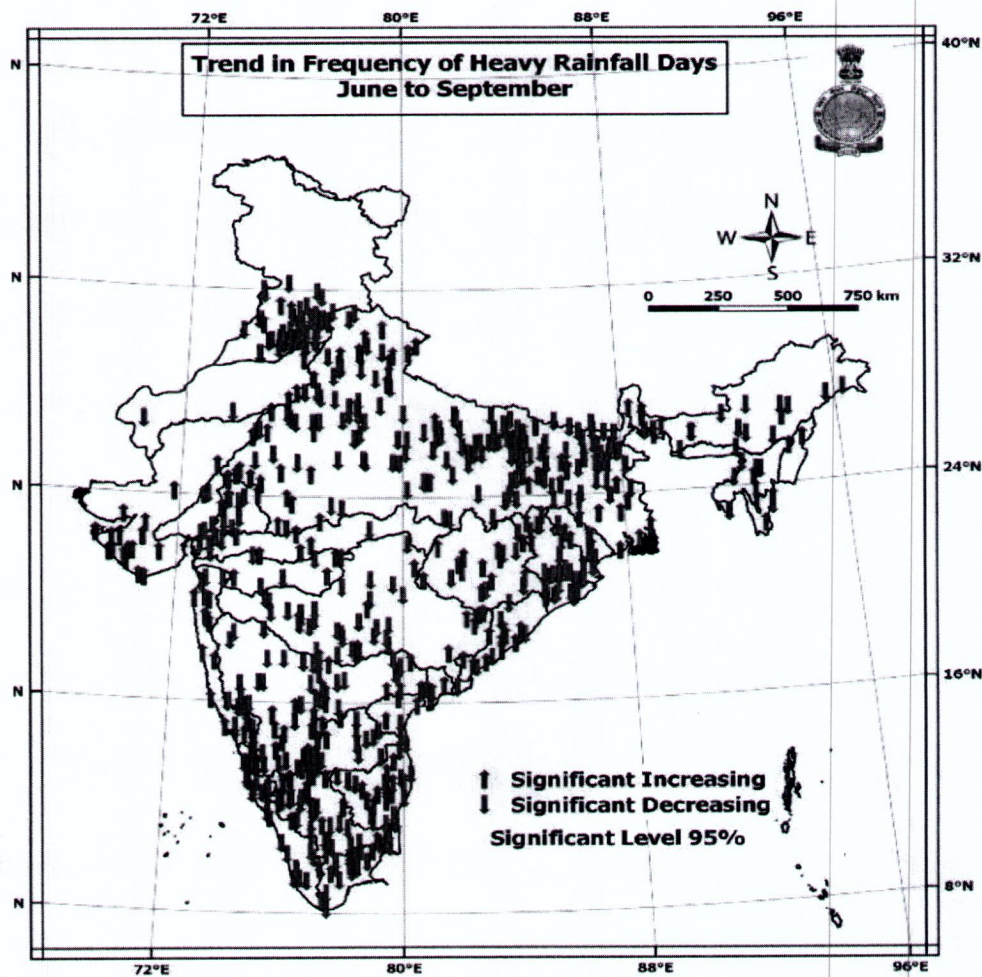
ANSWER
THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

- (a)–(b) India Meteorological Department (IMD) has studied and investigated the observed changes of rainfall patterns and its extremes in the recent 30 years in different states and districts in the country **including Chhattisgarh**, as a part of assessment of impact of environmental and climate change. 29 Reports of states and UTs on "Observed Rainfall Variability and Changes" have been published by IMD in January 2020. The reports are also available to the public on the IMD Pune website <https://imd pune.gov.in/hydrology/rainfall%20variability%20page/rainfall%20trend.html>).

The **highlights of the report** are given below;

- Five states viz., Uttar Pradesh, Bihar, West Bengal, Meghalaya and Nagaland have shown significant decreasing trends in southwest monsoon rainfall during the recent 30 years period (1989-2018).
- The annual rainfall over these five states along with the states of Arunachal Pradesh and Himachal Pradesh also show significant decreasing trends.
- Other states do not show any significant changes in southwest monsoon rainfall during the same period.
- Considering district-wise rainfall, there are many districts in the country, which show significant changes in southwest monsoon and annual rainfall during the recent 30 years period (1989-2018). With regard to the frequency of heavy rainfall days, significant increasing trend is observed over Saurashtra & Kutch, Southeastern parts of Rajasthan, Northern parts of Tamil Nadu, Northern parts of Andhra Pradesh and adjoining areas of Southwest Odisha, **many parts of Chhattisgarh**, Southwest Madhya Pradesh, West Bengal, Manipur & Mizoram, Konkan & Goa and Uttarakhand.

The trend in Frequency of heavy rainfall days during monsoon for the period (1989-2018) is given in Figure below.



- (c) - (d) IMD issues forecasts and warnings related to extreme weather events and share the same with Disaster Management Authorities as well as general public through various platforms for necessary preparedness and to support mitigation measures.

IMD follows a seamless forecasting strategy. The long-range forecasts (for the whole season) issued are being followed with extended range forecast issued on every Thursday with a validity period of four weeks. To follow up the extended range forecast, IMD issues short to medium range forecast and warnings daily valid up to next five days with an outlook for subsequent two days. The short to medium range forecast and warning at district and station level are issued by state level Meteorological Centres (MCs)/Regional Meteorological Centres (RMCs) with a validity of next five days and are updated twice a day. The short to medium range forecast is followed by very short range forecast of severe weather up to three hours (nowcast) for all the districts and 1089 cities and towns. These nowcasts are updated every three hours.

Forecast is issued for 36 meteorological sub-divisions from National Weather Forecasting Centre, IMD HQ and is updated four times a day. The forecasts and nowcasts are issued at District Level and Station Level by State Level Meteorological Centres and Regional Meteorological Centres.

While issuing the warning suitable colour code is used to bring out the impact of the severe weather expected and to signal the Disaster Management about the course of action to be taken with respect to impending disaster weather event. Green color corresponds to no warning hence no action is needed, yellow color corresponds to be watchful and get updated information, orange color to be alert and be prepared to take action whereas red color signals to take action.

IMD started issuing Impact Based Forecast (IBF) recently which give details of what the weather will do rather than what the weather will be. It contains the details of impacts expected from the severe weather elements and guidelines to general public about do's and don'ts while getting exposed to severe weather. These guidelines are finalised in collaboration with National Disaster Management Authority (NDMA) and is already implemented successfully for cyclone, heat wave, thunderstorm and heavy rainfall. Work is in progress to implement the same for other severe weather elements.

Meteorological Centre at Raipur provides forecast and warning for Chhattisgarh State. It provides impact based forecast & warnings for all the 27 districts daily valid upto next five days. It also provides location specific forecast for 19 locations. It provides district level nowcast and states level nowcast for 33 locations for all severe weather.

- (e) -(f) In order to enhance the weather monitoring and forecasting capabilities of the country including capacity building and upgradation of technology, various programs are being implemented in IMD under the umbrella scheme "Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS)" of the MoES. There are 4 sub-schemes of IMD under ACROSS namely, Atmospheric Observation Network (AON), Upgradation of Forecast System (UFS), Weather & Climate Services (WCS) and Commissioning of Polarimetric Doppler Weather Radars (DWR).

Major progress already made under ACROSS-IMD follow:

- IMD's DWR network has expanded to 33 DWRs (including DWRs from ISRO) across the country to support monitoring & forecasting of severe weather like thunderstorm, hailstorm, lightning, squall, heavy rain and cyclone etc.
- The network of upper air observatories has been enhanced and it comprise of 56 Radiosonde/ Radiowind and 62 Pilot balloon observatories at present to measure the vertical profile of meteorological elements viz., temperature, wind and humidity.
- IMD maintains 216 Surface Observatories, 918 Automatic Weather Stations (AWS) Network (inclusive of 198 Agro-AWS) and 1382 Automatic Rain Gauge Stations (ARG) Network and 34 High Wind Speed Recording systems along east and west coast.

- Satellite derived products are augmented with establishment of Multi Mission Data Receiving and Processing System. The system was dedicated to the nation on 15th January, 2021.
- Installation of Frangible mast, Current Weather Instrument System (CWIS) and PC based display completed at 39 airports and will be extended to 72 airports in near future. All the remaining airports and upcoming airports under UDAN scheme will be equipped with frangible masts and CWIS in next five years to provide quality aviation meteorological service.
- Advance observing systems such as Wind Lidar/Wind Profiler and Microwave Radiometers to detect and nowcast aviation hazards & weather extremes e.g., thick fog, gust wind etc. and facilitate more precise management of take-off and landing operations to be introduced at major airports.
- About 198 Agro-AWS have been installed at District Agromet Units (DAMUs) in KrishiVigyanKendras (KVKs) premises which have soil moisture and soil temperature sensors additionally.
- Experimental block level agromet advisories are issued for ~3000 blocks covering ~355 districts of the country at present. Issuance of Block level weather forecast and Agromet Advisory Service Bulletins is expected to increase to 5000 blocks in 2022 and uptopanchayat level by 2024.
- Mausam and Meghdoot mobile apps launched. Using this App, farmers can get Weather observations and forecast, Weather based crop and livestock-specific agrometeorological advisories in English and regional language for their districts.
- Noteworthy improvement has been made in track and intensity forecast of the tropical cyclones, due to which the loss of life due to Tropical Cyclones has been reduced significantly to less than 100 during recent cyclones.
- High Resolution Rapid Refresh (HRRR) model is operationalized in experimental mode for three domains (Northwest India, East & North-East India and South Peninsular India) covering the entire mainland of India. HRRR model is run with Radar Data Assimilation at 2km horizontal resolution to provide Nowcast guidance and produce hourly forecast products for next 12 hours.
- Location specific Meteograms for 751 districts and 658 stations of India and 491 stations of SAARC countries, 1000 National Agriculture Market (eNAM), 7000 Blocks are generated along with all meteorological Sub-Division based forecasts.
- Different customized post-processed products based on NWP models are being generated specifically for different sectorial applications including hydrology, health, environment, transport, power, agriculture, cyclone, thunderstorm, heat/cold wave, fog etc.
- Web GIS Portal has been developed for real time monitoring and forecasting of severe weather events like cyclone, heat wave, cold wave and heavy rainfall.
- For capacity building, several trainings, workshops, seminars etc. are organized on a regular basis.

(g) Doesn't arise.
