

GOVERNMENT OF INDIA  
MINISTRY OF EARTH SCIENCES  
**RAJYA SABHA**  
**UNSTARRED QUESTION NO. 1000**  
ANSWERED ON 13/02/2025

**WEATHER AND CLIMATE SERVICES**

**1000. SHRI AYODHYA RAMI REDDY ALLA:**

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

- (a) the manner in which Government develops and implements a comprehensive national framework for climate change adaptation, which integrates weather and climate services with sectoral policies and programs for agriculture, water, health and disaster management;
- (b) the manner in which Government will improve the accuracy and lead time of weather forecasts, particularly for extreme weather events like cyclones, floods and heatwaves which have devastating impact on human lives, livelihoods and infrastructure; and
- (c) the measures taken by Government to address the disproportionate impact of weather and climate extremes on vulnerable populations, including the poor, women, children and marginalized communities?

**ANSWER**

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

- (a) The India Meteorological Department (IMD) has been actively working for the development and implementation of a national framework for climate services (NFCS) to strengthen climate change adaptation by integrating weather and climate services with sectoral policies and programs. The NFCS aims to support decision-making in critical sectors such as agriculture, water resources, health, and disaster management. Some examples of the sector-specific weather and climate services are:
  - Establishment of Agromet Advisory Services (AAS) for farmers.
  - Collaboration with the Central Water Commission (CWC) for flood and drought forecasting.
  - Climate-sensitive health risk mapping and early warnings for vector-borne diseases.
  - Strengthening climate resilience through the National Disaster Management Authority (NDMA) and State Disaster Management Plans.
  - Establishing a climate data portal for researchers and stakeholders.
  - Organizing stakeholder consultation workshops with State Governments to identify the gap areas and possible solutions.

In October 2023, Climate Research & Services (CRS), IMD, Pune, organized a stakeholder consultation workshop on the NFCS-India at Pune. In collaboration with key ministries, the IMD continues to expand sector-specific climate services to ensure a science-based, policy-driven, and impact-oriented approach to climate resilience.

- (b) The Ministry continuously enhances and upgrades meteorological observations, communications, modeling tools, and forecasting systems. The IMD uses the latest tools and technologies to predict severe weather events. This includes sophisticated dynamical numerical weather prediction models at higher spatial and temporal resolution, multi-model ensemble methods, artificial intelligence, and machine learning (AI/ML) & data science methodologies, complemented with improved ground-based & upper air observations and advanced remote sensing network for real-time monitoring and predictions. IMD uses the latest dissemination tools, including Common Alert Protocol (CAP), mobile apps, websites, APIs, and other social media platforms, to provide efficient, effective, and timely early warning services. IMD is constantly working to improve and adapt to the latest technologies.

The Ministry is making continuous efforts to make advancements in cyclone prediction systems to minimize the impact of cyclones in the country. The India Meteorological Department has demonstrated its capability to provide high-precision early warning for cyclones in recent years. The IMD provides heatwave forecasts and warning information to stakeholders, including ministries of the Union Government, State Governments, and local Government bodies. The IMD issues various outlooks/forecasts/warnings for the public and disaster management authorities to prepare for extreme weather events, including cyclones, heat waves, etc. While issuing the alert, a suitable color code is used to highlight the impact of the severe weather expected and signal disaster management about the course of action to be taken regarding an impending disaster weather event.

- (c) The Government of India recognizes that weather and climate extremes disproportionately affect vulnerable populations, including the poor, women, children, and marginalized communities. Multiple initiatives focusing on adaptation, resilience-building, social protection, and inclusive policies have been implemented to address these challenges. Some of the work related to the Ministry of Earth Sciences in collaboration with other ministries are:

- Impact-Based Forecasting (IBF) provides localized risk assessments for vulnerable populations before extreme events like cyclones, floods, and heatwaves.
- Heat Action Plans (HAPs) are implemented in various cities to protect vulnerable groups such as daily wage workers, older people, and slum dwellers.
- Training and capacity-building programs for women, children, and marginalized groups through local NGOs and government agencies
- Disaster management authority programs include strengthening climate-resilient housing and infrastructure in coastal, flood-prone, and drought-affected areas.

Apart from this, initiatives from the other ministries of the Government of India include:

- Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) provides employment in climate-resilient infrastructure, such as water conservation, afforestation, and drought-proofing.
- National Adaptation Fund for Climate Change (NAFCC) funds projects that enhance the adaptive capacity of rural and vulnerable communities in agriculture, water, and disaster-prone areas.

- National Action Plan on Climate Change (NAPCC) and State Action Plans on Climate Change (SAPCCs) incorporate gender and social inclusion measures.
- Jal Shakti Abhiyan & Atal Bhujal Yojana focus on water conservation, groundwater recharge, and access to clean drinking water in drought-prone regions.
- Public Distribution System (PDS) Strengthening ensures food security for low-income communities during climate shocks such as droughts and floods.

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