

Case Study: Soybean Farmer's Success through Precision Farming using AgriDoot – By NovosEdge

Introduction to Precision Farming

Precision farming is the future of agriculture. With advancements in technology, farming is evolving into a data-driven, efficient, and sustainable practice. The startup NovosEdge Pvt Ltd based in Bhopal - MP, their flagship product AgriDoot, combines cutting-edge technologies such as IoT, GIS, AI and ML to offer farmers a holistic approach to modern farming.

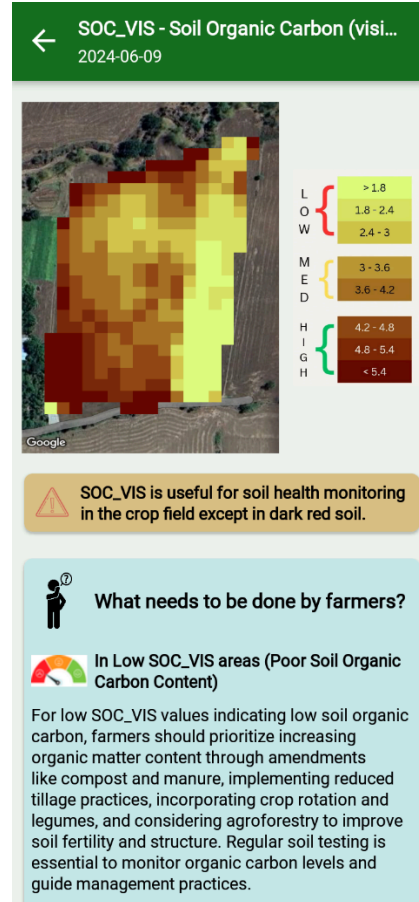
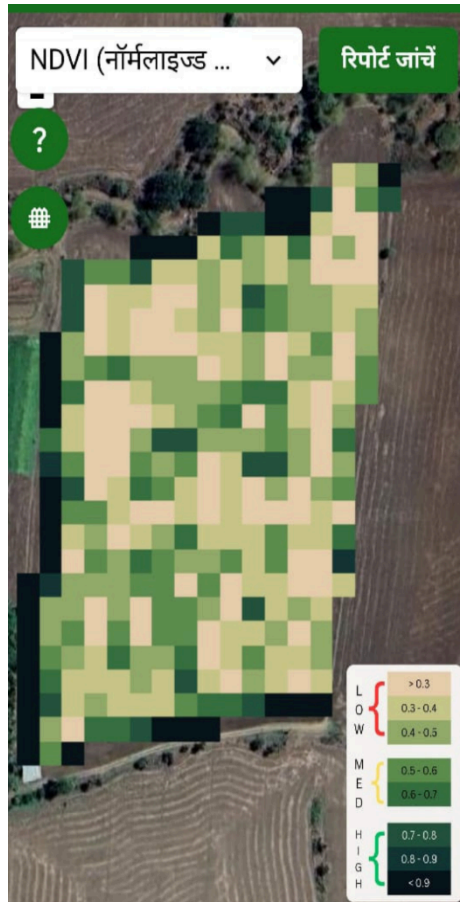
How AgriDoot is Empowering Farmers ?

At AgriDoot, we believe that real-time data is the key to unlocking a farmer's potential. Our precision farming solutions enable farmers to access crucial crop stage-wise data in real time. Farmers can now receive timely alerts for disease and pest outbreaks, irrigation requirements, and much more, all tailored to their specific crop and field conditions.

Vyom GIS: Revolutionizing Crop Monitoring

One of our flagship technologies is Vyom GIS, which facilitates satellite-based crop monitoring. Every 4-5 days, farmers can receive satellite insights on their crop and field conditions, including:

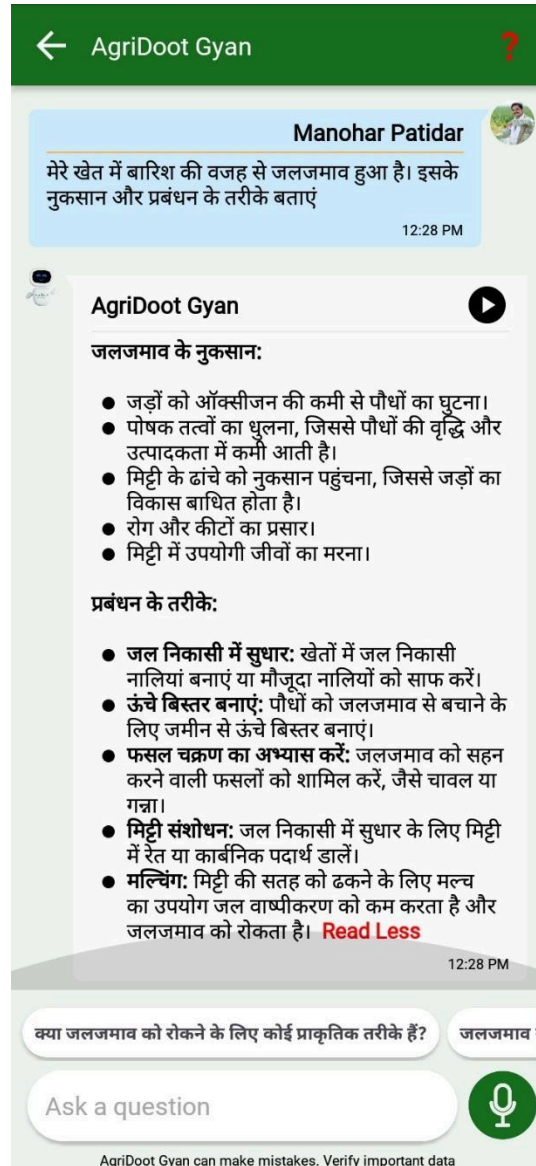
- Crop Health
- Soil Organic Carbon Levels
- Soil Moisture Status



This satellite data provides critical insights for efficient irrigation management and overall field monitoring, empowering farmers to make informed decisions.

AI in Agriculture: GYAN – AI based Chatbot

In today's era, artificial intelligence is transforming industries across the board. Agriculture should be no exception. That's why we developed GYAN, an AI-based chatbot designed to help farmers solve problems by asking relevant questions and offering expert advice in real-time. With GYAN, farmers can access the knowledge and support they need, anytime, anywhere with voice assistance features in their own language.



AgriDoot IoT-based smart farming device

Smart farming devices provided the soybean farmer with real-time crop stage insights and actionable suggestions tailored to the field's specific needs. With predictive alerts for disease and pest risks, the farmer could proactively manage threats, ensuring optimal crop health and yield. Additionally, the device offered two-level soil moisture alerts, guiding the farmer to maintain ideal moisture levels, supporting robust crop development and effective irrigation management throughout the soybean growth cycle.



Leaf-Based Disease Detection and Expert Advice

AgriDoot's precision farming solutions include leaf-based disease detection, allowing farmers to not only detect diseases early with image-based analysis but also their organic and chemical management and their reason of occurrence. Farmers can also receive expert advice through video calls, ensuring that they get personalized guidance from agricultural experts.

<
परिणाम

सेप्टोरिया लीफ स्पॉट



विवरण

सेप्टोरिया लीफ स्पॉट पौधों को प्रभावित करने वाला एक कवक रोग है, जिसमें पत्तियों पर भूरे रंग के केंद्रों के साथ छोटे, काले धब्बे होते हैं। इससे पत्तियां पीली पड़ जाती हैं और पत्तियां गिर जाती हैं। पानी के छींटों और हवा के माध्यम से फैलता है।

अनुशंसित दवा

रोको कवकनाशी

समाधान

<
परिणाम

अनुशंसित दवा

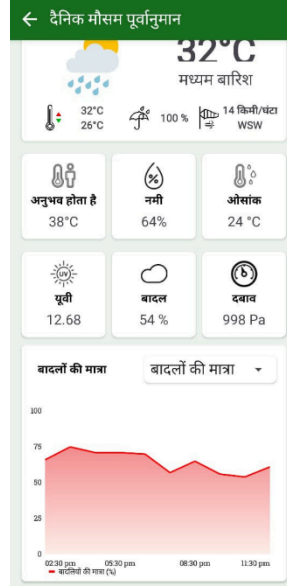
रोको कवकनाशी

समाधान

सेप्टोरिया लीफ स्पॉट, जिसे सेप्टोरिया ब्लाइट के रूप में भी जाना जाता है, भारत सहित दुनिया भर में टमाटर को प्रभावित करने वाला एक आम कवक रोग है। अगर इसे अनियंत्रित छोड़ दिया गया तो इससे उपज में काफी नुकसान हो सकता है। इसे प्रबंधित करने के बारे में कुछ जानकारी यहां दी गई है: लक्षण: पत्तियों, तनों और फूलों पर भूरे केंद्र और गहरे किनारों के साथ छोटे, गोल से लेकर अनियमित धब्बे। धब्बे फैलते हैं और आपस में जुड़ जाते हैं, जिससे पत्ती झूलस जाती है और पत्तियां गिर जाती हैं, जो निचली पत्तियों से शुरू होकर ऊपर की ओर बढ़ती हैं। गंभीर रूप से पत्ते गिरने से फल धूप की चपेट में आ सकते हैं और उपज पर असर पड़ सकता है। प्रबंधन: निवारक उपाय: पौध

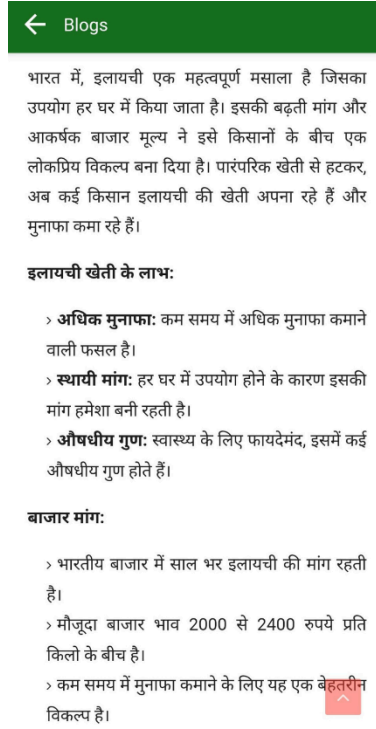
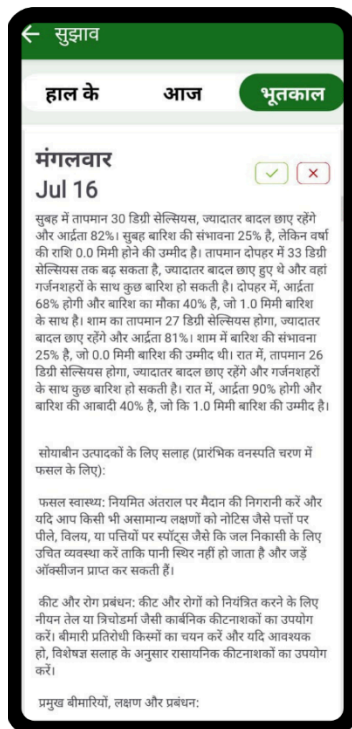
Real-Time Weather Forecasts and More

We provide real-time weather forecasts based on the farmer's specific field location, helping them make informed decisions about irrigation, pest control, and other management practices. Additionally, farmers have access to blogs, market rates, and a variety of other resources to stay updated and informed.



A Holistic Approach to Sustainable Agriculture

Our mission at AgriDoot is to connect farmers with precision farming solutions that are both effective and affordable. By leveraging the power of technology, we aim to address previously untouched agricultural challenges while promoting sustainable farming practices that conserve resources and protect the environment for future generations.



Farmer Details

The research study was conducted on the farm of Mr. Manohar Patidar Ji, a progressive farmer from Parwalia Sadak, Bhopal, who is recognized for his innovative approach to agriculture. He has received numerous awards from both state and central governments for being an advanced farmer. His attachment to modern farming technologies makes him an ideal subject for this case study. The study was conducted on his 1 acre farm, where the irrigation source was rainfall during the Kharif season. Parwalia Sadak, Bhopal (Latitude: 23.3648° N, Longitude: 77.4871° E) experienced temperatures ranging from 20°C to 37°C between June and October 2024, with humidity levels between 50% and 90%. Rainfall varied from 90–280 mm, peaking in July and August. These conditions provided a suitable environment for Kharif crops with sufficient moisture and moderate temperatures. Manohar sourced his seeds from the local market and applied fertilizers as per recommended doses. Intercultural operations, including herbicide, pesticide, and insecticide applications, were carried out according to crop needs. Field preparation started 14 days prior to sowing, which took place on 22 June 2024, and harvesting was completed on 10 October 2024.



Methodology

Field Preparation and Sowing: AgriDoot's Role in Precision Farming

During the field preparation and sowing stage, the farmer used various machinery and tillage practices to clear and prepare the land. Soil testing was conducted, and fertilizers were applied

accordingly, along with vermicompost, FYM, soil micronutrients, and manures. Labor costs, seed purchases, and other inputs were also factored in.

How AgriDoot helped:

- **Weather Forecasting:** AgriDoot provided accurate weather forecasts, helping the farmer plan field preparation efficiently, reducing input costs by avoiding unfavorable weather conditions.
- **Gyan AI Chatbot:** With the help of Gyan, the farmer received precise recommendations for the amount of FYM, vermicompost, and fertilizer basal doses, as well as the best seed varieties suited to local conditions.
- **Vyom GIS:** The farmer used Vyom GIS to access satellite-based maps of the field's organic carbon status, ensuring that manure and fertilizers were applied exactly where needed for optimal results.
- **IoT Sensor and Satellite Irrigation Data:** AgriDoot's IoT sensor device provided real-time soil moisture data, while Vyom GIS offered satellite-based irrigation insights, ensuring precise soil moisture management.
- **Sowing Recommendations:** The smart farming IoT system advised the farmer on the ideal day for sowing seeds, taking into account critical factors like moisture levels and weather conditions, optimizing seed germination. With AgriDoot's technological support, the farmer significantly reduced input costs, particularly in field preparation and sowing, something that would have been difficult without these precision farming tools.

Seedling to Vegetative Stage

AgriDoot's Role in Precision Farming, During the seedling to vegetative stage, AgriDoot provided continuous support to the farmer through daily suggestions and expert advisory via the app, ensuring timely interventions and effective management. The farmer also benefited from agronomist support and field visits, enhancing crop health and addressing issues in real-time.

How AgriDoot helped:

- **Daily Suggestions and Expert Support:** The AgriDoot app provided daily recommendations, offering expert guidance on managing crop growth. Agronomist support and timely field visits helped ensure that potential issues were tackled early on.

- **Leaf Disease Detection:** Using the leaf disease detection feature, the farmer identified early signs of disease and pest attacks and did management according to recommendation. This allowed for prompt application of control measures, reducing the cost of pest and disease management while maintaining crop sustainability.
- **IoT Sensors for Pest/Disease Alerts:** AgriDoot's IoT sensors provided early warnings for upcoming disease and pest outbreaks, enabling the farmer to take preventive action well in advance. This proactive approach helped reduce input costs and increased crop yield.
- **Vyom GIS for Plant Health Monitoring:** Through Vyom GIS, the farmer monitored plant health via satellite imagery, receiving crucial data on crop condition and soil organic carbon. This enabled precise nutrient management, targeting areas that needed attention for optimal growth.
- **Soil Moisture Data:** AgriDoot's IoT sensors also provided real-time soil moisture data, helping the farmer optimize irrigation scheduling and reduce water wastage. Combined with Vyom GIS satellite data, this ensured accurate moisture management, crucial for crop growth at this stage.
- **Weather Forecasting:** The IoT weather forecast device provided precise, localized weather updates, helping the farmer to follow optimum management practices to maintain field drainage, pesticide application, and other operations efficiently, reducing risks posed by unexpected weather conditions.
- **Slot Booking and Technical Support:** The slot booking feature allowed the farmer to consult directly with AgriDoot's technical team to address specific crop concerns. The farmer's issues were resolved quickly, offering practical solutions on the spot.

Flowering and Fruiting Stage: AgriDoot's Role in Precision Farming

During the flowering and fruiting stage, critical activities like weed control, PGR (Plant Growth Regulator) applications, pest control, and nutrient supplementation were carried out as per recommended guidelines to support optimal flower and fruit development.

How AgriDoot helped:

- **IoT Sensor Device for Timely Nutrient Application:** AgriDoot's IoT sensor device provided real-time insights on crop needs, suggesting the ideal timing for nutrient sprays.

This ensured that nutrient levels were maintained to support healthy flowering and strong fruit set, maximizing crop potential.

- **GYAN AI Recommendations:** Through GYAN AI, the farmer got precise recommendations for applying PGRs, pesticides, and additional nutrients to improve flower health and ensure strong fruit formation. GYAN AI's support helped the farmer apply the correct doses based on current field conditions.
- **Vyom GIS for Monitoring Plant Health:** Using Vyom GIS satellite data, the farmer tracked plant health across the field. Regular updates on areas of varying vigor allowed the farmer to target specific zones for additional nutrient or pest management, optimizing resource usage and promoting balanced flowering and fruiting.
- **Soil Moisture Data for Irrigation Timing:** With soil moisture data provided by AgriDoot's IoT sensors, the farmer could accurately time irrigation to maintain optimal moisture levels. This was critical for supporting flower and fruit growth without over- or under-watering, especially during sensitive stages.
- **Weather Forecasting for Spraying and Pest Control:** The IoT-based weather forecast device provided localized weather updates, helping the farmer plan pesticide and nutrient sprays on days with minimal risk of rain, preventing spray loss and maximizing effectiveness.
- **Slot Booking for Expert Advice:** Through the slot booking feature, the farmer could connect directly with AgriDoot's technical team for guidance on specific flowering and fruiting concerns. This immediate access to expert advice helped the farmer address any emerging issues efficiently.

By utilizing AgriDoot's precision farming tools — such as GYAN AI, Vyom GIS, IoT sensor devices, and weather forecasting — The farmer maintained ideal conditions for flowering and fruiting. The real-time data and targeted support allowed for effective pest control, precise nutrient applications, and efficient irrigation, ultimately leading to a healthier crop, reduced input costs, and enhanced yield potential.

Maturing and Harvesting Stage: AgriDoot's Role in Precision Farming

In the maturing and harvesting stage, the farmer faced unexpected rainfall, which could have impacted the crop's readiness and quality. Effective rainwater management and AgriDoot's real-time, field-specific weather updates helped the farmer mitigate risks associated with excess

water. By following weather forecasts, the farmer timed harvesting for optimal conditions, ensuring a smooth, sunlit period to avoid crop damage.

How AgriDoot helped:

- **Real-time Weather Forecasting:** With localized weather data from AgriDoot, the farmer managed water levels by draining excess rainwater from the field and delayed harvesting to avoid losses during unpredictable weather.
- **GYAN AI for Timely Harvesting and Storage Guidance:** Using GYAN AI, the farmer verified the ideal time for harvesting, ensuring high-quality yield and minimizing post-harvest losses. GYAN AI also provided expert advice on storage practices, helping the farmer follow necessary precautions for preservation and reduced spoilage, ultimately leading to better market prices.
- **Vyom GIS for Monitoring Crop Maturity:** With Vyom GIS satellite data, the farmer tracked crop maturity and moisture levels across the field, timing irrigation and ensuring optimal conditions for the harvest stage.
- **Moisture and Pest Alerts:** AgriDoot's IoT sensors provided real-time soil and crop moisture data, enabling the farmer to monitor field conditions closely. Additionally, pest and disease alerts during maturity helped the farmer take early action, preserving crop quality.
- **Mandi Rate Feature for Market Insights:** The Mandi Rate feature gave the farmer access to soybean prices across Madhya Pradesh, including local mandi rates, allowing the farmer to make informed selling decisions based on favorable market trends.
- **Blogs and Slot Booking for Continuous Support:** AgriDoot's blog resources and slot booking feature connected the farmer with expert advice, helping manage crop maturity, storage practices, and pest control. These tools ultimately maximized income and supported strategic decision-making.

With AgriDoot's technology support—spanning IoT sensors, Vyom GIS, GYAN AI, real-time weather updates, and market insights—the farmer navigated the challenges of maturing and harvesting, preserving crop quality, reducing losses, and achieving a higher income at the time of sale.

Comparison Table: Traditional vs. Precision Farming (Per Acre)

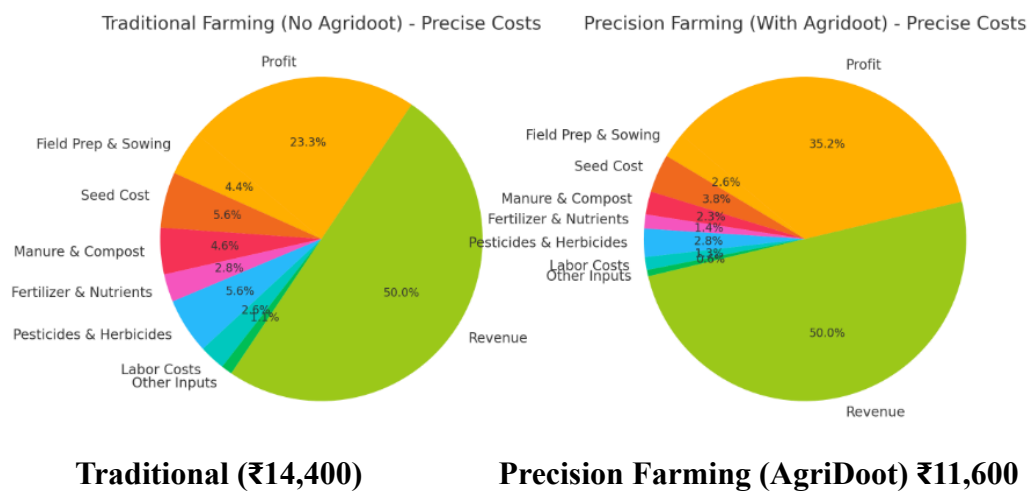
This table provides a comparison of input costs, yield, revenue, and profit for soybean farming using traditional methods versus AgriDoot's precision farming techniques per acre:

Practice	Traditional Farming (No AgriDoot) Approx	Precision Farming (With AgriDoot) Approx	Comments	Cost Reduction (%)
Field Preparation & Sowing	₹2,400	₹2,000	Reduced by weather-based planning	16%
Seed Cost	₹3,000	₹3,000	No change	0%
Manure & Compost	₹2,500	₹1,800	Precise soil fertility data	28%
Fertilizer & Nutrients	₹1,500	₹1,100	Customized nutrient planning and application	26%
Pesticides, Insecticides, Herbicides and Spray	₹3,000	₹2,200	Early pest alert & prevention	26%
Labor Costs	₹1,400	₹1,000	Optimized precision timing	28%
Other Inputs	₹600	₹500	Preventative health measures	17%
Total Input Cost	₹14,400	₹11,600	Reduced by 20%	20%
Yield per Acre	6 Quintals	8-10 Quintals	1.3-1.5x increase	30-40%
Revenue (at ₹4,500 per quintal)	₹27,000	₹39,136	Quality yield premium 4892/q (MSP)	45%
Profit	₹12,600	₹27,536	Notable profit increase	118%

Outcome

The comparison highlights that AgriDoot's precision farming significantly reduces input costs and improves yield and profit margins. Key benefits include a 20% reduction in input costs, a 1.5x increase in yield, and a notable profit increase due to improved crop quality and market rates. AgriDoot's technology supports farmers in achieving sustainable agricultural practices while maximizing profitability.

Farming Input Cost/Acre



Results and Analysis

The results of the comparison between traditional and precision farming methods demonstrate AgriDoot's effectiveness in cost reduction and yield improvement.

Cost Efficiency

AgriDoot's precision farming approach reduces input costs by **20%**, lowering the total input cost from **₹14,400 (traditional)** to **₹11,600 (precision)**.

- **Higher Yield:** Precision farming yields **8-10 quintals** per acre, doubling the output compared to traditional farming (**5-6 quintals**).
- **Increased Revenue:** Due to the higher yield, precision farming generates approximately **₹39,136** in revenue, compared to the traditional range of **₹27,000**.
- **Profitability:** Precision farming shifts profitability from an average of **₹12,600** (traditional) to **₹27,536**, showing a 2x increase in profits per acre.

Conclusion

The case study clearly illustrates that AgriDoot's precision farming technology significantly enhances farming efficiency and profitability:

- 20% cost reduction in specific input areas, such as fertilizer, pesticide, and labor.
- Increased the yield due to data-driven sowing, irrigation, and pest prevention measures.
- Enhanced revenue and 2x increase in profitability demonstrate AgriDoot's ability to improve farming returns through targeted resource allocation.

Farmer Recommendations

For farmers interested in adopting AgriDoot's precision farming system, here are key suggestions from our user:

- **Leverage Real-Time Data:** Use AgriDoot's real-time insights to optimize each stage of the crop cycle, from soil preparation to pest management.
- **Follow Timely Alerts:** Regularly monitor AgriDoot's predictive alerts to stay ahead of potential threats and improve crop health.
- **Adjust Nutrient and Irrigation Practices:** Based on soil and moisture data, tailor irrigation and nutrient application to ensure cost-effective and efficient crop growth.
- **Embrace Preventative Health Measures:** Use AgriDoot's health tracking features to reduce disease risks, lower pesticide use, and boost overall crop resilience.

By integrating AgriDoot's advanced features, farmers can enjoy increased profitability, reduced costs, and more sustainable practices, paving the way for modern, scalable, and environmentally conscious farming.

Appendix



(a)



(b)



(c)



(d)



(e)

(a) Mr. Patidar's Farm (b) Team AgriDoot giving App's insights (c) Discussion about crop management (d) Crop at vegetative stage (e) Field visit and discussion with farmer

Available in 10+ languages

Choose Language

☒ English

☐ हिंदी

☐ ಕನ್ನಡ

☐ मराठी

☐ ગુજરાતી

☐ தமிழ்

CONTINUE

Get your farm details

Plant Disease Crop Feedback Crop Details

Hil Satish

Crop Name Rapeseed and Mustard

Crop Type Varuna

Crop Season PreWinter Season

Crop Planting Date 2023/12/21

Crop Stage Ready for Harvesting

Picture saved

Book Slots with Agro Experts

Slot Booking

Name Satish Sharma

Mobile Number

Preferred Date

Preferred Time

Problem

Image Upload Choose File

Atleast 2 images needed

Description

Please fill date

Early Disease Prediction for your farm

Smart Crop Diagnosis Suggestions

Tomato Early Growth Stage

Probability: Very Low

Possible Diseases

Black rot
Infested seed and transplants give the pathogen the ability to travel long distances. Symptoms may not appear in the seedbed, resulting in infected plants to be transplanted into the field. The pathogen is then spread within a field by splashing water, wind, equipment, people, and insects.

Downy mildew
Small purplish brown spots on under surface of leaves. Small, pale yellowish-brown spots on upper surface of leaves.

Daily Blogs by Our Agro Experts

Recent posts

खेती की नई तकनीक: बिना मिट्टी के इस्तेमाल से कमाओ लाखों...!

इन् चोर्णों को खेत से अभी निकाल फेंको... नहीं तो उपज हो जाएगी कम...!

Gov - Daily Mandi Rates

State District Crop

Mad... All

Soyabean Ashoknagar

Rs 4200 / Q

October 24, 2024

Minimum Price Rs 3800 / Q

Maximum Price Rs 4657 / Q

Maize Khetia

Rs 1580 / Q

October 24, 2024

Minimum Price Rs 1575 / Q

Maximum Price Rs 1590 / Q

Soyabean Khetia

Rs 3700 / Q

October 24, 2024

Minimum Price Rs 3401 / Q

Maximum Price Rs 3709 / Q

Wheat Berasia

Personalized Farm Data & Info

Repeseed and Mustard Ready for Harvesting

Temperature 20.37°C

Pressure 962.01 Pa

Humidity 97.75% RH

Wind Speed 0.00 m/s

Wind Direction N

Rain 0.00 mm

Leaf Wetness 100

LUX 3302.25 lux

UV 0.00

Soil Temp 19.42°C

Soil Moist 100.00%

Dew 19.42°C

Root Temp

Root Moist

EC Conductivity

Gyan - Your AI Farming Assistant in Your Language

Ravina Deshmukh msp of rice

AgriDoot Gyan

MSP of Rice

Minimum Support Price (MSP) is the minimum price set by the Government of India to protect farmers from distress sale of produce. MSP is announced by the Government for 23 crops at the beginning of the sowing season. The MSP of rice varies depending on the variety and quality of the rice. The MSP for rice is currently set as follows:

- Common Grade: Rs. 20,400 per quintal
- A Grade: Rs. 20,650 per quintal
- Super Fine Grade: Rs. 21,150 per quintal

Objectives of MSP:

- To ensure a fair and reasonable return to farmers for their produce.
- To protect farmers from

Micro Weather Forecast

Chhapra

07:48 am / 03-04-2024

23°C

Broken clouds

Feels Like 22°C

Humidity 24%

Visibility 10 Km

Today's Weather Forecast

07:30 am 23°C

08:30 am 25°C

09:30 am 27°C

Daily Weather Forecast

Today April 3, 2024

Give your insights on crop

Plant Disease Crop Feedback Crop Details

Repeseed and Mustard Ready for Harvesting

Image Upload

Choose File

Feedback

Write your feedback

SEND FEEDBACK

Picture saved

Vyom Data Analysis & Suggestion

NDVI data is more effective when the plant is small and has low canopy density, especially in vegetative stage.

What needs to be done by farmers?

In Low NDVI areas (Poor Crop Health)

Optimize seedling by ensuring correct depth, spacing, and density, and manage nutrients through targeted fertilization and soil test report. Monitor and control pests and diseases promptly, and adjust irrigation based on weather and soil moisture to prevent drought stress.

Instant Disease Detection

Cercospora Leaf Spot | Gray Leaf Spot

Description

Gray leaf spot is a fungal disease affecting grasses. It causes small, tan to brown spots on leaves, which enlarge to form gray centers with dark borders. Thinning in warm, humid conditions, it spreads via spores.

Recommended Medicine

Antracol Fungicide

Solution

Products containing