

BHARAT FORECASTING SYSTEM: SCIENCE & TECHNOLOGY

NEWS: Government to unveil Bharat Forecasting System on May 26

WHAT'S IN THE NEWS?

The Ministry of Earth Sciences has launched the Bharat Forecasting System (BFS), India's first indigenously developed high-resolution weather model, to enhance forecast accuracy using IITM Pune's supercomputing infrastructure. It offers better disaster preparedness and agricultural planning with 6 km resolution and faster processing via the Arka supercomputer.

Context and Launch

- The **Ministry of Earth Sciences (MoES)** officially unveiled the **Bharat Forecasting System (BFS)** in 2024.
- The model was formally **handed over to the India Meteorological Department (IMD)** for operational weather forecasting.

About Bharat Forecasting System (BFS)

Nature and Development

- India's **first indigenously developed, high-resolution weather forecasting model**.
- Developed by the **Indian Institute of Tropical Meteorology (IITM)**, Pune.

Technological Features

- **High Spatial Resolution:**
 - Provides forecasts at **6 km x 6 km resolution**, a major improvement over existing models.
 - Plans are underway to **further enhance the resolution** to 3 km and 1 km grids.
- **Supercomputing Power:**
 - Runs on the '**Arka**' **supercomputer** installed at IITM, Pune.
 - Arka offers **11.77 petaflops of processing speed** and **33 petabytes of storage**.
 - Reduces the model's runtime from **10 hours (on Pratyush)** to **just 4 hours**, ensuring **faster forecasts**.

Radar Integration

- Uses data from **40 Doppler Weather Radars** across India.
- IMD plans to **expand radar coverage to 100 units** to improve observational input.

Geographical Coverage

- The BFS covers a **tropical belt from 30° South to 30° North**, including the **entire Indian mainland** and surrounding tropical regions.

Applications and Purpose of BFS

1. Enhanced Forecast Accuracy

- With smaller grid size (36 sq km vs earlier 144 sq km), BFS significantly **improves accuracy of localised weather predictions**.
- Particularly useful for **microclimate-sensitive regions**, like cities or coastal areas.

2. Disaster Risk Reduction

- Helps in **early detection and warnings** for:
 - **Cyclones**
 - **Flash floods**
 - **Extreme rainfall**
- Crucial for **saving lives and minimizing infrastructure damage**.

3. Agricultural Support

- Panchayat-level weather data helps farmers in:
 - **Crop planning**
 - **Irrigation scheduling**
 - **Protection from weather-related shocks**

4. Urban Planning and Public Safety

- Assists **civic bodies** in preparing for short-term disruptions like:
 - Urban flooding
 - Heatwaves
 - Storm surges
- Benefits **disaster response teams, planners, and municipalities**.

5. Water Resource Management

- Supports **reservoir regulation, dam operations, and flood control planning**.
- Assists in **efficient distribution of irrigation and drinking water**.

6. Nowcasting Capability

- BFS enables **nowcasting**—very short-term predictions (1–2 hours ahead).
- Critical for managing **rapidly developing weather systems**, e.g., thunderstorm bursts.

7. Sectoral Impact

- Enhanced forecasting benefits key sectors like:
 1. **Aviation**
 2. **Defense**
 3. **Power generation**
 4. **Transport and logistics**

Institutional Context

India Meteorological Department (IMD)

- **Established in 1875**; one of the oldest meteorological agencies globally.
- Functions under the **Ministry of Earth Sciences (MoES)**.
- Headquartered in **New Delhi**.
- Operates **six Regional Meteorological Centres (RMCs)** across India.
- Serves as a **Regional Specialized Meteorological Centre** under the **World Meteorological Organization**.
- Responsible for **weather forecasting, observations, and seismology**.

Indian Institute of Tropical Meteorology (IITM), Pune

- A **premier R&D institute** under MoES.
- **Established in 1962**, became autonomous in 1971.
- Located in **Pune, Maharashtra**.
- Engaged in **advanced climate and monsoon research**, air quality modeling, and supercomputing.
- Hosts **‘Pratyush’** and now **‘Arka’** supercomputers for climate modeling.

Significance of Bharat Forecasting System

Self-Reliance and Innovation

- Reduces India’s dependency on **foreign weather models**.
- Encourages **indigenous R&D in atmospheric science and high-performance computing**.

Global Edge

- Global models (e.g., from UK, USA, Europe) operate at **9–14 km resolution**.
- BFS, with **6 km resolution**, offers **superior detail and granularity** in the tropical zone.

Strategic Relevance

- Reliable forecasts enhance decision-making in **national security, disaster preparedness, and climate resilience planning**.

Source: <https://www.thehindu.com/news/national/government-to-unveil-bharat-forecasting-system-on-may-26/article69618414.ece>