GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 1932
TO BE ANSWERED ON WEDNESDAY, 11TH FEBRUARY, 2026

PRITHVI VIGYAN SCHEME

1932. SHRI JAGDAMBIKA PAL:
SHRI PRAVEEN PATEL:
SMT. SMITA UDAY WAGH:
SHRI KHAGEN MURMU:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether the implementation of the Prithvi Vigyan (PRITHVI) Scheme has led to significant strengthening of long-term Earth observation networks including atmospheric, oceanic, cryospheric, geophysical systems along with the advances in numerical modelling and data assimilation capabilities;
(b) if so, the details of new observational assets deployed or existing infrastructure upgraded under the Scheme indicating their geographic or domain coverage particularly in Maharashtra including any stations or facilities benefiting the Jalgaon Lok Sabha Constituency;
(c) whether these enhanced systems have contributed to improved forecasting accuracy for weather events, climate variability and natural hazards such as floods, heatwaves and cyclones;
(d) if so, the measurable improvements recorded during 2024-25 including lead time, accuracy and early warning dissemination; and
(e) the steps taken to ensure effective utilisation of PRITHVI outputs by State agencies for disaster preparedness, agriculture and water resource management?

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

(a) Yes Sir.

(b) Under the PRITHvi VIgyan (PRITHVI) Scheme, new observational assets have been deployed and upgraded across diverse geographies and domains. These include:

- Doppler Weather Radar (DWR) network has been expanded to 48 DWRs with the commissioning of 10 X-Band Doppler Weather Radars and 02 C-Band DWRs. Global Climate Observing System (GCOS) Upper Air Network (GUAN) RS/RW stations increased from 6 to 12. Out of 62 stations, 25 Pilot Balloon (PB) stations were upgraded to GPS based PB stations. 400 Automatic Weather Stations (AWS) were added to the existing AWS network. In addition, 200 Agro-AWS were commissioned across the country. The High Wind Speed Recorder network along the East and West Coast of India has been expanded to 37 stations.

- In Maharashtra, there are 18 departmental and 24 non-departmental observatories, 85 Automatic Weather Stations (AWSs), 10 Agro- AWSs, 125 Automatic Rain Guage (ARG) stations and 350 District Rainfall Monitoring stations (DRMS). Also, the state Government of Maharashtra have installed 2321 Automatic Weather Stations (AWS) at circle level including 86 in the Jalgaon district. Further, there are 9 Doppler Weather Radars (DWRs) operational in Maharashtra, this radar network also covers some parts of the Jalgaon Lok Sabha Constituency. Details of these are given in Annexure I.
- The in-situ Ocean Observation Network have been enhanced with the deployment of 31 Argo floats, 5 surface drifters, maintenance of 17 coastal Acoustic Doppler Current Profiler (ADCP) moorings, 3 equatorial current meter moorings, and 3 XBT (Expendable Bathythermographs) transects, alongside commissioning 15 GNSS (Global Navigation Satellite Systems) receivers at tide gauge sites and establishing 14 new tide stations. The Wave-rider network has been expanded to 17 platforms, including a new buoy in Mauritius, while the GNSS– (Strong Motion Accelerometers) SMA network in the Andaman & Nicobar Islands has been strengthened with an additional GNSS station at East Island.
- To enable advanced real-time modelling, INCOIS has commissioned HPC–Tarang, a high-performance computing system dedicated to operational ocean forecasting.
- In the Himalayas, integrated glacio-hydrological monitoring systems with AWS and WLRs (Water Level Recorders) have been established in the Chandra Basin and extended to Arunachal Pradesh, supported by advanced remote sensing and xDEM-based tools for glacier mass balance estimation.
- Seismic networks have expanded to 165 operational stations nationwide, including extensive coverage in Maharashtra (15 in number). Details of seismic observatories in Maharashtra are tabulated in Annexure I.

(c) Yes Sir.

(d) Measurable improvements have been achieved across weather, climate, ocean, seismic, and disaster forecast services provided to states and the concerned ministries. Forecast accuracy for severe weather events has improved by 40% in recent decades, with one-day-ahead heavy rainfall warnings during the 2025 monsoon reaching 85% accuracy compared to 77% in 2020. Cold wave forecasts showed up to 65% gains in accuracy, while thunderstorm and lightning predictions improved by 53%. Cyclone forecasts demonstrated better track, intensity, and landfall predictions, and heatwave forecasts gained two extra days of lead time with the same accuracy as earlier shorter forecasts. Ocean services strengthened through the optimal ocean observing network, unified ocean modelling framework for operational ocean prediction, sea level projection, and ocean re-analysis to build a Digital Twin of the Ocean that can be effectively used for disaster prediction. The sea level rise, extreme sea levels and tidal inundations generated from climate change scenarios are used to assess the impact along the coastal zones. Seismology services advanced with a denser national network, enabling detection of earthquakes of magnitude 3.0 and above, and completion of seismic microzonation for 12 cities, for risk mitigation.

A total of 9342 crore SMS has been sent since August 2021 and during recent cyclone "MonTha", a total of 77.64 crore SMS sent to people. All these improvements have led to significant improvement in forecast accuracy of severe weather events and also significant reduction in death toll. For example, due to cyclones, around 7000 people lost their lives in 1999 Odisha Super Cyclone while it has been reduced to less than 100 over entire region from impact of tropical cyclones during recent years. Accurate forecast of 1 cyclone saves around 1100 crore rupees in terms of expenditure towards payment of ex-gratia to kins of dead, cost towards evacuation and savings to various sectors e,g Power, Marine, Aviation, Railways, etc. Similarly, heat wave related losses of lives have been reduced in recent years.

(e) The outputs of the PRITHVI scheme are the services provided covering all the five components of earth system namely atmosphere, hydrosphere, geosphere, cryosphere and biosphere that improve the understating of the Earth System Sciences. These services include weather forecasts (both on land and in the oceans) and warnings for various natural disasters like tropical cyclones, storm surge, floods, heat waves, thunderstorm and lightning; alerts for Tsunamis and monitoring of earthquakes, etc.

To improve India's disaster preparedness, agriculture and water resource management, the Government has fully organized an institutional mechanism for strengthening the observational network and adopting new techniques and technology to integrate and assimilate all types of data through all computational and modelling supports for generating forecasts and warnings at a more granular scale of various severe weather events affecting the region.

Ministry through the India Meteorological Department (IMD) follows necessary steps and action in coordination with the National Disaster Management Authority (NDMA) and Centre of Development of Telematics (C-DOT) for the dissemination and communication of the warnings. As per Standard Operating Procedure (SOP), IMD is generating Common Alerting Protocol (CAP) alerts using SACHET platform for severe weather events like Heavy Rainfall, Cyclone, Lightning, Thunderstorm, Dust storm etc. These alerts are disseminated by State Disaster Management Authority (SDMA) to geo targeted users via SMS. These alerts are also disseminated through SACHET website and SACHET mobile app. IMD's CAP feeds are also disseminated to Global Multi-Hazard Alert System (GMAS), Google, AccuWeather and Apple.

Bharat Sarkar has launched the Gram Panchayat Level Weather Forecasting (GPLWF) initiative recently. IMD, in collaboration with the Ministry of Panchayati Raj (MoPR), launched GPLWF for nearly all Gram Panchayats in India on 24th October 2024. These forecasts are accessible on digital platforms such as e-Gramswaraj (https://egramswaraj.gov.in/), the Meri panchayat app, e-Manchitra of MoPR, and Mausamgram of IMD (https://mausamgram.imd.gov.in/).

State agencies (Central Water Commission, State Irrigation Departments, SDMAs, Water Resource Departments, Agriculture & Water Boards, Canal & Command Area Authorities and Inter-State Water Boards) use PRITHVI outputs for water resource management by integrating forecasts into reservoir operations, flood and drought preparedness, and irrigation planning. Reservoir authorities regulate releases based on inflow predictions, while flood-prone regions receive early warnings for timely action. Seasonal outlooks guide groundwater recharge and water rationing, and irrigation departments schedule canal releases to optimize distribution. Basin-level forecasts also support inter-state water sharing, making PRITHVI a key tool for efficient and resilient water management.

Annexure I

Details of the Doppler Weather Radars (DWRs) in Maharashtra

S.No	State	Location
1.	Maharashtra	Mumbai
2.	Maharashtra	Nagpur
3.	Maharashtra	IITM Solapur
4.	Maharashtra	Veravali
5.	Maharashtra	Mumbai, Juhu (IITM*)
6.	Maharashtra	Mumbai, Panvel (IITM)
7.	Maharashtra	Mumbai, Kalyan, Dombivali (IITM)
8.	Maharashtra	Mumbai, Vasai, Virar (IITM)
9.	Maharashtra	Mahabaleshwar (IITM)

*Indian Institute of Tropical Meteorology (IITM), Pune

Details of Seismic observatories in Maharashtra

S N	Station	Latitude (ºN)	Longitude (ºE)	Date of Installation	Date of Upgradation /Modernisation
1	Akola	20.7017	77.0146	25.04.1983	19.11.2015
2	Karad	17.3077	74.1835	01.01.1970	21.11.2015
3	Latur	18.4104	76.5333	20.12.1993	24.11.2015
4	Mumbai	18.8975	72.8127	01.01.1899	20.10.2015
5	Nagpur	21.1699	79.0509	08.12.1988	14.06.2016
6	Pune	18.5300	73.8490	01.01.1949	21.12.2007
7	Solapur	17.6703	75.9229	11.07.2021	11.07.2021
8	Hingoli	19.6542	77.0943	14.07.2021	14.07.2021
9	Nashik	20.0299	73.7983	18.07.2021	18.07.2021
10	Palghar	20.0348	72.9133	22.07.2021	22.07.2021
11	Taliye	17.3419	73.7829	04.01.2022	04.01.2022
12	Govare	17.3468	73.7379	21.12.2021	21.12.2021
13	Panderpani	17.2692	73.7623	06-02-2024	06-02-2024
14	Pathurpunj	17.3011	73.6991	06-02-2024	06-02-2024
15	Atoli	17.2898	73.7686	06-02-2024	06-02-2024

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