GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 2112
ANSWERED ON 18/12/2025

MONITORING SYSTEM FOR RISK PRONE AREAS

2112. SHRI HARSH MAHAJAN:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether Government is formulating any policy for the scientific identification of locations prone to flash floods, cloudbursts and landslides in the country's hilly and vulnerable regions;
(b) if so, whether such risk-prone areas have been identified, so far, in the State of Himachal Pradesh as well as in other States;
(c) whether Government is working on a plan to equip these areas with real-time monitoring systems, early warning systems and sensor-based technology; and
(d) if so, the details of work completed, so far, under this plan and the targets set for the future?

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

(a) Yes. The India Meteorological Department (IMD) has identified areas vulnerable to various weather hazards, including extreme rainfall, snowfall, hailstorms, thunderstorms, etc.

(b) Yes. The list of districts vulnerable to heavy rainfall & floods, snowfall, etc., including that from the state of Himachal Pradesh is given in Annexure-1.

(c)-(d) Yes. The Government has been working to strengthen real-time monitoring systems, early warning systems, and sensor-based technology to detect, monitor, and provide timely early warnings for all types of severe weather events. Major progress and achievements are given in Annexure-2. In recent years, the observational infrastructure and monitoring network over hilly regions has been significantly strengthened. In the western Himalayan States, Doppler Weather Radars (DWRs) have been installed at ten locations—Srinagar, Jammu, Banihal Top, Mukteshwar, Surkanda Devi, Lansdowne, Leh, Kufri, Jot, and Murari Devi. These radars are operational and support real-time monitoring and nowcasting (short-range forecasts of a few hours) of various extreme weather events such as heavy rainfall and snowfall.

DWR observations are available every ten minutes in the form of cloud imagery and wind velocity measurements within the radar's coverage area. These observations support continuous monitoring and enable the issuance of nowcasts of heavy rainfall spells within short time frames (up to one hour).

A new Central Sector Scheme "Mission Mausam" has been also launched by MoES to further strengthen and upgrade the observational network for monitoring and forecasting severe weather events, with the goal of making Bharat a "Weather-ready and Climate-smart" nation with IMD as a major player.

Annexure-1

The list of districts vulnerable to various weather-related hazards:

State Name	Districts	Hazards
HIMACHAL PRADESH	BILASPUR, UNA, SIRMAUR, HAMIRPUR, SOLAN, MANDI, KANGRA, KULLU, CHAMBA, SHIMLA KINNAUR, LAHUL & SPITI	Snowfall events
JAMMU AND KASHMIR (UT)	MUZAFFARABAD, MIRPUR, SAMBA, KATHUA, JAMMU, REASI, UDHAMPUR, RAJOURI BADGAM, KULGAM, DODA, SHUPIYAN, KISHTWAR, PULWAMA, PUNCH, GANDERBAL, BANDIPORE, RAMBAN, ANANTNAG, SRINAGAR, BARAMULA, KUPWARA	
UTTARAKHAND	UDHAM SINGH NAGAR, NAINITAL, CHAMPAWAT, BAGESHWAR, UTTARKASHI, PITHORAGARH, HARIDWAR, TEHRI GARHWAL, RUDRAPRAYAG, ALMORA, PAURI GARHWAL, CHAMOLI, DEHRADUN	
HIMACHAL PRADESH	BILASPUR, UNA, SIRMAUR, HAMIRPUR, SOLAN, MANDI, KANGRA, KULLU, CHAMBA, SHIMLA, KINNAUR, LAHUL & SPITI	Cold Wave
JAMMU AND KASHMIR (UT)	KUPWARA, BANDIPORE, BARAMULA, GANDERBAL, ANANTNAG, KISHTWAR, SRINAGAR, BADGAM, PULWAMA, PUNCH, SHUPIYAN, KULGAM, RAJOURI, RAMBAN, REASI, DODA, JAMMU, KATHUA, UDHAMPUR, SAMBA, MUZAFFARABAD, MIRPUR	
UTTARAKHAND	ALMORA, BAGESHWAR, CHAMOLI, CHAMPAWAT, DEHRADUN, HARIDWAR, NAINITAL, PAURI GARHWAL, PITHORAGARH, RUDRAPRAYAG, TEHRI GARHWAL, UDHAM SINGH NAGAR, UTTARKASHI	
HIMACHAL PRADESH	BILASPUR, UNA, SIRMAUR, HAMIRPUR, SOLAN, MANDI, KANGRA, KULLU, CHAMBA, SHIMLA, KINNAUR, LAHUL & SPITI	Thunderstorm
JAMMU AND KASHMIR (UT)	KATHUA, KUPWARA, MUZAFFARABAD, KISHTWAR, BANDIPORE, MIRPUR, DODA, PUNCH, BARAMULA, UDHAMPUR, GANDERBAL, RAJOURI, BADGAM, SHUPIYAN, SRINAGAR, ANANTNAG, PULWAMA, REASI, KULGAM, RAMBAN, SAMBA, JAMMU	
UTTARAKHAND	UDHAM SINGH NAGAR, PITHORAGARH, HARIDWAR, PAURI GARHWAL, CHAMPAWAT, BAGESHWAR, CHAMOLI, NAINITAL, ALMORA, RUDRAPRAYAG, UTTARKASHI, DEHRADUN, TEHRI GARHWAL	

HIMACHAL PRADESH	BILASPUR, UNA, SIRMAUR, HAMIRPUR, SOLAN, MANDI, KANGRA, KULLU, CHAMBA, SHIMLA, KINNAUR, LAHUL & SPITI	Lightning
JAMMU AND KASHMIR (UT)	KUPWARA, RAJOURI, JAMMU, BARAMULA	
UTTARAKHAND	NAINITAL, PAURI, GARHWAL, UTTARKASHI, DEHRADUN, HARIDWAR, CHAMPAWAT, CHAMOLI, UDHAM SINGH NAGAR, ALMORA, RUDRAPRAYAG, BAGESHWAR, PITHORAGARH	
HIMACHAL PRADESH	LAHUL & SPITI, BILASPUR, UNA, SIRMAUR, KINNAUR, CHAMBA, SOLAN, HAMIRPUR, MANDI, KULLU, KANGRA, SHIMLA	Flood
JAMMU AND KASHMIR (UT)	KULGAM, BANDIPORE, SHUPIYAN, MUZAFFARABAD, GANDERBAL, KISHTWAR, KUPWARA, MIRPUR, SAMBA, BADGAM, RAMBAN, UDHAMPUR, ANANTNAG, KATHUA, RAJOURI, BARAMULA, PUNCH, PULWAMA, REASI, DODA, SRINAGAR, JAMMU	
UTTARAKHAND	BAGESHWAR, HARIDWAR, RUDRAPRAYAG, CHAMPAWAT, UDHAM SINGH NAGAR, ALMORA, DEHRADUN, NAINITAL, UTTARKASHI, PAURI, GARHWAL, TEHRI, GARHWAL, CHAMOLI, PITHORAGARH	

ANNEXURE-2

Major targets achieved in recent years by IMD are as follows:

- Expansion of the Doppler Weather Radar (DWR) network from 15 in 2014 to 47.
- Increase in the number of Automatic Weather Stations (AWS) from 675 in 2014 to 1208 at present.
- Increase in the number of Automatic Rain Gauges (ARG) from 1350 in 2014 to 1382.
- Increase in High Wind Speed Recorders from 19 in 2014 to 35.
- At present, there are 200 AGRO AWS, whereas there were no AGRO AWS in 2014.
- Increase in upper air observation systems from 43 in 2014 to 56 in 2024.
- 15 Heliport Weather Observing Systems (HAWOS) have been installed at various heliports across the country, while there was no HAWOS in 2014.
- Five number of Automated Weather Observing Systems (AWOS) have been installed at various airports across the country.
- Installation of Multi Mission Data Reception & Processing System (MMDRPS) in 2017 and upgraded system in 2021. Deployment of 25 Global Navigation Satellite System (GNSS) for total columnar water vapour management are some of the major interventions for upgradation of Satellite Meteorological services.
- Numerical Weather Prediction modelling capabilities of IMD have also reached new heights with improved dynamical models operationally run in a seamless manner from nowcast for a few hours to long range weather predictions with forecast up to a season.
- Indigenous development of the GIS platform and Decision Support System along with impact based forecasting technique enabled IMD to enter into a new era of service.
- While there has been pin pointed forecast accuracy for landfall point of the cyclones with zero error in most cases (20 km in 24 hours ahead forecast).
- The 24 hours forecast accuracy for heavy rainfall is about 80%, thunderstorm 86%, heat wave & cold wave about 88%.
- IMD has leveraged technology to bring out innovative solutions like dynamic Meteogram "MAUSAM GRAM" which provides weather information at all locations at any time.
- At present, IMD is providing the nowcast for about 1206 stations, city forecasts for more than 1200 stations apart from district level and sectoral forecast and warning services throughout the country.
- IMD is not only catering to the Indian region but also provides Cyclone forecast and warning services to 13 north Indian ocean countries along with forecast and warning services to SAARC nations.
- IMD also provides support for an integrated flood warning system for Mumbai and Chennai, flash flood guidance services for India, Bangladesh, Bhutan, Nepal and Sri Lanka, winter fog forecasts for IGI airport, New Delhi etc.
- IMD introduced, customised location specific forecast for offshore & onshore industries, airports, ports, Indian Air Force, Indian Oil corporation, Nuclear Power Corporation of India, marine weather forecast, cyclone forecast, heat wave forecast, thunderstorm forecast in text, graphic & GIS platform with socio-economic attributes, hazard & impact modelling as well as risk assessment in 2021.
- Panchayat Mausam Seva was launched on 15 January 2024 for the Panchayat level dissemination of Agromet services.
- Collaboration with Power Sector and provision of forecast enabled to improve Power Sector Economy and harnessing of renewable energy.

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