GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 519
ANSWERED ON 24/07/2025

BHARAT FORECAST SYSTEM

519.   # SHRI BABURAM NISHAD:
SHRI DEEPAK PRAKASH:
SHRI NARAYANA KORAGAPPA:
SHRI AMAR PAL MAURYA:
DR. SUDHANSHU TRIVEDI:
SHRI BABUBHAI JESANGBHAI DESAI:
SHRI KESRIDEVSINH JHALA:

Will the Minister of **EARTH SCIENCES** be pleased to state:

(a)   the key features and objectives of the newly launched Bharat Forecast System, and the manner in which it enhance India's weather prediction capabilities;

(b)   the manner in which the Bharat Forecast System contribute to reducing crop losses and improving disaster preparedness, particularly in the context of climate change; and

(c)   the significance of the Bharat Forecast System being developed indigenously, and the manner in which it align with the goals of Atmanirbhar Bharat and Make in India initiatives?

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

(a)   The Bharat Forecast System (BharatFS) is based on the newly implemented Triangular Cubic Octahedral (TCo) dynamical grid that enables the model to operate at 6 km horizontal resolution, surpassing its predecessor (GFS T1534 ~ 12km) and typical global operational models having horizontal resolution of 9–14 km. The recently acquired supercomputing facilities, Arka (IITM-Pune) and Arunika (NCMRWF-Noida), enabled the model to be used for real-time weather prediction by reducing the runtime from ~12 hours to just 3–6 hours. These key features have enhanced India's weather prediction capabilities by making India the only country running a global weather prediction model at such a high resolution for real-time weather prediction. The BharatFS was developed with the objective of generating forecasts at the cluster of panchayats level and improving the prediction of extremes. On research mode, it has demonstrated significant improvement in the rainfall forecast over the core monsoon region and 30% better accuracy for the extreme rainfall forecast compared to the previous operational model.

(b)   With the increase in horizontal resolution, the BharatFS is capable of generating distinct forecasts every 6 km. This allows the capturing of local weather features, thus enabling the forecasts to cater to a cluster of panchayats/villages. Localized forecasts help farmers with crop planning, irrigation, and harvesting. Additionally, water authorities can better manage reservoirs during monsoons, reducing flood risk and improving yield resilience. Climate change is increasing the frequency and severity of extreme events, and the BharatFS has demonstrated significant improvement in the skill of predicting the core monsoon region rainfall, with 30% improvement in the accuracy for the forecasting of extreme rainfall events. All these improvements are crucial for faster and targeted disaster response, increasing the disaster preparedness of our country.

(c)   The BharatFS being developed indigenously is highly significant, not only for advancing India's scientific capabilities but also for furthering national strategic and economic goals. BharatFS represents India's own high-resolution weather prediction model, designed by Indian scientists considering the complexities of forecasting due to Indian geography—the Himalayas and Western Ghats.

Developed by a team of scientists from Indian institutions like IITM-Pune, with support from the NCMRWF-Noida and the IMD. The modeling system is powered by indigenous MoES supercomputing facilities (Arka and Arunika). These achievements are aligned with "Make in India" – Showcasing India's capability to build world-class systems locally. The development and launch of BharatFS enables India to export meteorological services and support neighboring countries, reinforcing regional leadership and self-reliance. Empowering India to own and lead in climate and weather sciences demonstrates "Atmanirbhar Bharat". All these align strongly with the visions of Atmanirbhar Bharat (Self-Reliant India) and Make in India.

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