GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 2104
ANSWERED ON 21/12/2023

USE OF AI IN THE FIELD OF METEOROLOGICAL RESEARCH

2104. SMT. SANGEETA YADAV:

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

(a) the status of use of artificial intelligence and machine learning research in the field of meteorological research in the country;
(b) the details of programmes undertaken by the Ministry in collaboration for artificial intelligence during the last three years;
(c) the achievements and outcomes of artificial intelligence and machine learning research and development in terms of enhancing the understanding and prediction of weather; and
(d) the steps taken by the Ministry to accelerate the pace of artificial intelligence and machine learning research for making India a developed nation by 2047?

ANSWER
THE MINISTER OF EARTH SCIENCES
(SHRI KIREN RIJIJU)

(a) Artificial Intelligence (AI) and Machine Learning (ML) techniques are being used to improve the prediction skill of weather, climate, and ocean forecasts at various institutes under the ministry.

(b) Ministry of Earth Sciences (MoES) has established a dedicated AI and ML virtual center tasked with developing and testing various AI and ML techniques and capacity building activities by conducting workshops and conferences. A computing environment and virtual workspace for training and deploying AI models has been established on Graphical processor-based server in India Meteorological Department (IMD).

(c) Achievements and outcomes of AI and ML in the research and development (R & D) of weather prediction is provided below:

- Improved the short-range precipitation forecast in 1-day, 2-day and 3-day lead times with a reduction in bias.
- Developed high-resolution (300m) urban gridded meteorological data sets for temperature and precipitation.
- Developed the time-varying Normalized Difference Urbanization Index with a spatial resolution of 30 meters from 1992-2023.
- Developed very high-resolution precipitation data sets for verification purposes.
- Deep Learning approach is being explored for precipitation nowcasting using data from Doppler Weather Radars (DWRs).

(d) MoES envisages that many of the weather and climate forecasts will be based on hybrid technology of combining AI/ML models and traditional numerical weather prediction models. The institutes, under the Ministry of Earth Sciences (MoES), has been continuously encouraged to utilize AI and ML technological advancements in the field of Earth Sciences. In view of that, MoES is committed to enhance the High-Performance Computing (HPC) infrastructure as well. AI and ML based data driven modeling is required for generating species specific Potential Fishing Zone (PFZ) advisories for fishermen across the coastal States.

****