

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 1084
TO BE ANSWERED ON FEBRUARY 07, 2020**

GEO SCIENCE INVESTIGATION AND DISASTER MANAGEMENT

1084. SHRI T.R. BAALU:

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether his Ministry has conducted a detailed geo-sciences investigation in the earthquake-prone areas;**
- (b) if so, the details thereof;**
- (c) whether the Government is prepared to ease out/ manage the impact of earthquake in highly populated areas and if so, the details thereof;**
- (d) whether, the 'National Monsoon Mission' initiative has been taken by the Government to improve the current models to predict monsoon within a reasonable time-frame; and**
- (e) if so, the details thereof?**

ANSWER

**MINISTER OF MINISTRY OF SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(DR. HARSH VARDHAN)**

- (a) & (b) As per seismic zoning map, prepared by Bureau of Indian Standards (BIS), the country has been divided into four Zones i.e. Zone II to V, out of which Zone V is considered to be most seismically active, while Zone II is the least. However, the earthquake effects are found to be different within the same Zone. To further refine the zonation, Ministry of Earth Sciences (MoES) has undertaken hazard assessment on large scale i.e. microzonation. In this direction, MoES has completed seismic microzonation of Delhi and Kolkata cities and released the reports. Copies of these reports have also been provided to stake holders of concerned States and Central Government authorities to help in design of earthquake resistant structures, land use and urban planning. Seismic microzonation of few other areas like Jabalpur, Sikkim, Guwahati, and Bengaluru etc. has also been completed in project mode. Investigations related to microzonation of 4 cities namely, Chennai, Bhubaneswar, Mangalore, Coimbatore are expected to be completed by the end of 2020-21. Additionally, microzonation of 8 more cities, namely, Kanpur, Lucknow, Patna, Dhanbad, Varanasi, Meerut, Agra, Amritsar shall be initiated soon.**

Also, the earthquakes are being monitored on 24x7 basis by the National Centre for Seismology (NCS) to detect and disseminate the information about the earthquake parameters to all the user agencies and the disaster management authorities in less than 5 minutes.

(c) National Disaster Management Authority (NDMA) has published guidelines to manage the earthquakes in the country. Guidelines have been prepared through a series of consultations with key stakeholder groups in New Delhi, Kanpur and Mumbai. These consultations identified the critical factors responsible for the high seismic risk in India and prioritized the following six sets of critical interventions, which have been presented in these Guidelines as the six pillars of earthquake management:

- 1. Ensure the incorporation of earthquake-resistant design features for the construction of new structures.**
- 2. Facilitate selective strengthening and seismic retrofitting of existing priority and lifeline structures in earthquake-prone areas.**
- 3. Improve the compliance regime through appropriate regulation and enforcement.**
- 4. Improve the awareness and preparedness of all stakeholders.**
- 5. Introduce appropriate capacity development interventions for effective earthquake management (including education, training, R&D and documentation).**
- 6. Strengthen the emergency response capability in earthquake-prone areas.**

These guidelines are available at <https://ndma.gov.in/images/guidelines/earthquakes.pdf>

(d) Yes Sir. The 'National Monsoon Mission' initiative has been taken by the Ministry of Earth Sciences to improve the current models to predict Indian monsoon rainfall and its variability with reasonably good prediction skill using dynamical ocean-atmosphere models.

(e) Ministry of Earth Sciences (MoES) has launched the “Monsoon Mission” in 2012 with two major objectives: (1) To build a working partnership with the Academic and Research & Development Organizations at both national and international and to improve the monsoon forecast skill in the country; and (2) To setup a state-of-the-art dynamical modelling framework for improving prediction skill of (a) Seasonal and Extended range predictions, and (b) Short and Medium range (up to two weeks) prediction.

Indian Institute of Tropical Meteorology, (IITM) Pune has been coordinating the Monsoon Mission program. The targets set through the above objectives have been achieved successfully during the first phase of Monsoon Mission program (2012-2017), in association with National Centre for Medium Range Weather Forecasting (NCMRWF), India Meteorological Department (IMD) and Indian National Centre for Ocean Information and Services (INCOIS) under MoES.

After the successful completion of Phase-I (2012-2017), MoES has launched the Monsoon Mission Phase II (2017-2020) in September 2017, with emphasis on predicting extremes and development of climatic applications based on monsoon forecasts, especially in the field of agriculture and hydrology, while continuing model development activities.

During last three years and current year, important achievements made under National Monsoon Mission are as follows:

- Development of a dynamical seasonal prediction system Monsoon Mission Climate Forecast System (MMCFS) of very high resolution (of ~38km) with considerably good prediction skill for predicting Indian summer Monsoon rainfall (ISMR), using a modified version of Climate Forecast System Version-2 (CFSv2) T382 model by IITM. The model was transferred to IMD for operational forecasts to the nation from 2017 onwards.**
- Development of dynamical extended range prediction system (up to 4 weeks in advance) of very high accuracy by IITM which was made operational by IMD since 2017.**
- Significant improvement in prediction skill of the dynamical models (which was very low in the last decade) through model developmental activities.**
- Development of a very high resolution (~12km) Global Ensemble Prediction System (EPS) with 21 ensemble members for short range forecast system based on Global Ensemble Forecast System (GEFS) (T1534) by IITM which has been handed over to IMD for operational implementation since June 2018.**
- Development of 1km thunderstorm/lightening prediction system.**
- The cyclone prediction by IMD has been excellent in recent times with a very long lead time.**
- In association with IITM & NCMRWF, IMD has started giving prediction of heat waves, cold waves and other severe weather conditions at a very high skill.**

- **Works for climatic applications in agriculture and hydrology are in progress in IITM, in collaboration with IMD, ICRISAT, etc.**
- **All information and predictions are given for the whole country and thus, this Monsoon Mission program has shown its national behaviour in true sense.**
- **The achievements have been on the lines of the targets set for the Mission.**
