GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 4367
TO BE ANSWERED ON WEDNESDAY, 18TH MARCH, 2026

STUDIES FOR CLIMATE CHANGE

†4367. SHRI AJAY BHATT:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) the details of the number of programmes being run at the national level to conduct studies related to climate change particularly in Uttarakhand along with the time since when the said programmes have been operational;
(b) the details of the funds being spent annually on the said programmes, State-wise; and
(c) whether the programmes orgainised for the study of climate change during the last three years have helped in preventing accidents/adverse effects caused by climate change and if so, the details thereof?

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

(a) The Ministry of Earth Sciences (MoES) had established the Centre for Climate Change Research (CCCR) at the Indian Institute of Tropical Meteorology (IITM) in Pune in 2010. The centre has been undertaking studies related to climate change and its impacts across various parts of the Indian region, including the State of Uttarakhand. This center has published a report, "Assessment of Climate Change over the Indian Region". The report is available at the following link: https://link.springer.com/book/10.1007/978-981-15-4327-2. The India Meteorological Department (IMD) routinely collects and updates observational data for climate monitoring and publishes climate diagnostics and long-term climate trend analyses based on datasets available from various States, including Uttarakhand, from time to time. Further, IMD also studied changing rainfall patterns in the country and extremes in the recent 30 years at different spatial scales (States and Districts). A total of 29 reports on "Observed Rainfall Variability and Changes" for various States/UTs were published and are publicly available.

The Department of Science and Technology (DST) is implementing two National Missions on Climate Change: the National Mission on Strategic Knowledge for Climate Change (NMSKCC) and the National Mission for Sustaining the Himalayan Ecosystem (NMSHE). Under these missions, various research and development programmes and capacity building programmes are being supported.

Under NMSKCC, DST has supported a study to conduct the vulnerability mapping of Indian states and published the report “Vulnerability Profiles for India: State and District Level using a Common Framework”. This report identifies the most vulnerable States and Districts in India, including Uttarakhand, with respect to the current climate and the main drivers of vulnerability.

(b) The Ministry implements Central Sector Schemes uniformly across the country; therefore, the allocation of funds is not made on a State-wise basis. Funds under these schemes are not released directly by the MoES to the State Governments for implementation.

(c) Yes. The programmes and studies related to climate change and extreme weather have been conducted by IMD and other institutions under the Ministry of Earth Sciences over the last three years, demonstrating a trend of increasing frequency of heavy rainfall events during the monsoons of 2023 and 2025. This has helped improve the region's monitoring and early warning system through the installation of additional observational systems, e.g., DWR and AWS/ARG, and the identification of hotspots. New high-resolution numerical weather prediction (NWP) models, such as BharatFS, have been developed to improve real-time forecasting of these events. These new developments have been helping improve the monitoring and forecasting of these events and, in turn, reduce the adverse impacts of weather- and climate-related events through improved monitoring, forecasting, and early warning services. IMD has also adopted Impact-Based Forecast (IBF) and risk-based warnings since 2019 for severe weather events such as heavy rainfall, cyclones, heat waves, cold waves, and thunderstorms at district and city levels. These warnings are disseminated to disaster management authorities and the public through multiple platforms to enable timely preparedness and response measures. Due to improvements in forecasting techniques, observational networks, Doppler Weather Radars (DWRs), and NWP models, timely warnings and evacuation measures have significantly reduced loss of human lives from extreme weather events in India over the years.

Recently, the India Meteorological Department, in coordination with other centres in the MoES, has developed an end-to-end GIS-based Decision Support System (DSS), which has been working as the front end of the early warning systems for the timely detection and monitoring of all-weather hazards across the country. It is supported with specific severe weather modules to provide timely impact-based early warnings for extreme weather events like cyclones, heavy rainfall, droughts, etc., which devastate human lives, livelihoods, and infrastructure. The system utilizes historical data, including extreme events, as well as real-time surface and upper-air meteorological observations available for the Indian region and its neighbouring areas. It also includes radar observations, available every 10 minutes, and satellite products every 15 minutes. It also uses numerical weather prediction products from a suite of models run in the MoES institutions. These include hyperlocal, regional, and global models. Further, IMD plays a crucial role in safeguarding lives and property through its advanced observational network and forecasting systems, enabling timely preparedness and response in close collaboration with the National Disaster Management Authority (NDMA). This coordinated approach ensures that accurate and timely weather information reaches authorities and the public, enhancing disaster risk reduction efforts across the country.

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. This atlas will help State Government authorities and disaster management agencies identify the hotspots, including vulnerable urban and rural areas, and plan and take appropriate action to tackle 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.

IMD has launched seven of its services (Current Weather, Nowcast, City Forecast, Rainfall Information, Tourism Forecast, Warnings, and Cyclone) with the 'UMANG' Mobile App for use by the public. Moreover, IMD developed a mobile App, 'MAUSAM' for weather forecasting, 'Meghdoot' for Agromet advisory dissemination, and 'Damini' for lightning alerts. The Common Alert Protocol, developed by the NDMA, is also being implemented by the IMD to disseminate warnings.

DST has established State Climate Change Cells (SCCCs) in 30 States/UTs with the aim to assist States to take up vulnerability and risk assessment, human & institutional capacity building programs, and public awareness programs to prepare the community from adverse effects caused by climate change.

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. These efforts have significantly contributed to minimizing loss of life and property during extreme weather events driven by a changing climate.

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