

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 5743
TO BE ANSWERED ON WEDNESDAY, 6TH APRIL, 2022**

WEATHER FORECAST FOR FARMERS

5743. SHRI SUKHBIR SINGH JAUNAPURIA:

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether the Government has information regarding weather forecasting services to be provided to farmers, tourists and users by Department of Meteorology at district and block levels in the country;
- (b) if so, the details thereof and if not, the corrective steps being taken by the Government in this regard;

- (c) whether the Department of Meteorology is being modernized by the Government;
- (d) if so, the details thereof and the amount being spent by the Government thereon;
- (e) whether the Government has any plan to make farmers aware regarding meteorology; and
- (f) if so, the number of farmers benefitted by the awareness programmes by the Government regarding weather during the last three years, district-wise?

ANSWER

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

- (a-b) IMD, Ministry of Earth Sciences (MoES) in collaboration with Indian Council of Agriculture Research (ICAR) and State Agriculture Universities (SAUs) and other institutions is rendering District/Block level Agrometeorological Advisory Services (AAS) for the benefits of farmers in the country under the scheme "GraminKrishiMausamSewa (GKMS)". The main emphasis of the existing AAS system is to collect and organize climate/weather, soil and crop information, and to amalgamate them with weather forecast to assist farmers to take decisions on day-to-day farm operations, which can further optimize the application of input resources at farm level during deficient rainfall situation and extreme weather events to reduce monetary loss and to maximize crop yield.

The various developments in the field of Agrometeorological Advisory Service are summarized below.

- **District and Block level AAS Bulletins:**

Under the scheme, 5-day medium range weather forecast at district and block level is generated and based on the forecast, location-specific block and district level agromet advisories are presently prepared by the 130 Agromet Field Units (AMFUs) located in State Agricultural Universities, Indian Council of Agricultural Research (ICAR) Institutes, IITs etc. and 199 District Agromet Units (DAMUs) at KrishiVigyanKendras (KVKs) under ICAR network and communicated to the farmers on every Tuesday and Friday. Along with the biweekly bulletins, daily weather forecast and nowcast information are also disseminated to the farmers by Regional and State Meteorological centers of IMD.

- **Establishment of DAMUs:**

After successful implementation of District level AAS through the network of 130 AMFUs, Organizational setup of GKMS network is being augmented by establishing DAMUs in the premises of KVKs jointly by IMD and ICAR to prepare sub-district/block level advisory and to enhance the outreach of services. Two additional manpower, viz. one Subject Matter Specialist (Agrometeorology) and one Agromet Observer, are recruited at each KVK to take care of activities of DAMU. Expert panel is constituted at each DAMUs consisting of experts of KVK and district level agriculture officer to prepare the weather based advisory for the farmers, utilizing the past, present and forecast weather information; location specific knowledge; and satellite-based information. As on date, 199 DAMUs have been established and block AAS have been rolled out to the farmers at micro-level. Year wise details of DAMUs set up is as under

- **Installation of Agro-AWS:**

One Agro-AWS is being installed at each newly established DAMU to record the changes in weather parameters. 200 of these Agro-AWSs are under the process of installation at present (198 Agro-AWSs have already been installed); and the process for another set of 330 Agro-AWSs is at an advance stage of procurement. The Agro-AWSs also have soil moisture and soil temperature sensors up to one meter depth, as these parameters are very important for decision making in farm level risk management. It will fulfill the requirement of the country to have a benchmark district network of soil moisture and soil temperature observations in the country.

- **Generation of Agromet Products:**

Generation of Agromet advisories based on realized and forecast weather and crop state and stage is always difficult. In view of enhancing the analytical ability of the scientists / experts, it is required to develop / generate and use various agromet products utilizing different weather, crop and satellite data available on real time basis.

In view of above, the agromet products like spatial distribution of weather parameters, maps on Normalised Difference Vegetation Index (NDVI), Vegetation Condition Index (VCI), Temperature Condition Index (TCI), Standardized Precipitation Index (SPI) etc. are generated on daily and weekly basis and communicated to AMFUs and DAMUs to facilitate preparation of more appropriate Agromet advisories.

- **Agromet Decision Support System (<https://agromet.imd.gov.in>):**

A dedicated portal 'Agromet DSS' has been developed to make seamless data & information exchange among concerned organizations in a more objective, timely, transparent and effective manner leading to improvement in the quality of services. Agromet-DSS facilitates the scientists / institutions with customised tools to integrate weather and crop information to prepare agromet advisories at finer scales in short time to serve farming community at micro level.

- **Real-time monitoring dashboard (<https://imdagrmet.gov.in/>):**

IMD has also developed 'Real Time Monitoring Dashboard' for monitoring the preparation of Agromet advisory Bulletins at district and block level and also the Farmers Awareness Programmes (FAPs) conducted by each DAMU.

- **Inception of new techniques and tools:**

- Nowcast (up to 3 hours), medium range forecast (up to 5 days) and extended range forecast based advisory with a lead period of 15 days are provided to farmers and planners at central and state level.
- Introduced very short range forecast for severe weather event like thunderstorm, lightning etc.; special advisories are disseminated through mKisan portal and other social media.
- Enhanced National collaboration for research & development and outreach of agromet advisories.
- Introduction of Satellite based products as additional tools for decision making by the Agromet Experts.
- Development of dynamic feedback - real time weekly / fortnightly and end-of-season.
- Online reception of weather data from manual agromet observatory in near real time.

- **Outreach and Dissemination:**

Agromet Advisories are disseminated to the farmers through multichannel dissemination system like print and electronic media, Door Darshan, radio, internet etc. including SMS using mobile phones through Kisan Portal and also through private companies under Public Private Partnership (PPP) mode. SMS to the farmers through private companies is continued.

Apart from issuing district and block level agromet advisories, Impact Based Forecasts (IBF) for extreme weather events detrimental to crops along with possible measures are being issued for various districts in different states as and when situation arises. The weather warnings for heavy rainfall, hail storm, cold wave, frost, heat wave, high wind etc. at district level are issued by the concerned RMCs and MCs of the respective states and accordingly the appropriate farm operations to save the crops are prepared by AMFUs and DAMUs. The consolidated IBF is prepared by the RMCs and MCs of IMD and disseminated to the district collectors and Agricultural officers of the concerned districts.

Social media is also used for quicker dissemination of forecast and advisories to the farmers. At present farmers of 1,164,27 villages in 3505 Blocks have been covered through 15240 WhatsApp groups. State Agriculture Department officials of District and Block level are also included in these WhatsApp groups. Agromet advisories are also communicated through YouTube Channel by AMFUs and DAMUs across the country. Farmers feedback are also being collected and uploaded in YouTube Channel. In addition, advisories are also being circulated through a number of Facebook pages created by

AMFUs and DAMUs. Initiative on collaboration with State Government has been taken up for integration of weather forecast and Agromet advisories with state government mobile apps and websites. The integration has been completed for Bihar, Chhattisgarh, Gujarat, Haryana, Madhya Pradesh, Nagaland, Rajasthan and Tamil Nadu states and about 6.2 million farmers of above-mentioned states are getting benefitted from weather forecast and agromet advisories.

Services to tourists IMD provides the weather information comprising of observed maximum temperature, minimum temperature, their departure from normal, 24-hour rainfall, sky condition and sunset/sunrise, moonset/moonrise timings alongwith 7-day weather forecasts of temperature, rainfall and warnings to 526 cities across the country. Information on extreme weather events in the month alongwith all-time records, climatological data about mean daily maximum, minimum temperature, total rainfall, number of rainy days and mean number of days with details of hail, thunder, fog and squall etc. was also being provided. These cities include about 106 tourist destinations across the country for which 7-day forecast is being issued twice a day. The information is posted on IMD website. In addition to these short & medium range forecast, nowcast with validity of 3-6 hours for extreme weather like thundersquall, thunderstorm, intense rain spell etc. is also being issued every three hours for about 1089 cities and towns including many tourist locations covering all the districts in the country.

IMD is also issuing special forecasts for pilgrims of Char-Dhamyatra, Kailash-Mansarovar Yatra, Sri Amarnathji Yatra and Kumbh Mela. IMD also provide weather information for Mata Vaishno Devi Shrine in the recent past comprising of (i) Yatra Route Weather Advisory, (ii) current observations, (iii) 6-hourly low level wind and temperature forecasts for helicopter operation; and (iv) 3-day forecasts & warnings for Jammu Division. Similar service is also being extended to various other pilgrim/tourist destinations across the country with a focused effort for Himalayan region. Moreover, IMD is also issuing special forecasts for weather information regarding mountain expedition as per the requirements submitted by mountaineering teams.

In 2020, IMD has launched seven of its services (Current Weather, Nowcast, City Forecast, Rainfall Information, Tourism Forecast, Warnings and Cyclone) with 'UMANG' mobile App for use by public including tourists.

- (c)-(d) Modernization of IMD is being carried out under successive Plan periods through implementation of various activities under Central sector schemes. There are 4 sub-schemes of IMD under umbrella Central Sector Scheme ACROSS of MoES namely, Atmospheric Observation Network (AON), Upgradation of Forecast System (UFS), Weather & Climate Services (WCS) and Commissioning of Polarimetric Doppler Weather Radars (PDWR) aimed at expansion of observational network and improvement in Weather & Climate services. Details of activities under ACROSS follow:

Commissioning of 11 C-band Polarimetric Doppler Weather Radars:

- Improve upon the spatial and temporal density of Radar observational network, particularly over the regions with large data gaps in the country.
- Effective Nowcasting and timely as well as precise warnings for severe weather events like Thunderstorms, Heavy Rainfall, Downburst, Gale winds, Hail, etc.
- Improved data collection and archival which will help in preparation of better climatology for the region.
- With the availability of additional ground truth, verification of forecasts of numerical models can be carried out more realistically.

Upgradation of Forecast System:

- Augmentation and sustenance of Communication Systems including upgradation of MFI systems.
- Development of an advanced Operational Forecast System (including Monsoon Mission-IMD), Automation of Nowcast, Thunderstorm Testbed, Urban Meteorological Services and Positional Astronomy services.
- Upgradation of Hydrometeorological Services.
- Integrated Himalayan Meteorological Programme for Western & Central Himalayas aimed at establishing the dense observational network through commissioning of Doppler Weather Radars, Automatic Weather Stations, Automatic Rain Gauges, Snow Gauge sensors, HAWOS, surface observatories etc.
- Capacity building, Outreach, R&D, Publication etc.

Weather & Climate Services:

- Setting up of District Agro-Met Units (DAMUs) at all the districts complementarily with existing AMFUs in the country for extension of Agromet Advisory Services (AAS).
- To expand the outreach of weather based Agromet advisories to the farmers through multiple means of communication, collection of feedback and impact assessment of AAS.
- Major upgradation of Meteorological facilities at all airports through commissioning of State-of-art Integrated Aviation Weather Observing Systems (AWOS), Microwave Radiometers, Doppler LIDARs, Wind Profilers etc to support Aeronautical MET Services.
- Setting up of automated Heliport Weather Observing & Transmitting System (HAWOS) at Heliports, Landing ground, and other strategic locations to support the helicopter and low level flight operation of IAF, Indian Army and CPMF and also at important tourist and pilgrimage locations.
- Sustenance & maintenance of Aviation Meteorological instruments and facilities through repairs, procurement of sensors, spares, CAMC/AMC etc.
- Establishment of a state-of the-art Climate Data Centre with integrated advanced Climate Data Services portal for rendering national and regional climate services.
- To provide a comprehensive set of improved and specialized climate services for the country through upgradation of the existing operational activities of climate monitoring, climate prediction, climate data management and climate applications.

Atmospheric Observations Network:

- Integrated Meteorological Services for the North-East (NE) region through commissioning of DWRs, AWOS/ HAWOS, AWSs/ARGs/ SGs, Microwave Radiometers, Wind LiDARsetc, and establishment/ upgradation of Meteorological Centres aimed at improving weather and climate services over the region.
- Sustenance and Augmentation of observational networks comprising of Doppler Weather Radars (DWRs), Automatic Rain Gauges (ARGs), Automatic Weather systems (AWSs), Upper Air (RS/RW and PB), Surface, Environmental and Polar Observatories etc.
- Establishment/ upgradation and maintenance of Multi processing, computing and communication facilities for Satellite Meteorological Applications

Year-wise cumulative expenditure on all 4 sub-schemes of IMD under ACROSS namely, Atmospheric Observation Network (AON), Upgradation of Forecast System (UFS), Weather & Climate Services (WCS) and Commissioning of Polarimetric Doppler Weather Radars (PDWR) during 2018-22 is as follows:

(Rs. in Crores)				
Name of Sub-scheme	Total expenditure during 2018-19	Total expenditure during 2019-20	Total expenditure during 2020-2021	Total expenditure during 2021-2022 (till 30/03/22)
ACROSS- IMD (AON, UFS, WCS & PDWR)	175.94	206.04	150.33	180.79

- (e)-(f) With the advancement of information communication technology, Farmers access the weather information including alerts and related agromet advisories specific to their districts through the mobile App viz., ‘Meghdoot’ launched by Ministry of Earth Sciences, Government of India. These weather details are also accessible by farmers through another App ‘KisanSuvridha’, launched by Ministry of Agriculture & Farmers Welfare. Also, a few AMFUs have developed mobile Apps to facilitate quick dissemination of agromet advisories to the farmers of their region.

IMD is taking continuous efforts to popularize the services among the farming community by organising Farmers’ Awareness Programmes (FAPs) in collaboration with AMFUs and DAMUs in various parts of the country. IMD along with the experts from AMFUs and DAMUs also participate in KisanMelas, Farmers’ Day etc. to create awareness about the services, so that more farmers get benefitted.

Number of FAPs conducted and farmers benefitted during last 3 years

Year	FAPs Conducted	Number of Farmers who attended FAPs
2019-20	1624	95544
2020-21	1385	61217
2021-22	1578	67528
