GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 2073
ANSWERED ON 08/08/2024

INSTALLATION OF NEW SUPERCOMPUTERS IN THE COUNTRY

2073. **#** SHRI TEJVEER SINGH:

Will the Minister of EARTH SCIENCES be pleased to state:

(a)   the number of new supercomputers got installed recently in the country by the Ministry for meteorology, climate change and earthquake research; and

(b)   the details of the major research activities being carried out and achievements being made through these supercomputers, along with the kind of benefits and improvements expected from the results of these research?

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

(a)   New supercomputers of 21.1 PetaFlops capacity will be installed this year by the Ministry. Existing two supercomputers details are as follows:

     i.   Pratyush:
- Located at the Indian Institute of Tropical Meteorology (IITM) in Pune.
- Peak speed: 6.8 PetaFlops
- Purpose: Weather forecasting and climate research work

    ii.   Mihir:
- Located at the National Centre for Medium-Range Weather Forecast (NCMRWF) in Noida.
- Peak speed: 2.8 PetaFlops

(b)   Supercomputer facilities are crucial to improving weather forecasting for seasonal, long, and short-range predictions, ensemble predictions with more members, and climate change scenario generation for hundreds of years. These computationally intensive processes require advanced computational resources and high storage capacities.

The supercomputers are used for weather and climate modeling, coupled ocean-atmosphere-biosphere-cryosphere models, and associated data assimilation, which are highly compute-intensive tasks. It is also used for operational activities such as monsoon prediction, air quality assessment, and forecast of extreme weather events (cyclones, fog, etc.).

The first climate model from India, IITM Earth System Model, has contributed to the climate change assessment report of IPCC (IPCC AR6) and national climate change assessment report by the Ministry, "Assessment of Climate Change over the Indian Region" (https://link.springer.com/book/10.1007/978-981-15-4327-2), utilized the supercomputer. Regional climate change projections were also carried out using the supercomputer. Also, the first version of the Decadal Climate Prediction System (IITM-DCPS) has been developed.

In addition, supercomputers have been the backbone of significant improvements in weather forecast accuracy over the past two decades. Supercomputing facilities will help advance the understanding of weather and climate, resulting in better prediction and improved weather services for the nation. The major benefits include:

    i.   Improved weather and climate forecasts at a very high resolution and forecasts of extreme events at the block level.

    ii.   Carryout research to improve the Indigenous dynamical models for better prediction.

    iii.   Leveraging the new HPC facility to develop models using the latest technologies like Artificial Intelligence (AI) and Machine Learning (ML) to improve the last mile services to different stakeholders.

    iv.   Improving short, medium, and long-range forecasts for monsoon.

    v.   Better forecast of Air Quality and Fog forecasts for many cities in India.

****