



5-Day Weather  
Forecast



Impact-Based  
Crop Advisory



Pest & Disease  
Alerts

KALP Portal:

<https://webgis.imd.gov.in/agro/>

Available in: हिंदी | English

*From Weather Forecast to Farm Action*



सत्यमेव जयते  
Ministry of Earth Sciences  
Govt. of India



## Krishi Advisory based on Location specific weather Prediction (KALP)



*Empowering Farmers through Location-Specific Weather Intelligence*

<https://webgis.imd.gov.in/agro/>

**Agromet Advisory Services Division  
India Meteorological Department  
Ministry of Earth Sciences  
Government of India  
January 2026**



सत्यमेव जयते

डॉ. एम. रविचंद्रन  
Dr. M. Ravichandran

सचिव  
भारत सरकार  
पृथ्वी विज्ञान मंत्रालय  
पृथ्वी भवन, लोदी रोड़, नई दिल्ली-110003

SECRETARY  
GOVERNMENT OF INDIA  
MINISTRY OF EARTH SCIENCES  
PRITHVI BHAWAN, LODHI ROAD, NEW DELHI-110003



## FOREWARD

Agriculture is the backbone of India's economy and the primary source of livelihood for a large section of our population. In the current scenario which is marked by climate variability and increasing weather extremes, the integration of science, technology, and digital innovation is essential to support farmers in managing weather associated risks and reduce the weather induced losses.

The India Meteorological Department (IMD), Ministry of Earth Sciences (MoES), has been serving the farming community since 1945 with the initiation of Farmers Weather Bulletin. Since then with the advent of technology, extension of weather observation network and weather forecast the customized weather information in the form of advisory also follows era of evolution. The Gramin Krishi Mausam Sewa (GKMS) scheme of IMD is now a cornerstone of weather-based agricultural advisory services in the country. Building upon this strong foundation, the development of KALP (Krishi Advisory based on Location specific weather Prediction) represents a significant step towards modernizing and digitizing the delivery of agromet advisories. By integrating IMD's forecast products with scientifically defined crop thresholds and delivering advisories through user-friendly digital interfaces, the platform enhances the precision, timeliness, and usability of agromet advisory services.

It reflects the collective efforts of scientists, and experts working towards a common goal of empowering farmers with actionable weather intelligence. I express my deep appreciation to all the scientist and experts involved in preparing this platform.

  
(M. Ravichandran)





## डॉ. मृत्युंजय महापात्र

मौसम विज्ञान विभाग के महानिदेशक,  
विश्व मौसम विज्ञान संगठन में भारत के स्थाई प्रतिनिधि  
विश्व मौसम विज्ञान संगठन के तीसरे उपाध्यक्ष

*Dr. Mrutyunjay Mohapatra*

Director General of Meteorology,  
Permanent Representative of India to WMO  
Third Vice President of WMO

भारत सरकार  
पृथ्वी विज्ञान मंत्रालय  
भारत मौसम विज्ञान विभाग  
मौसम भवन, लोदी रोड़  
नई दिल्ली-110003  
Government of India  
Ministry of Earth Sciences  
India Meteorological Department  
Mausam Bhawan, Lodi Road  
New Delhi-110003



### PREFACE

Weather and climate play a decisive role in agricultural productivity and food security in India. With increasing climate variability and the growing frequency of extreme weather events, the need for timely, accurate, and location-specific agrometeorological advisories has become more critical than ever. The India Meteorological Department (IMD), Ministry of Earth Sciences (MoES), has been continuously strengthening its services to support the farming community through scientific weather forecasts and Agromet advisories. Gramin Krishi Mausam Sewa (GKMS) scheme is the flagship service of the IMD, providing timely, location-specific and actionable weather-based advisories to farmers through a nationwide network of Agromet Field Units (AMFUs).

With the increasing availability of high-resolution weather forecast and advancement in digital technology, there is a growing need to transform scientific information into location-specific and operationally relevant advisories. In this context, KALP (Krishi Advisory based on Location specific weather Prediction) has been developed.

KALP provides an interactive environment where users can access five-day weather forecast of the desired location, select their own crops and corresponding stages, and receive advisories structured around Forecast–Impact–Action logic. The framework is decision-support system that integrates: Weather forecast (Location specific), crop phenology, crop sensitivity towards weather and management practices to generate impact-based, actionable advisories for farmers. Automatic geo-location identification, Panchayat-level selection, and bilingual outputs make Agromet advisories more precise and user-friendly.

I trust that KALP will contribute meaningfully to strengthening IMD's agro meteorological services and assist farmers in managing weather-related risks more effectively. I appreciate the dedicated efforts of the teams involved in the development and operationalization of this platform and look forward to its continued refinement and wider adoption.

(M. Mohapatra)

## ACKNOWLEDGEMENT

The development and operationalization of KALP (Krishi Advisory based on Location-specific Weather Prediction) has been made possible through the collective efforts and guidance of several organizations, institutions, and individuals. The India Meteorological Department (IMD), under the Ministry of Earth Sciences (MoES), gratefully acknowledges the continued support, leadership, and encouragement provided by the Ministry in strengthening weather-based services for the agricultural sector.

We sincerely acknowledge the valuable contributions of scientists, officers, and technical staff of IMD network, whose expertise in weather forecasting has been instrumental in developing the KALP platform. The role of the Gramin Krishi Mausam Sewa (GKMS) network, including Agromet Field Units (AMFUs) is gratefully acknowledged for providing domain knowledge, crop-weather expertise, and field-level insights that have strengthened the advisory framework of KALP. We also acknowledge the efforts of the AASD, IISD and NWP teams involved in designing, developing, and operationalizing the digital platform.

The successful development of KALP reflects a collaborative approach towards delivering farmer-centric, location-specific, and impact-based agrometeorological advisories, and we look forward to continued cooperation among all stakeholders in further strengthening this initiative.

**(D.S. Pai)**

# **Table of Content**

- 1. Introduction**
- 2. Concept of Forecast–Impact–Action Framework for Agriculture**
- 3. Scope of utilization of the portal**
- 4. System Overview**
- 5. Flowchart of KALP Portal**
- 6. How This Advisory System Helpful for the Farmers/Users**
- 7. Farmer-Centric Features of the Advisory System**
- 8. How to Use the System (User Workflow)**
  - 8.1. System Home Page**
  - 8.2. Location Selection (District/Block/Gram-Panchayat)**
  - 8.3. Crop Selection and Growth Stage selection**
  - 8.4. Advisory Output (Impact and Suggested Action)**
  - 8.5. Pest and Disease Advisory**
- 9. Conclusion and Way forward**

## **Executive Summary**

KALP (Krishi Advisory based on Location-specific Weather Prediction) is a digital agrometeorological advisory platform developed by the India Meteorological Department (IMD) under the Ministry of Earth Sciences to strengthen the delivery of Weather Based Crop Advisory Services. The platform has been designed to translate scientific weather forecasts into actionable, location-specific advisories tailored to crop type and growth stage.

KALP automatically detects the farmer's location or allows manual selection up to the Gram Panchayat level, ensuring field-level relevance of advisories. Users can select the crop and its current growth stage, following which the system provides a five-day forecast of agriculturally important weather parameters. These forecasts are dynamically compared with crop- and stage-specific threshold values embedded in the system. Based on this assessment, KALP generates impact-based advisories covering crop management, pest and disease risk, and recommended actions to mitigate adverse weather effects.

The platform complements the expert-driven Gramin Krishi Mausam Sewa advisory service of IMD by offering a standardized, digital decision-support tool that enhances consistency, timeliness, and accessibility of advisories. Advisory outputs are available in Hindi and English, and can be viewed, downloaded, and shared through the KALP Web Portal and the MAUSAM website.

By supporting informed decision-making from sowing to harvesting, KALP aims to reduce weather-induced crop losses, optimize input use, and enhance farm productivity. The platform represents an important step towards weather-smart and climate-resilient agriculture, reinforcing IMD's commitment to deliver.

## 1. Introduction

Indian agriculture is predominantly weather dependent. Variability in temperature, rainfall, humidity, wind and extreme weather events such as heat waves, cold waves, frost, heavy rainfall and dry spells significantly influence crop growth, productivity and farm income. Small and marginal farmers, who constitute a major proportion of the farming community, are particularly vulnerable to weather-induced risks due to limited resources and adaptive capacity.

Recognizing the critical role of weather in agriculture, the India Meteorological Department (IMD), Ministry of Earth Sciences has been providing Weather-Based Crop Advisory Service to farmers under Gramin Krishi Mausam Sewa Scheme. These services aim to translate weather forecasts into actionable, crop- and stage-specific advisories that help farmers make informed decisions related to sowing, irrigation, fertilizer application, pest and disease management, harvesting and post-harvest operations.

With advancements in numerical weather prediction, increased spatial resolution of forecasts, and digital dissemination platforms, there is a growing need for location-specific and crop-specific advisory systems. Generic advisories often fail to capture local agro-climatic variability and crop sensitivity at different growth stages. Therefore, IMD has taken initiative to provide location-specific weather forecast-based agrometeorological advisories to the farmers across the country.

## 2. Concept of Forecast–Impact–Action Framework for Agriculture

Under KALP, advisories follow the Forecast–Impact–Action framework. Weather forecasts are interpreted in terms of their likely impact on crops and translated into actionable farm advisories. The framework is decision-support service that integrates: Weather forecasts (Location specific), Crop phenology and sensitivity and Agro-management practices to generate impact-based, actionable advisories for farmers. These advisories forecast based interpret “**Impact: what the weather will do to the crop**” and “**Informed Action: what the farmer should do in response**”.

### **3. Scope of utilization of the portal**

The advisory framework is applicable across spatial scales from district to village level and across crops and phenological stages. The framework applies to the selected location of the farmer; this location specificity ensures that advisories account for weather forecast for the farmer's location their selected crop and the selected phenological phase. The system is enabling with the Major Region specific field crops (wheat, rice, maize, pulses, oilseeds etc). Since the crop sensitivity varies with the type of crop and their phenological phases the same weather condition can be beneficial at one stage and harmful at another, hence separate weather thresholds and advisory logic established in the literature and field experiments has been incorporated for major crop growth stages, viz. Sowing and germination, crown root establishment, vegetative growth (tillering/branching), Flowering, Grain filling, physiological maturity etc.

Weather conditions play a crucial role in the occurrence, survival, multiplication and spread of insect pests in agricultural crops. Temperature, relative humidity, rainfall, wind and cloudiness directly influence pest life cycles, population dynamics and infestation severity. Temperature controls pest development rate and survival, Relative Humidity favors multiplication of sucking pests, rainfall influences egg hatching, larval survival and migration, Cloud Cover prolongs pest activity duration and Wind Speed affects pest dispersal.

Changes in weather patterns often lead to sudden pest outbreaks, causing significant crop losses if timely preventive measures are not taken. Each pest has a specific range of temperature, humidity and moisture conditions that favors its multiplication and spread. In the framework pest-weather relationship-based advisories also enabled to anticipate pest risk using weather forecasts and issue preventive and early warning advisories to farmers.

### **4. System Overview**

Location-specific advisories are prepared by integrating: Multi Model Ensemble weather forecast of 12.5 km resolution for all the important weather parameters for

agriculture like Maximum and Minimum temperature, Rainfall, Maximum and Minimum relative humidity, Wind speed, Wind direction and cloud cover for next 7 days. Crop stage information viz. provided by the users. The crop stage wise threshold viz. based on the known crop weather relationship established by various researchers existing district wise and crop wise crop weather calendars and pest weather calendars developed by IMD under Gramin Krishi Mausam Sewa Scheme and other institutions. All these inputs are evaluated against the weather forecast and **crop- and stage-specific thresholds** to flag the alarming situation to the farmers/users and also provide the suitable action to be performed. The weather forecast parameters are dynamically compared with crop- and growth-stage-specific threshold values embedded in the system. Advisories are customized according to crop growth stages in view of the fact that the same weather condition may have different impacts at different stages. Based on the identified impacts, action oriented advisories are formulated based on agronomic operations, crop protection measures to be followed etc.

Forecast	Likely Impact	Advisory Action
Tmax > 30°C during grain filling stage of the wheat Crop	High maximum temperature leads to shortened grain filling period, Shriveled grains and yield loss	Provide irrigation. Apply foliar spray of KNO <sub>3</sub> 0.5% to improve the grain weight. Flowering is a critical stage hence maintains the soil moisture. Preferably provide the irrigation in night.

Based on the established thumb rules for occurrence of diseases under the congenial weather the weather forecast is evaluated against crop- and stage-specific congenial weather threshold to classify the situation as: Low, Medium and High chances of occurrence of diseases in the field. Accordingly, the Impact and suggested action for incidence of occurrence of pest and diseases are also incorporated in the advisory. Eg. Yellow Rust/Stripe rust of Wheat

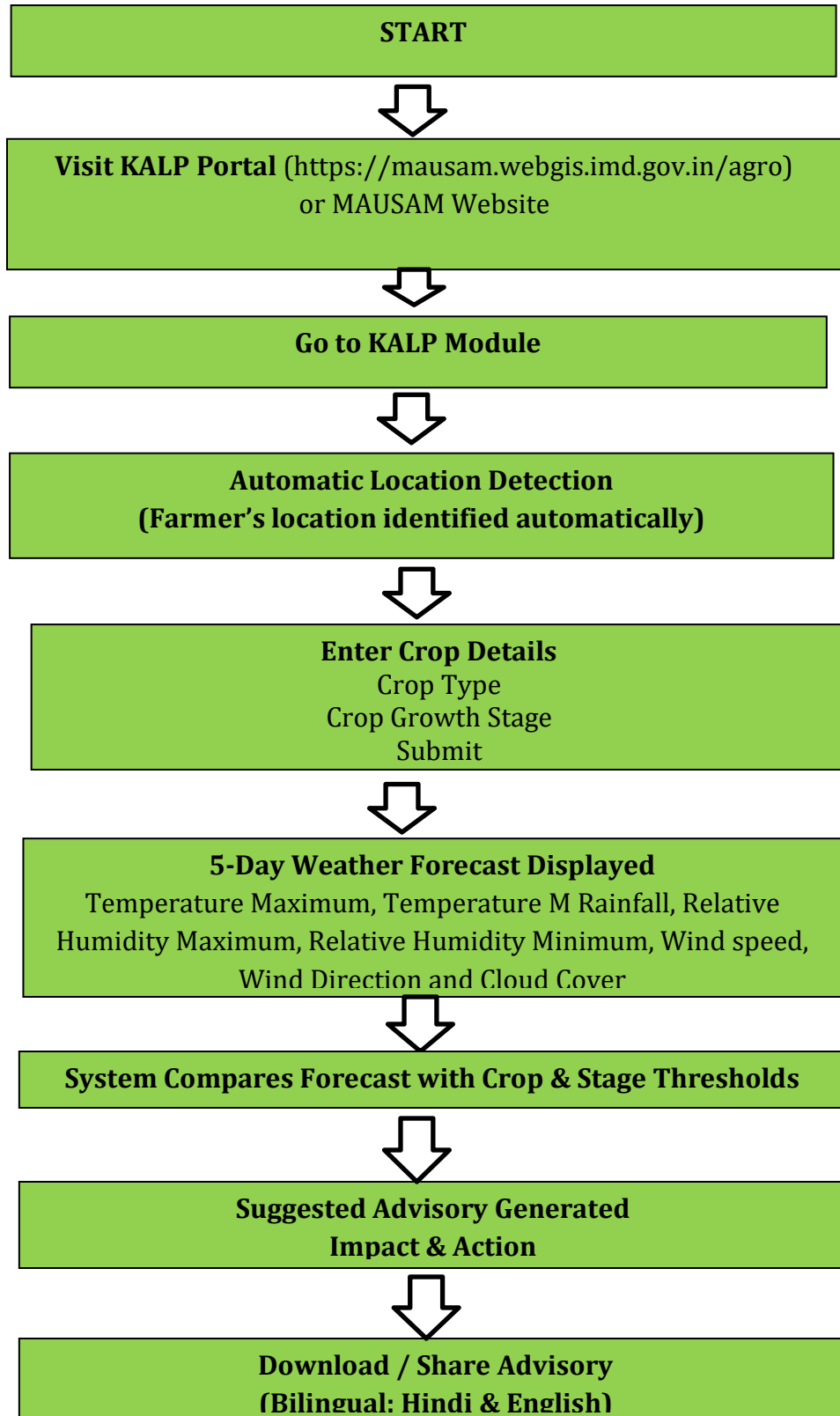
Forecast	Likely Impact	Advisory Action
T max >20, Tmin 10– 15°C, RH >85%	Cool, cloudy, and humid weather increases yellow rust risk	Spray recommended fungicide at first sign of disease, especially between tillering and heading stage. Dithane M-45 @ 2.5 grams/litre of water, Propiconazole (Tilt) 25 EC @ 0.1 % (1 ml/liter apply or Tebuconazol (Foliur) 25.9 EC @ 1ml/litre of water may be used. Protect the flag leaf to reduce the yield loss.

KALP is accessible through the portal (<https://webgis.imd.gov.in>) and the MAUSAM mobile application. The system provides bilingual information in Hindi and English, ensuring wider usability among farmers and extension personnel. Advisory outputs can be viewed, downloaded, and shared, facilitating easy dissemination.

KALP automatically detects the farmer’s location, shows the local weather forecast, checks crop-specific limits, and gives simple advice on what to do and what to avoid.

## 5. Flowchart of KALP Portal

The KALP portal flowchart represents a seamless process that converts location-specific weather forecasts into actionable, crop- and stage-based agromet advisories to support informed farm-level decision-making. Farmers use the advisory information to take **timely field-level actions**, such as irrigation scheduling, fertilizer application, pest and disease management, or harvesting decisions. The portal supports regular updates based on updated forecast, and user feedback can be utilized to refine advisory content and system performance.



**Fig.1** Flowchart of KALP

## **6. How This Advisory System Helpful for the Farmers/Users**

Location-specific advisories provide relevant, timely and actionable guidance that directly corresponds to their local weather conditions, crop type and growth stage. These weather forecast-based advisories help farmers to plan farm operations, reduce weather induced crop losses like terminal heat stress, frost injury at early stages, waterlogging after heavy rainfall or disease outbreaks during humid weather etc. Optimize input use like avoid fertilizer loss due to rainfall, reduce pesticide sprays, optimize irrigation water use etc. Enhanced Crop Productivity by protecting critical stages of the crops such as: flowering, grain filling and fruit setting. Enhancing Climate Resilience of Farmers, by regularly utilizing location-specific advisories, farmers become better prepared to cope with the climate variability like: Increasing erratic rainfall patterns, rising night temperatures, more frequent extreme events etc

## **7. Farmer-Centric Features of the Advisory System**

Location-specific weather forecast-based agrometeorological advisories are designed with a strong farmer-centric approach, ensuring that weather information is translated into simple, timely and actionable guidance at the farmer's field level, for their crop in their own language. The advisory system is designed to serve the farmer-first incorporating simple language, local names, action-oriented recommendation, avoidance of technical jargons and effort to provide practical field level instructions.

KALP further strengthen this farmer-first approach by delivering real-time, location-specific forecasts and clear Normal–Caution–Severe risk signals, making scientific weather intelligence easily understandable and directly usable by farmers, Displaying advisories in a visual and user-friendly manner.

## **9. How to Use the System (User Workflow)**

The comprehensive KALP: IMD Operational Manual. Facilitates the user by users by figures, flow diagrams, and step-by-step guidance on how farmers/ users can use the IMD digital system.

### **8.1 System Home Page**

KALP is a location-specific agromet advisory portal available at <https://webgis.imd.gov.in/agro/> that helps farmers plan their agricultural activities using weather forecasts. By selecting location, crop, and crop stage, user can access five-day weather forecasts and simple, impact-based advisories for crop, pest and diseases to support decisions from sowing to harvesting.

The home page has been designed to support the farmers to get the information about the forecast impact and suggested action on the single page and also there are download buttons are enabled to download the advisory for further dissemination.

The screenshot displays the KALP Portal Home Page. At the top, the header reads "KALP:Krishi Advisory based on Location Specific Weather Prediction". On the right, there are options for "English" and "Admin", along with logos for the Ministry of Earth Sciences and the Government of India. Below the header, weather data is shown: "Temp (Min/Max): 6.6°C / 17.5°C", "RH (Min/Max): 34% / 60%", and "Precipitation (3 days): 0.0mm".

The main content is divided into two columns. The left column, titled "Crop Information", features a green notification bar stating "Manual coordinates set successfully" with a "Refresh" button. Below this, there are input fields for "Manual Coordinates (Optional)" with values "28.82" and "76.85", and a "Use These Coordinates" button. Further down, there are dropdown menus for "State" (set to "HARYANA") and "District" (set to "ROHTAK"), a "Search" button, and a "Search by Code:" field.

The right column, titled "Location Map", contains a "Location Information" section with the following details: "Address: Sampla, Rohtak, Haryana, India", "State: Haryana", "District: Sampla", and "Coordinates: 28.820000, 76.850000". Below this information are "Reset View" and "Use My Location" buttons. At the bottom of this column is a map showing the location of Sampla, with a tooltip indicating "Manual Location Lat: 28.820000 Lon: 76.850000".

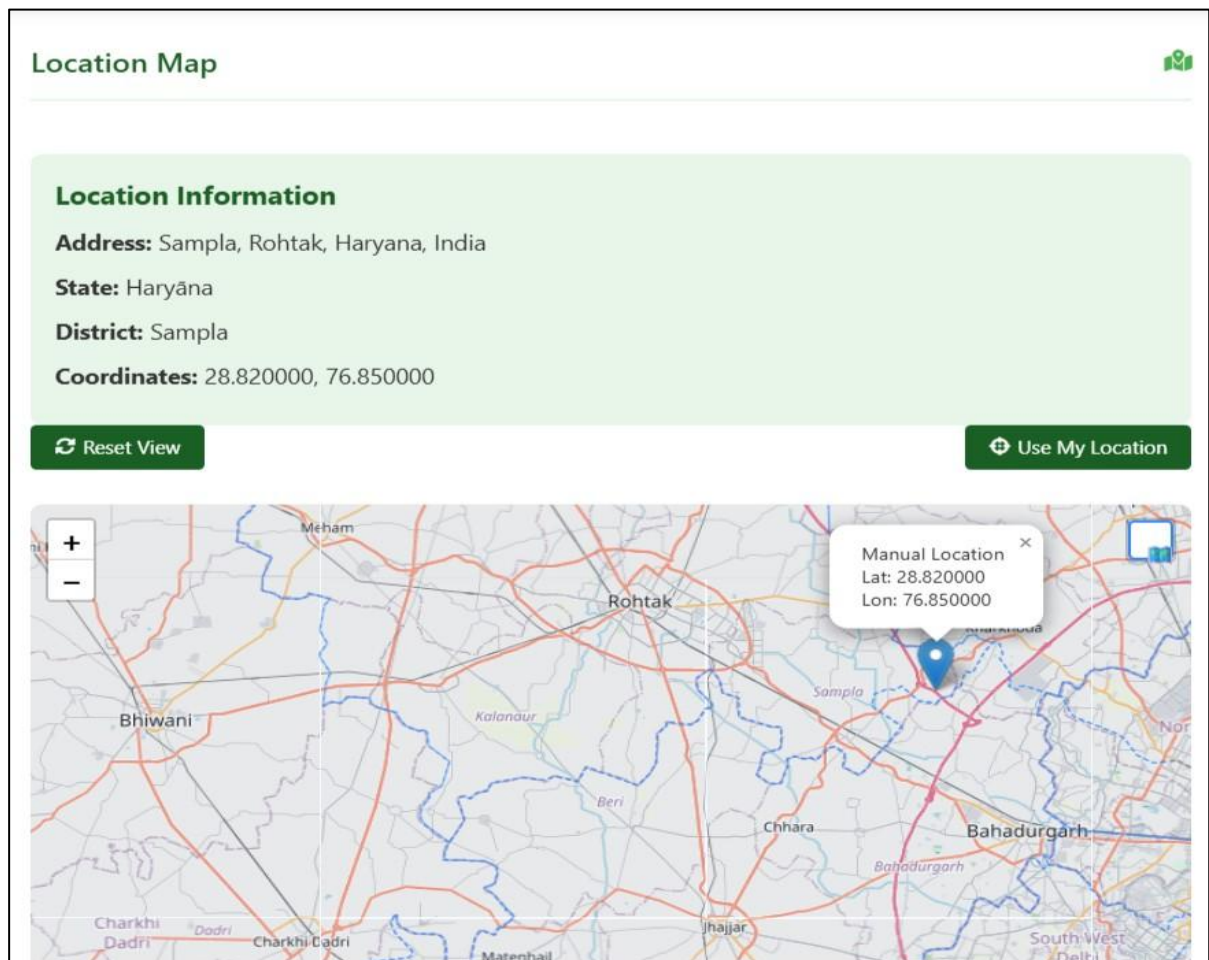
**Fig.2.** KALP Portal Home Page

User can open the system on mobile or computer by clicking on the URL: <https://webgis.imd.gov.in/agro>

## 8.2 Select Location (District/Block/Gram-Panchayat)

**Automatic location information:** The users system or mobile geo coordinates will be automatically fetched by the system and accordingly the weather forecast of their location will be appeared on the screen.

The provided facility of location selection on the map will be helpful for the user to get the information by just clicking on the map and system will automatically fetch their location coordinates and display the forecast and advisory for selected crop.



**Fig. 3:** Location Selection Screen through Map

The screenshot shows a user interface for location selection. It features three main sections: 1. 'State' with a dropdown menu currently showing 'HARYANA'. 2. 'District' with a dropdown menu showing 'ROHTAK' and a green 'Search' button with a magnifying glass icon. 3. 'Search by Code:' with a dropdown menu showing 'Pincode' and a text input field containing 'Enter code', followed by another green 'Search' button with a magnifying glass icon.

**Fig. 4:** Location Selection Screen through Dropdown Menu

Dropdown options allow users to select their location up to the Gram Panchayat level, enabling farmers to access weather forecasts and advisories specific to their own village or any other selected area

### 8.3 Crop Selection and Growth Stage selection

The screenshot shows a user interface for crop selection. It features two main sections: 1. 'Crop Name' with a dropdown menu currently showing 'Wheat'. 2. 'Crop Stage' with a dropdown menu currently showing 'Grain filling'.

**Fig. 5:** Selection of crop and the growth stage of the crop through dropdown menu

User can select their crop and the phenological stage corresponding to which the advisory is required. The list of the crops added in the dropdown menu is as per the major crops sown in the selected location.

## 8.4 Weather Forecast Visualization

7-Day Weather Forecast 09/01/2026								
Day	Min Temp (°C)	Max Temp (°C)	Min RH (%)	Max RH (%)	Precip (mm)	Cloud Cover (octas)	Wind Speed	Wind Direction
Today	6.9 ⚡	14.6	50	64	0.0	1	1.7	304°
Tomorrow	5.3 ⚡	16.0	45	70	0.0	0	2.0	46°
11/01/2026	6.6 ⚡	16.9	40	59	0.0	0	3.9	338°
12/01/2026	7.2 ⚡	15.7	37	56	0.0	1	3.6	306°
13/01/2026	4.6 ⚡	16.5	35	64	0.0	0	2.3	347°

**Fig. 6:** Weather Forecast table

In the screen the tabular display of next 5 days forecast of the user location will appear for the weather parameters Temperature, Rainfall, Relative Humidity, Cloud Cover and Wind.

The table also highlights weather parameter values when they cross the predefined threshold limit for the selected crop and its specific growth stage. For example, in the selected case of *State: Haryana, District: Rohtak, Block:Rohtak*, the forecasted minimum temperature for the next five days is shown to be crossing the threshold (optimum minimum temperature requirement of 10 °C) for *Wheat at the Grain Filling stage*. Accordingly, the system flags this condition to draw user attention. The same provision has been kept for other weather parameters also.

The system is enabled with predefined crop specific and stage specific threshold values for all above listed weather parameters, ensuring timely identification of potential weather-related risks and to support informed decision-making.

## 8.5: Advisory Output (Impact and Suggested Action)

**✦ Advisory & Pest Info**

**Advisory & Pest Info**

*Based on crop stage & weather conditions*

---


**Weather Advisory**

**⚠ Weather Alert:** The following conditions exceed thresholds:

**Low Temperature:** Low minimum temperature leads to stunted growth of crop, frost injury of leaves and reduced the number of tillers in plant.  
Threshold: 6.0

Recommendation: Avoid the use of pesticide or fertilizer sprays during frost. Provide light irrigation in the evening.

**Crop Stage: Tillering**



Current crop is in **Tillering** stage. Monitor growth and apply appropriate agricultural practices.

**Fig.7:**Crop advisory based on weather forecast and thresholds

Based on the comparison between forecasted weather parameters and crop-stage-specific threshold values, the system automatically assesses the likely impact on the selected crop and displays the corresponding suggested actions. Continuing with the example of State: Haryana, District: Jind, Block: Jind, where the forecasted minimum temperature for the next five days is crossing the optimum threshold (10 °C) for Wheat at the Grain Filling stage, the system identifies potential adverse impacts such as delayed grain filling, shrivelling of grains and possible yield reduction. Accordingly, the system generates and displays stage-specific advisory actions, such as Provide Irrigation to maintain the soil moisture. Spray 2% Urea or 0.5% KNO<sub>3</sub> avoidance of


stress conditions. This Impact–Action linkage enables users to clearly understand the consequence of the forecasted weather and take timely, preventive field-level actions.

## 8.6 Pest and Disease Advisory

**Pest & Disease Information**

✔ **Yellow Rust/Stripe rust**

Low Risk



**Management**

✔ Current weather conditions are NOT favorable for Yellow Rust/Stripe rust development.  
Spray Dithane M-45 @ 2.5 grams/litre of water, Propiconazole (Tilt) 25 EC @ 0.1 % (1 ml/liter apply or Tebuconazol @ 25.9 EC 1ml/litre of water

**Fig.8** Pest advisory based on weather forecast and thresholds

KALP provides weather-based pest advisories by analyzing forecast conditions that favor pest and disease development, helping farmers take timely preventive and control measures. Continuing with the example of State: Haryana, District: Jind, Block: Jind, for Wheat at the Grain Filling stage, the system assesses the preexisting favorable condition of occurrence of all possible disease of Wheat at grain filling stage with the forecast value of Minimum Temperature, Maximum temperature, Relative humidity, and Rainfall. If two or more forecast parameters values matches with the preexisting threshold alarming situation will be raised by the portal. In the present example since only the Temperature condition is favorable and the Humidity and Rainfall is not conducive the LOW RISK of occurrence of Yellow Rust is reflected.

## **9. Conclusion and Way forward**

KALP is a robust, farmer-centric digital platform under the IMD Weather Based Crop Advisory Services, effectively bridging the gap between scientific weather forecasting and practical agricultural decision-making. By integrating location-specific weather forecasts with crop- and growth-stage-specific threshold values, the system converts complex meteorological information into simple, actionable advisories at the farmer's field level. The automated location detection, Gram Panchayat-level selection, bilingual information delivery, and Forecast-Impact-Action framework collectively enhance the usability and relevance of advisories. KALP strengthens farmers' capacity to manage weather-related risks, optimize resource use, and reduce crop losses, thereby contributing to climate-resilient and sustainable agricultural practices.

To further enhance the effectiveness and outreach of KALP, the following strategic directions are proposed:

### **9.1 Expansion of Crop and Pest Coverage**

Gradual inclusion of additional crops, varieties, and weather-driven pest and disease modules will improve advisory depth and relevance across diverse agro-climatic regions.

### **9.2 Refinement of Thresholds and Local Customization**

Continuous validation and refinement of crop- and stage-specific thresholds using field observations and feedback through the field level manpower under GKMS Scheme as well as the users will strengthen the accuracy of advisories at the local level.

### **9.3 Integration with additional spectrum of weather forecast**

Incorporation of warning and extended-range forecasts will enable early warning and medium-term planning for critical farm operations.

### **9.4 Integration of products to support the decision making of framers**

Integration of multiple agrometeorological products within the KALP platform to enhances its capability to support informed and timely decision-making by farmers. Beyond routine weather forecasts, the incorporation of value-added products such as soil moisture status, Standardized Precipitation Index (SPI), and rainfall anomaly

indicators provides a more comprehensive assessment of moisture availability and drought or excess rainfall conditions at the field level.

### **9.5 Enhanced Digital Dissemination and Interoperability**

Wider integration with mobile applications, SMS/IVR services, and other national agricultural digital platforms will ensure timely delivery of advisories to last-mile users.

### **9.6 Feedback-Driven System Improvement**

Establishment of structured feedback mechanisms from farmers and field agencies will support continuous system improvement and operational fine-tuning.

