GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 616
TO BE ANSWERED ON WEDNESDAY, 23ʳᴰ JULY, 2025

STRENGTHENING WEATHER FORECASTING

616.   THIRU D M KATHIR ANAND:

Will the Minister of EARTH SCIENCES be pleased to state:

(a)   whether the Government has put in place any advanced technology or monsoon prediction models and if so, the details thereof;
(b)   the effective measures taken to strengthen coastal flood defenses;
(c)   whether the Government plans to expand seismic monitoring networks, if so, the details thereof and their impact on disaster resilience;
(d)   whether the Government has any advanced weather forecasting facilities available in the Vellore Lok Sabha constituency and if so, the details thereof;
(e)   whether the Government has made any arrangements for common people particularly farmers to receive timely weather forecast alerts including monsoon rains and if so, the details thereof;
(f)   the steps taken to protect the people and farmers against droughts; and
(g)   the timeline for installing advanced weather stations locally?

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

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(a)   Yes. The India Meteorological Department (IMD) has been using advanced technology for operational monsoon prediction. Since 2017, IMD has been using the Monsoon Mission Climate Forecast System (MMCFS), a state-of-the-art coupled ocean-atmosphere model, to generate high-resolution (~38km) seasonal and monthly rainfall and temperature forecasts. The MMCFS model is used for the preparation of the monthly El Niño Southern Oscillation (ENSO), Indian Ocean Dipole (IOD) bulletin. Since 2021, IMD has adopted a new strategy for issuing monthly and seasonal operational forecasts for the southwest monsoon rainfall over the country based on both the statistical forecasting system and the newly developed Multi-Model Ensemble (MME) based forecasting system. The MME approach uses the coupled global climate models (CGCMs) from different global climate prediction and research centres, including IMD's Monsoon Mission Climate Forecasting System (MMCFS) model. The MMCFS and MME data are updated every month. This was to satisfy the demands from different users and Government authorities for forecasting the spatial distribution of seasonal rainfall, along with the regionally averaged rainfall forecasts for better regional planning of activities.

For the short-range forecasting, IMD has recently unveiled the Bharat Forecasting System—the world's highest-resolution operational weather model, operating on a 6 km grid. This is a major leap forward in India's weather prediction capabilities, especially for localised forecasts. Previously, IMD operated numerical models with a resolution of 9 km, which provided district-level forecasts. While effective, these models had limitations in capturing small-scale weather variations that significantly affect local communities, agriculture, and disaster response.

(b)   Coastal flood defenses predominantly include the construction of Sea walls/ Revetments/Embankments, etc., and these works are planned & executed by respective Maritime States/UT Governments, as per their requirements. The Central Government only plays a promotional, advisory & catalytic role. These projects are generally funded by States/UTs from their own source of funds or through multilateral funding/Central Assistance.

However, the Central Government has taken certain initiatives to support efforts in addressing coastal flooding by facilitating access to scientific data. One such measure is the development of the Coastal Management Information System (CMIS), which facilitates the collection of critical coastal data to support informed decision-making by stakeholders.

CMIS was initiated by the Government of India during the 12thFive-Year Plan to address the challenges of coastal erosion through a scientific and data-driven approach. Recognizing the absence of a dedicated coastal data repository, CMIS was planned to systematically collect and analyze key coastal parameters.

Under CMIS, nine (9) key coastal data are being collected viz. (i) Wave data (ii) Ocean Current (iii) Bathymetry (iv) Beach Profile (v) Shoreline change (vi) Riverine data (vii) Wind and rainfall data (viii) Tides (ix) Onshore and Offshore sediment data at Eight (8) locations along the Indian coastline.

Details of CMIS sites are as given below:

- Nanidanti-Motidanti (Gujarat) Satpati (Maharashtra)
- Malvan (Maharashtra)
- Baga (Goa)
- Benaulim (Goa)
- Ponnani (Kerala)
- Devaneri (Tamil Nadu)
- Karaikal (Pondicherry)

Another important objective of CMIS is to support effective coastal protection planning, erosion mitigation, and climate adaptation by providing reliable, site-specific data.

As a non-structural measure of flood management, the Central Water Commission (CWC) issues short-range flood forecasts with a lead time of up to 24 hours to concerned State Governments at identified locations. Timely flood forecasts are being issued when a certain threshold limit is reached.

(c)   Yes. The Government of India, through the National Centre for Seismology (NCS) under the Ministry of Earth Sciences (MoES), is expanding its seismic monitoring network by adding 100 seismic observatories. Expansion of the seismic monitoring network will significantly boost India's disaster resilience by enabling faster dissemination of earthquake information to initiate disaster relief activities. Also, the earthquake data is used for seismic hazard assessment, which in turn will be used in the smarter planning and safer infrastructure through seismic microzonation studies.

(d)   Yes. The Vellore Lok Sabha constituency has a departmental meteorological office with meteorological monitoring and observational facilities. IMD has also established a meteorological facility in Vellore Airport to provide airport met services through an online briefing system. One Automatic Weather Station (AWS) is also functional at Krishi Vigyan Kendra, Vrinchipuram, in Vellore district, providing weather data at 15 15-minute intervals. A meteorological facility has been set up in a Mobile van in Vellore Airport, as commercial operations are yet to start. But, there is an existing provision to provide current weather data when required.

(e)-(f) IMD runs a scheme, viz. Gramin Krishi Mausam Sewa (GKMS) to render weather forecast-based operational Agrometeorological Advisory Services (AAS) involving several leading organizations such as Indian Council of Agricultural Research (ICAR), State Agriculture Universities (SAUs), Indian Institute of Technology (IIT), State agriculture departments, NGOs, etc., for the benefit of the farming community. This scheme assists farmers in making informed decisions regarding their day-to-day agricultural operations for minimizing crop damage and losses due to unusual weather and taking advantage of favorable weather and climatic conditions.

Under GKMS, 130 Agromet Field Units (AMFUs) covering 127 agroclimatic zones located at various SAUs, IITs, institutes of ICAR, etc., are operational across the country. IMD provides medium-range weather forecasts for rainfall, temperature, relative humidity, cloud cover, wind speed, and direction at district and block levels for the next five days, along with subsequent week rainfall and temperature outlook at the meteorological sub-division level. Based on observed and forecasted weather, AMFUs prepare biweekly Agromet Advisories (every Tuesday and Friday) for their respective districts to help the farming community make appropriate decisions about crop and variety selection, sowing, harvesting, irrigation, and fertilizer application.

Along with the biweekly bulletins, daily weather forecast and nowcast information are also issued by the Regional Meteorological Centers (RMCs) and Meteorological Centers (MCs) of IMD. Impact-based forecasts (IBFs) for agriculture are also being prepared by AMFUs based on the severe weather warnings for different districts of various States and UTs across the country issued by the National Weather Forecasting Centre (NWFC), New Delhi, and RMCs and MCs of IMD.

The Agromet Services mentioned above take care of the impact on different crops due to extreme weather conditions, including deficient rainfall/dry spells along with the necessary guidelines for farming operations during such occasions.

To provide timely weather forecast alerts, including information on monsoon rains, weather forecast, and Agromet advisories, a multichannel dissemination system is being used, including print and electronic media, Doordarshan, radio, internet, and SMS through Kisan Portal and Public-Private Partnership (PPP) initiatives. SMS-based alerts and warnings along with suitable remedial measures, are being sent during extreme weather events like cyclones, deep depressions, etc., through the Kisan Portal. Technological advancements have further enhanced accessibility, enabling farmers to receive location-specific forecasts and advisories through mobile apps such as 'Meghdoot' and 'Mausam', and Social media platforms like WhatsApp, Facebook, etc. Additionally, IMD has integrated its services with IT platforms of 18 State Governments, allowing farmers to access information in both English and regional languages.

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). To enhance the reach and effectiveness of the GKMS services, IMD is actively engaging with various stakeholders, including state agriculture departments, NGOs, and SAUs, to create awareness among the farming community by organizing Farmers' Awareness Programs (FAPs) in collaboration with AMFUs across different regions of the country. Additionally, IMD, along with experts from AMFUs, actively participates in Kisan Melas, Farmers' Day Programmes, and field visits, facilitating direct interaction with farmers to promote the utilization of these weather-based agricultural advisory services, thereby maximizing their benefits for the farming community.

(g)   The automatic weather stations (AWS) are installed as per the requirement. So far, 1008 AWS, 1382 Automatic Rain Guages, and 200 Agro AWS have been installed across the country.

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