

## Burning Issues -2014

### Minister of Earth Sciences

#### Forecasting Of Natural Calamities LSQ 633

26th November, 2014  
Shri Chandra Prakash Joshi

#### Questions:

Will the Minister of Earth Sciences be pleased to state:-

(a) whether the Government has latest scientific techniques to forecast the natural calamities in the country;-

(b) if so, the details thereof;

(c) whether the technique is of international Standards;

(d) if so, the details thereof and if not, the reasons therefore; and

(e) the steps taken/being taken by the Government to evolve scientific techniques to forecast natural calamities.

#### Answers:

Minister For Ministry Of Science And Technology And Ministry Of Earth Sciences (Dr. Harsh Vardhan)

(a) Yes Madam as far as the Hydro-meteorological hazards (Cyclones; heat wave/cold wave; Heavy rainfall events; Thunderstorms) and Tsunami are concerned.

(b) Improvement of weather forecasting services is a continuous process. As part of its XI five year plan, Government had implemented a comprehensive modernization programme for Earth System Science Organization-India Meteorological Department (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 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.

As and when the cyclone systems move in to the 500Km surveillance range of DWRs, identification of strong wind zones and pockets of heavy rainfall within the core cyclone area is carried out and their rapid changes are monitored on continuous basis. IMD currently operates 5- Doppler Weather Radars (DWR) at Chennai, Machilipatnam, Visakhapatnam, Kolkata, Sriharikota on the east coast along with a network of Automatic Weather Stations (AWS) and Automatic Rain Gauges (ARG) for continuous weather surveillance over the Bay of Bengal and Arabian Sea.

ESSO-IMD has operationalized its location specific nowcasting weather service across the country. This service activity currently covers 147 urban centres on experimental basis under which nowcast of severe weather (Thunderstorms; heavy rainfall from lows/depressions over the land) in 3-6h range is issued. Origin, development/movement of severe weather phenomena are regularly monitored through DWRs and with all available other observing systems (AWSs; ARGs; Automatic Weather Observing Systems-AWOS; satellite derived wind vectors, temperature, moisture fields etc.)

Integrated Agro-meteorological Advisory Service (AAS) is rendered now on twice-weekly basis in collaboration with State Agricultural Universities (SAUs), institutions of Indian Council of Agricultural Research (ICAR) etc. Realized weather of the previous week and quantitative district level weather forecast for next 5-days in respect of rainfall, maximum temperature, minimum temperature, wind speed, wind direction, relative humidity and clouds as well as weekly cumulative rainfall forecast are provided. Further, crop specific advisories, generated in partnership with SAUs and ICAR, to help the farmers are issued and widely disseminated. The AAS of ESSO-IMD has been successful in providing the crop specific advisories to the farmers at the district/agro-climatic zone level twice weekly

	<p>through different print/visual/Radio/ IT based wider dissemination media including short message service (SMS) and Interactive Voice Response Service (IVRS) facilitating for appropriate field level actions.</p> <p>(c-e) Yes Madam. Government feels that the upgradation of the observing system, high performance computing, communication, forecast/warning systems, product dissemination systems etc. should become a part of continuing process by which state-of-the art science and technology tools shall be made accessible to the scientists engaged in weather research and forecasting towards enhancing the service quality.</p>
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<b>GLOBAL WARMING</b> LSQ 627 26th November, 2014 Smt. Kamla Devi Patle	
<b>Questions:</b>	<b>Answers:</b>
<p>Will the Minister of Earth Sciences be pleased to state:-</p> <p>(a) whether the Government has conducted any scientific study on climate change caused by global warming and its impact on monsoon;</p> <p>(b) if so, the details thereof;</p> <p>(c) the reasons for global warming and the steps taken/proposed to be taken by the Government in this regard;</p> <p>(d) whether the Government proposes to establish a National Institute on Climate Change; and</p> <p>(e) if so, the details thereof?</p>	<p>Minister For Ministry Of Science And Technology And Ministry Of Earth Sciences (Dr. Harsh Vardhan)</p> <p>(a) Yes Madam.</p> <p>(b) Ministry of Environment and Forests (MoEF), Govt of India had undertaken the Indian second National Communication to UNFCCC during 2009-2011(NATCOM-II). The communication had been a national effort which involved many multi-disciplinary scientific groups. Ministry of Earth Sciences carried out scientific studies on projected climate change and variability under Global and Regional Climate Change (GRCC) government programme under which programme a dedicated Centre for Climate Change Research (CCCR) within the Indian Institute of Tropical Meteorology (IITM), Pune, was established.</p>

Monsoon rainfall varies on different spatial and temporal scales. Extreme rainfall events that occur at some isolated places (viz. heavy rainfall over Mumbai or in Rajasthan) are highly localized and are part of the natural variability of the Indian monsoon system itself. Although, some recent studies hint at an increasing frequency and intensity of extremes in rainfall during the past 40-50 years, their attribution to global warming is yet to be established. Moreover, the report of the Inter- governmental Panel on Climate Change and our country's own assessment using regional climate models indicate that the extremes rainfall events are likely to be more frequent in the later part of the 21st century all over the world including India. As regards other extreme weather phenomena, there are many other reasons for their occurrence, which cannot always be related to climate change.

Although, the monsoon rainfall at all India level does not show any trend but on regional scale, areas of increasing trend is discerned. It is not clear if this increasing trend in the heavy rainfall events is attributable to global warming. Summary of the observed long term changes so far include:

(i) Mean annual surface air temperatures show a significant warming of about 0.5 degree C/100 years during the last century.

(ii) No significant long-term trends are reported in the frequencies of large-scale droughts or floods in the summer monsoon season.

(iii) The average seasonal rainfall over India has shown decline in the last five decades, especially after 1970, that is not found to be statistically significant. Further over core monsoon zone, the contribution from increasing heavy rain events is offset by decreasing moderate events and hence on the long term the change is not appreciable. Many studies have discussed the possible reasons for recent weakening monsoon.

(iv) Studies were undertaken in four climate sensitive regions of the country, viz. Himalayan Region, Western Ghats, North Eastern Region, Coastal Areas to assess the possible impacts on the four sectors viz. agriculture, water, forests and health. A Report entitled, Climate Change & India: A 4X4 Assessment – A Sectoral and Regional

Assessment of Impact of Climate Change in 2030s, has been released by the Government during November, 2010 under the aegis of the Indian Network of Climate Change Assessment (INCCA).

(c) Global warming has been attributed largely to the increase in concentration of greenhouse gases mainly from anthropogenic activities. The Government has initiated the National Action Plan on Climate Change in specific areas for addressing long term and integrated strategies for achieving key goals of sustainable development in the context of climate change, so as to reduce its adverse impacts.

(d-e) Government of India is setting up a National Institute for Climate Change Studies and Actions (NICCA) under Climate Change Action Programme (CCAP) of the Ministry of Environment, Forests & Climate Change with an objective to support all scientific, technical and analytical studies relating to climate change policy and implementing strategies. The institute has an outlay of Rs. 25 crores for the 12th Five Year Plan out of an allocated budget of Rs. 290 crores for CCAP.