GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 4141
TO BE ANSWERED ON WEDNESDAY, 18TH MARCH, 2026

CLIMATE RESILIENCE STRATEGIES

†4141. MRS RUCHI VIRA:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether the Government has reviewed the preparedness and effectiveness of climate adaptation and disaster risk reduction measures for farmers, urban population and vulnerable groups across the country particularly Moradabad district of Uttar Pradesh in the context of increasing heat waves, erratic rainfall, water crisis incidents and their combined impacts;
(b) if so, the details of the efforts made by the Government in the form of climate resilience strategies, early warning systems, heat-action plans, water conservation measures and district level capacity building initiatives in the district, district-wise; and
(c) if not, the reasons therefor?

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

(a)-(b) Yes. The Government of India through Ministry of Earth Sciences (MoES) institutions and India Meteorological Department (IMD) has undertaken continuous monitoring & rigorous review about preparedness and effectiveness of climate adaptation and disaster risk reduction measures for various desired targeted vulnerable groups/communities of the country including that of Moradabad district of Uttar Pradesh in close co-operation with the local/State Government allied departments & agencies to address the multilateral impacts & challenges offered due to increasing heat waves, erratic rainfall, water stress and related climate risks.

The interventions undertaken by the India Meteorological Department under the Ministry have significantly contributed to measurable socio-economic benefits for farmers, fishermen, vulnerable communities, and the general public, particularly in disaster-prone and climate-sensitive areas, including Moradabad district of Uttar Pradesh. The manner in which these benefits have accrued is as follows:

Improved Agricultural Planning and Productivity: District-level and block-level weather forecasts, agrometeorological advisories, and seasonal outlooks enable farmers to make informed decisions regarding sowing, irrigation, fertilizer application, harvesting, and crop protection. This has resulted in reduced crop losses, optimized input costs, and improved yields.

Reduction in Loss of Life and Property: Early warnings related to cyclones, heavy rainfall, heat waves, cold waves, thunderstorms, and lightning have enabled timely evacuation, preparedness measures, and contingency planning. This has substantially minimized casualties and damage to livelihoods.

Heatwave and Cold Wave Action Plans: Forecast-based advisories have enabled local administrations to implement heat action plans, adjust working hours, and ensure access to drinking water and shelters, thereby protecting outdoor workers, the elderly, and economically weaker sections.

Support to Disaster Management Authorities: Impact-based forecasting and real-time monitoring support State and district administrations in planning relief and response operations. Early action reduces recovery costs and safeguards vulnerable communities.

Climate Services for Long-term Resilience and Anticipatory Action against Climate Risk: Climate data services and seasonal forecasts assist policymakers in water resource management, crop insurance planning, reservoir operations, and infrastructure preparedness, contributing to long-term socio-economic resilience.

The measurable benefits are reflected in reduced disaster-related mortality, lower crop losses, improved marine safety, and enhanced preparedness at community and administrative levels. Continuous modernization of forecasting systems and expansion of dissemination channels through mobile applications, SMS alerts, and coordination with State agencies further strengthen outreach to affected populations.

The India Meteorological Department, in collaboration with various research centers across the country, has undertaken several initiatives to enhance monitoring and early warning systems across the country, including urban climate platforms. These efforts have significantly contributed to minimizing the loss of life and property during extreme weather events, including heat waves. These include:

- Heat Action Plans (HAPs) in 23 States that are prone to heatwave conditions were jointly implemented by the National Disaster Management Authority (NDMA) in collaboration with the State Governments.

- Issuing seasonal and monthly outlooks, followed by extended-range forecasts of temperature and heatwave conditions. The early warning and forecast information are also disseminated through various social media platforms for timely public outreach.

- District-wise heatwave vulnerability Atlas over India to help State Government authorities and disaster management agencies in planning.

- The hot weather hazard analysis map of India incorporates daily data on temperature, wind patterns, and humidity levels.

- A series of National and State-level heatwave preparedness meetings are conducted much before the start of the summer season, with regular review meetings from time to time during the season.

IMD has also brought out a web-based "Climate Hazard & Vulnerability Atlas of India" prepared for the thirteen most hazardous meteorological events, which cause extensive damage and economic, human, and animal losses. The same can be accessed at https://imdpune.gov.in/hazardatlas/abouthazard.html. The atlas provides information that may assist State Government authorities and disaster management agencies in identifying potential hotspots and in planning appropriate measures to address extreme weather events. This product is helpful in building Climate change-resilient infrastructure.

IMD has been using all the latest available communication systems for improving outreach. Early warning dissemination has been strengthened through official IMD websites, API-based direct to the users, Common Alerting Protocol (CAP), WhatsApp groups, mobile applications, web portals, SMS alerts, and closer coordination with disaster management authorities. Social Media Platforms such as YouTube, Facebook, X, and Instagram have been widely used by IMD. Also, IMD uses the following Apps:

- MAUSAM App for weather forecasting and warnings
- MEGHDOOT App for agro met services
- DAMINI App (developed by IITM) for lighting warning
- UMANG App (developed by MeitY) for Weather forecasting and warnings

To ensure localised relevance and last-mile connectivity of weather updates in remote and vulnerable regions, IMD, in collaboration with the Ministry of Panchayati Raj (MoPR), has recently launched Panchayat-level weather forecasts covering nearly all Gram Panchayats in India. These forecasts are accessible through digital platforms such as e-Gramswaraj (https://egramswaraj.gov.in), Meri Panchayat app, e-Manchitra of MoPR, and Mausamgram of IMD, MoES (https://mausamgram.imd.gov.in). The main aims and objectives of Gram Panchayat Level Weather Forecasting (GPLWF) are to provide weather forecasts up to Gram Panchayat Levels, covering critical parameters such as temperature, rainfall, humidity, wind, and cloud conditions-essential data that farmers need for informed decision-making regarding sowing, harvesting, and irrigation. The platform is making weather forecast information accessible anytime and anywhere at the panchayat level across the country. This weather information reaches a larger number of people through Pashu Sakhis and Krishi Sakhis under the Ministries of Agriculture and Farmers Welfare and Rural Development.

To further advance weather and climate services in India, IMD conducts multiple State-level stakeholder consultation workshops with various State Government departments. These engagements include users from agriculture, water resources, energy, disaster management, transport, aviation, media, health, urban planning, and local communities. The discussions help identify practical gaps, emerging needs, and opportunities to improve the usability, accessibility, and reach of weather and climate services across the country. Numerous efforts have been undertaken by the Government of India through IMD and other MoES institutions to strengthen climate resilience through effective early warning systems, heat-action plans, sectoral disaster management plans, and district-level preparedness. Further details are given in Annexure-1.

(c) Does not arise.

Annexure-1

Multi Hazard Impact Based Forecasting and Risk Based Early Warning Services: The India Meteorological Department (IMD) as part of its operational mandate not only used to generate and publish various Met Monograms in the form of State Climatological Summary, Climatological Normals, Climatological Atlases, Annual Climate Statement, Climate Hazard & Vulnerability Atlas of UP, Monsoon Report etc. based on the long term data base towards monitoring and analysis of weather over the state of Uttar Pradesh including Moradabad; but also provides Multi-Hazard impact-based weather forecasts and Risk based early warning services in seamless manner covering all spatio-temporal scales at par with the Global standards. In order to cater the needs of the seamless forecasting IMD used to issue qualitative monthly and seasonal outlook for rainfall as well as maximum and minimum temperatures including outlooks on heat waves and cold waves at regional scale; followed by weekly Extended Range Forecast for 02 weeks at zonal/sub-divisional scale; followed by Daily Medium Range Forecast for a week at district/subdistrict scale and Sub-daily Nowcasts at hyperlocal level to enable various stakeholders, disaster managers and administrative authorities to enable preparedness, response-mechanism, plan for anticipatory actions & to mitigate climate-related risk appropriately.

Meteorological Infrastructure Development & Upgradations: As an effective initiative to monitor and track the extreme weather and climate events such as extreme rainfall, heat waves and floods for the state of Uttar Pradesh and to improve disaster preparedness and weather forecasting of the state recently IMD, GoI and GoUP has taken joint initiative and signed an MoU for improving weather observation network in UP. Associated with this, 22 automated instruments (06- AWS + 16-ARG) (all quipped with temperature, humidity and rainfall sensors) have already been established and commissioned in Moradabad district in addition to the pre-existing IMD network of 01 AWS & 01 PTO.

Technological Advancements towards OUTREACH: MoES, along with its institutions, also used to fund various projects like Monsoon Mission and recently launched Mission Mausam to carry out studies pertaining to understanding the causes of extreme weather and climate events such as extreme rainfall, heat waves, and cyclones in the country, including the State of Uttar Pradesh, during recent years. As a revolutionary step to ensure effective outreach, the IMD recently launched a GIS-enabled Decision Support System with sector-specific applications designed to enable timely, actionable responses for targeted sectors/end users. This is being popularised by UPSDMA, UPCAR & State Agriculture department among local authorities and disaster managers through their bulletins, newsletters, and proceedings for efficient implementation in the true spirit.

Climate Resilient Strategies and Capacity Building: As an initiative towards this community-level awareness programmes and online webinars are being organised for administrators, disaster managers and potential stakeholders time to time under various programs and schemes such as under Gramin Krishi Mausam Sewa (GKMS) scheme, time to time Farmer Awareness Program at Moradabad are being conducted by AMFU Meerut & SAMC Lucknow in physical/virtual mode.

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