



Session 4: Smart Farming Systems - Precision, Automation & Climate Resilience

AGRICULTURE SUMMIT

Theme: Farmers First: Ensuring Farmer-Centric Digital Transformation

3-4 December 2025 | Hall No - MR 10

GEOSPATIAL
WORLD
ADVANCING KNOWLEDGE FOR SUSTAINABILITY

Presented By:

Dr. Siddhartha Khare

Founder of Bhoomicam Pvt. Ltd.

Assistant Professor, Geospatial Engineering,
IIT Roorkee



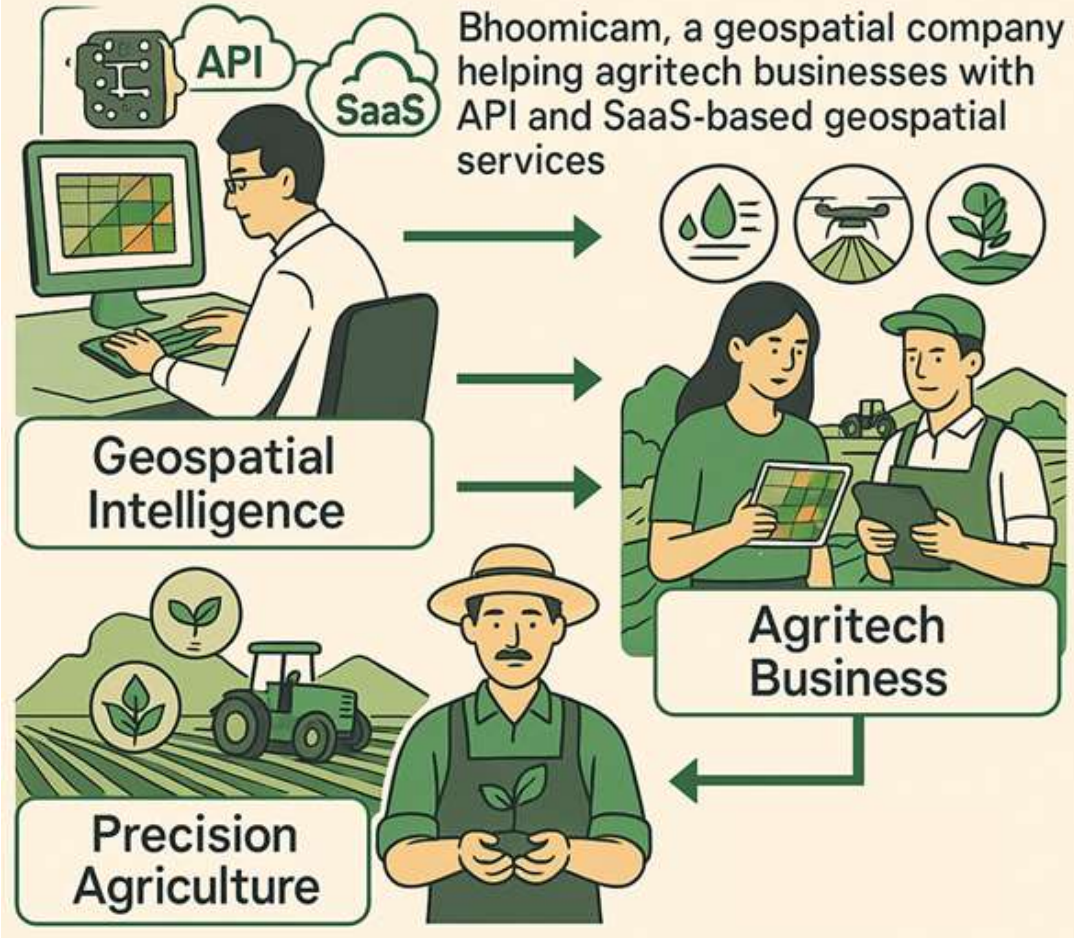
A Geospatial Agritech Company

Incubated at Tides, IIT Roorkee

Revolutionizing Agriculture with AI & Satellite Technology



Bhoomicam



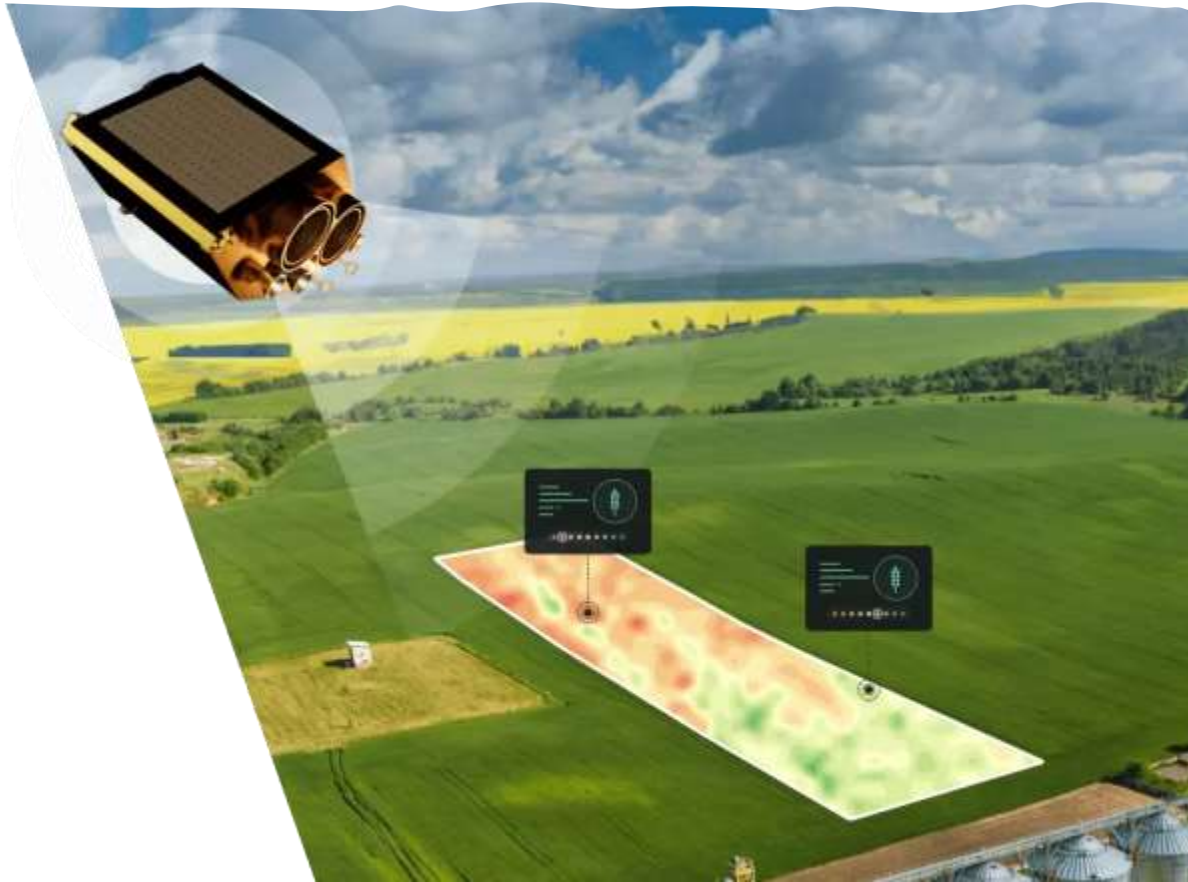
BHOOMICAM

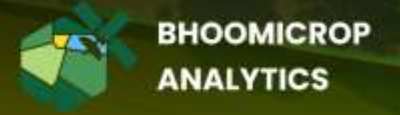
Bhoomicam is a Geospatial AI startup providing crop-specific analytics, dashboards, and API-based services to AgriTech companies—including organic, seed, and contract farming businesses—to scale precision agriculture and manage 1000+ farmlands effectively.



Why Agri-AI Matters?

- By leveraging AI's capabilities in **data analysis, predictive modeling, and precision farming**:
 - Indian farmers can gain insights into **localized weather patterns,**
 - optimal planting times, and resource allocation,**
 - leading to **improved crop yields and reduced waste.**





Revolutionising Agriculture with Geo-Spatial Intelligence

- | | | |
|--|---|---|
|  Enhanced Data Driven Advisories |  Customizable API Integration |  Access to Historical and Real-Time Data |
|  Risk Assessment & Financial Insights |  Precision Mapping & Visualization |  Precision Mapping & Visualization |
|  Scalable Solutions for Diverse Needs |  Stress Detection & Alert Mechanism |  Crop Health Indicators and Indexes |
|  Deforestation Area Identification |  Weather Forecasting for Crop Planning |  Yield Estimation and crop identification |

- ✓ Simple WhatsApp-based advisory model, accessible without additional app downloads
- ✓ User-friendly dashboard for agribusinesses, FPOs, and policymakers to track farmer engagement.
- ✓ Satellite-driven insights with weather forecasts for real-time crop monitoring

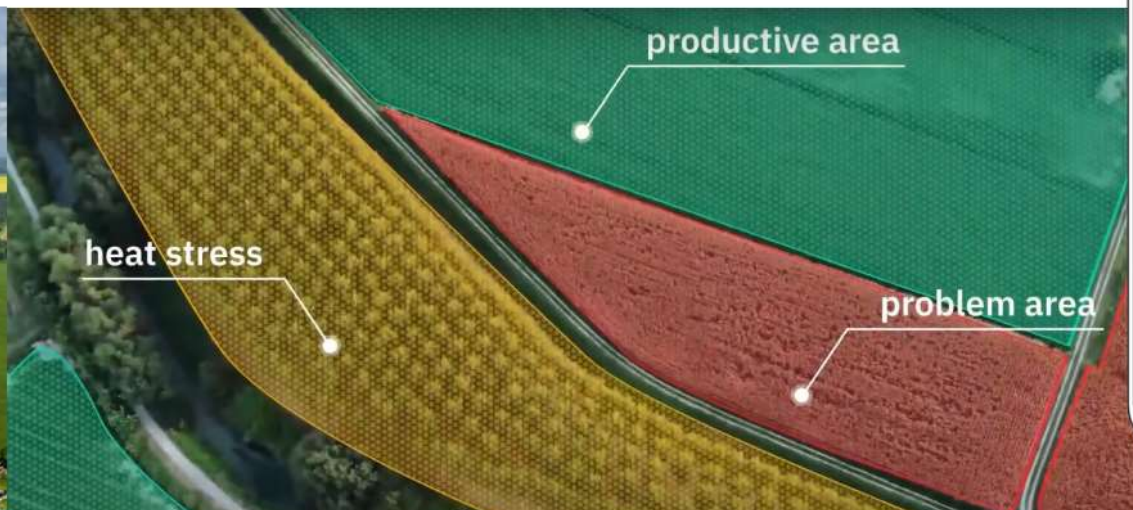
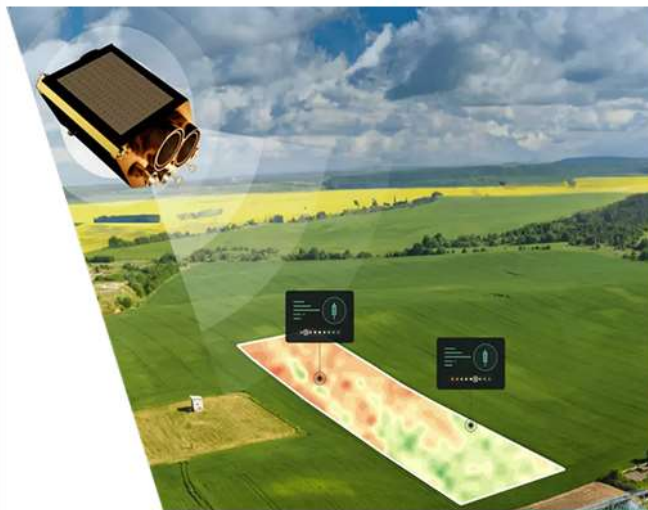
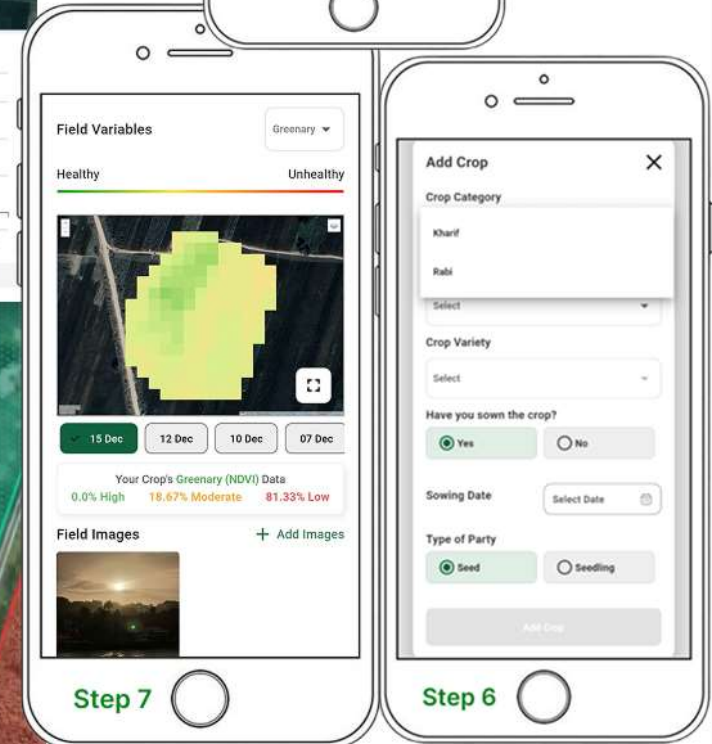
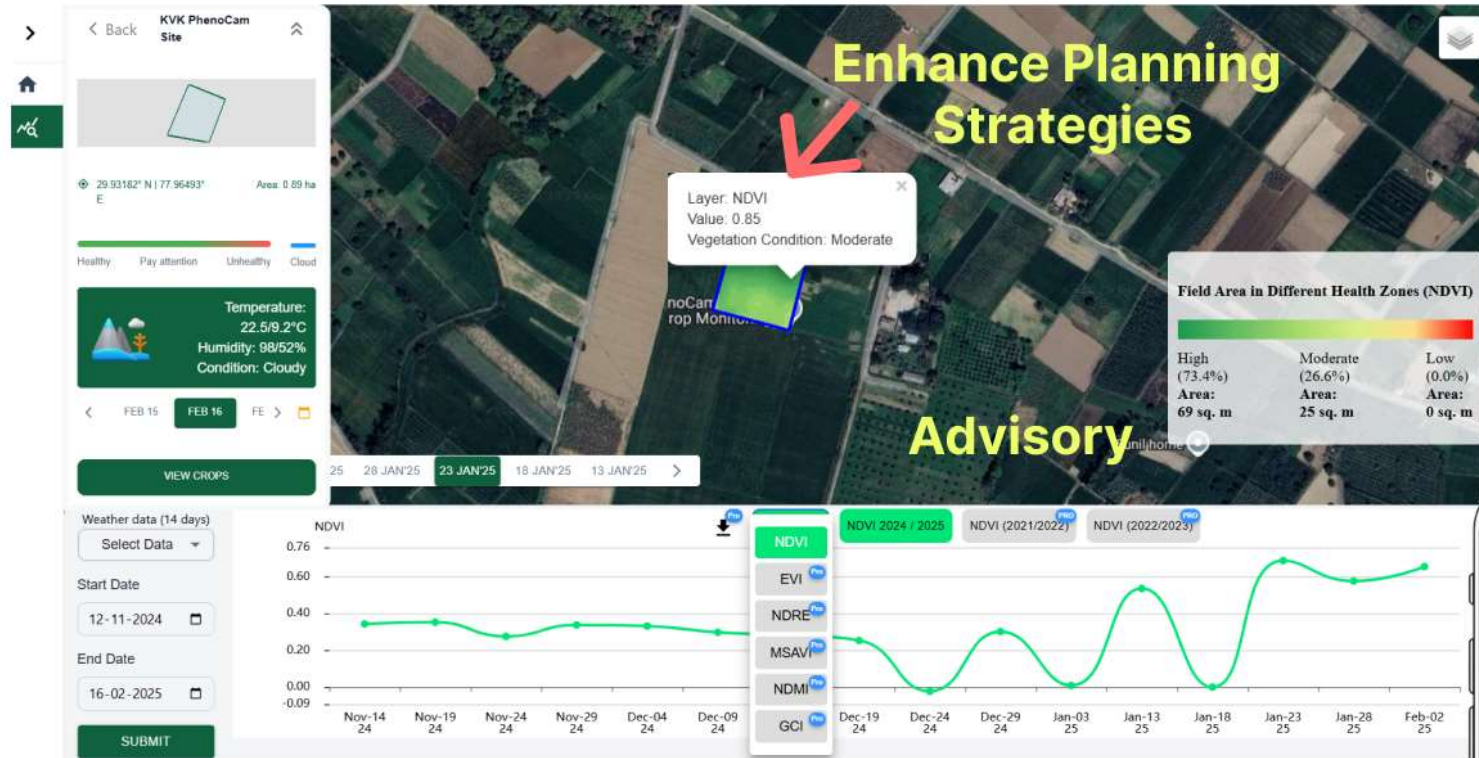


What Bhoomicam Does?

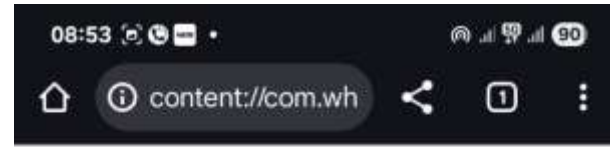
BhoomiCrop Analytics, the core of its offerings, is a **Software as a Service (SaaS) platform** and **API Services** that integrates data on crop health, weather, farm operations, and more into an accessible interface.

SOLUTIONS FOR STAKEHOLDERS

Discover Previously Unseen Trends



Whatsapp based Advisories



रिपोर्ट दिनांक: 04-11-2025



फ़ील्ड जानकारी

मालिक का नाम: किसान

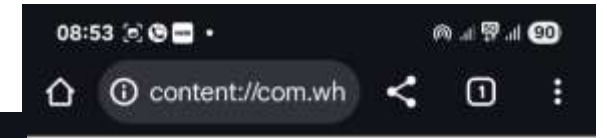
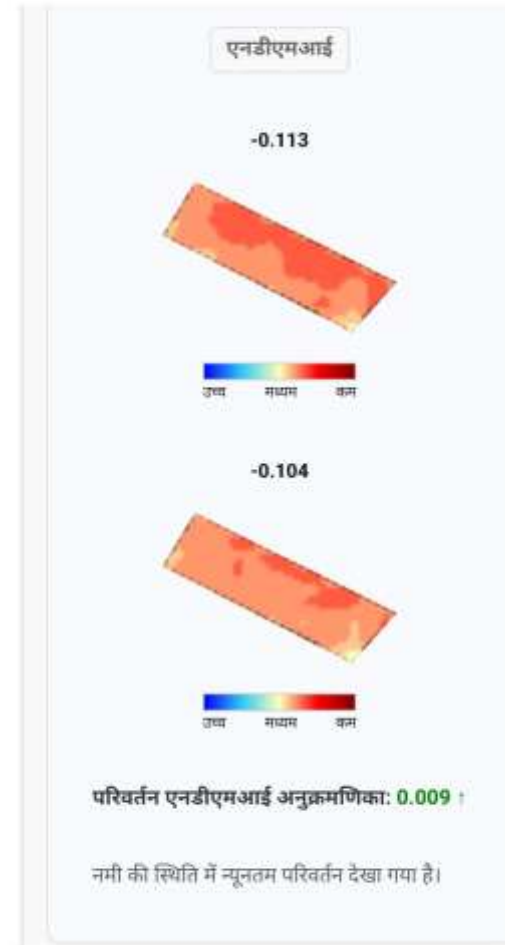
फ़ील्ड का नाम: खेत 6 मोमफली फसल

क्षेत्रफल (हेक्टेयर): 0.55

फसल का नाम: पेनुत

बुआई की तिथि: 2025-06-05

जगह: अक्षांश: 26.882, देशान्तर: 71.438



जगह: अक्षांश: 26.882, देशान्तर: 71.438

फ़ील्ड छवि



पूर्वानुमान मौसम की जानकारी

समय	तापमान अधिकतम (डिग्री सेल्सियस)	तापमान न्यूनतम (डिग्री सेल्सियस)	वर्षा योग (मिमी)
4 नवंबर, 2025	32.7	21.9	0
5 नवंबर, 2025	32.1	18.4	0
6 नवंबर, 2025	29.7	16.9	0
7 नवंबर, 2025	29.2	14.6	0

08:54

content://com.wh

पूर्वानुमान मौसम की जानकारी

समय	तापमान अधिकतम (डिग्री सेल्सियस)	तापमान न्यूनतम (डिग्री सेल्सियस)	वर्षा योग (मिमी)
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8 नवंबर, 2025	29	14.8	0
9 नवंबर, 2025	29.1	16.1	0
10 नवंबर, 2025	28.8	16.2	0

08:54

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सलाहकार: फसल: गेहूं

चरण: टिलरिंग चरण

दिनांक: 27 अक्टूबर 2025

सलाह:

फसल वर्तमान में टिलरिंग चरण में है, जो अंतिम उपज निर्धारित करने के लिए महत्वपूर्ण है। किसानों को सलाह दी जाती है:

सिंचाई: यदि खेत में नमी के तनाव के लक्षण दिखाई देते हैं, खासकर रेतीली या हल्की मिट्टी में, तो हल्की सिंचाई करें।

पोषक तत्व प्रबंधन: यूरिया @ लगाएं। स्वस्थ टिलर निर्माण को बढ़ावा देने के लिए सिंचाई के बाद 45 किलोग्राम/एकड़।

खरपतवार नियंत्रण: बुआई के 30 दिनों के बाद 500 ग्राम/एकड़ की दर से 2,4-डी सोडियम नमक जैसे अनुशंसित जड़ी-बूटियों का उपयोग करके उभरने के बाद निराई करें।

कीट और रोग निगरानी: एफिड्स या पीले रतुआ के शुरुआती लक्षणों के लिए नियमित रूप से खेतों का निरीक्षण करें। यदि देखा जाए, तो इमिडाक्लोप्रिड 17.8 एसएल @ 0.3 मिली/लीटर पानी का छिड़काव करें।

मौसम संबंधी सावधानी: यदि अगले 24-48 घंटों में भारी वर्षा का अनमान है तो सिंचाई से बचें।

08:54

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पिछली छवि

छवि दिनांक: 31-10-2025

हालिया छवि

छवि दिनांक: 02-11-2025

परिवर्तन

सलाहकार: फसल: गेहूं

चरण: टिलरिंग चरण

दिनांक: 27 अक्टूबर 2025

सलाह:

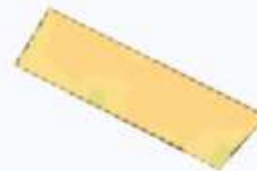
फसल वर्तमान में टिलरिंग चरण में है, जो अंतिम उपज निर्धारित करने के लिए महत्वपूर्ण है। किसानों को सलाह दी जाती है:

08:54

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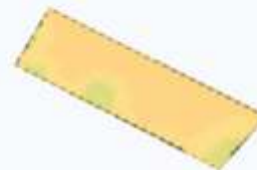
एनडीवीआई

0.133



उच्च मध्यम कम

0.137



उच्च मध्यम कम

परिवर्तन एनडीवीआई अनुक्रमणिका: 0.004

फसल स्वास्थ्य स्थितियों में न्यूनतम परिवर्तन हुआ है।

SOLUTIONS FOR STAKEHOLDERS

Bhoomicrop Analytics

Field Leaderboard

Upgrade Plan

Field Leaderboard

A user-friendly notification customization feature

Index
NDMI

Report date
05-02-2025

PDF

XLS

SNo.	Select	Field	Location	Area	Crop	Sowing Date	Stage	Index Value	Value Change	Image Date	Harvesting Date	Preview
2	<input type="checkbox"/>	Konch Farm	26.01154° N 79.15260° E	1.19	Rice	2024-07-01	Harvested	0.10	0.04	2025-02-04	2024-11-08	
3	<input type="checkbox"/>	KVK Roorkee	29.93037° N 77.96480° E	22.83	Sugarcane	2024-11-07	Elongation	0.24	0.00	2025-02-02	2025-09-03	
4	<input type="checkbox"/>	Roorkee Big Field	29.89909° N 77.89477° E	269.4	Sunflower	2024-11-25	Seed Development	0.16	-0.02	2025-02-02	2025-03-25	
5	<input type="checkbox"/>	Roorkee Big Field	29.89909° N 77.89477° E	269.4	Sugarcane	2024-11-25	Elongation	0.16	-0.02	2025-02-02	2025-09-21	
6	<input type="checkbox"/>	KVK Roorkee	29.93037° N 77.96480° E	22.83	Wheat	2024-11-25	Booting	0.24	0.00	2025-02-02	2025-04-14	
7	<input type="checkbox"/>	OK USA	35.53827° N 97.23227° W	15.29	Sugarcane	2024-11-26	Elongation	-0.27	-0.07	2025-02-02	2025-09-22	

12/page

Page 1 of 2



Get updated regularly on the state of your crops, according to their VI value change. Keep a firm grip on your fields and, as a result, increase yields and revenue.

Variable rate technology and VRA maps for precision agriculture

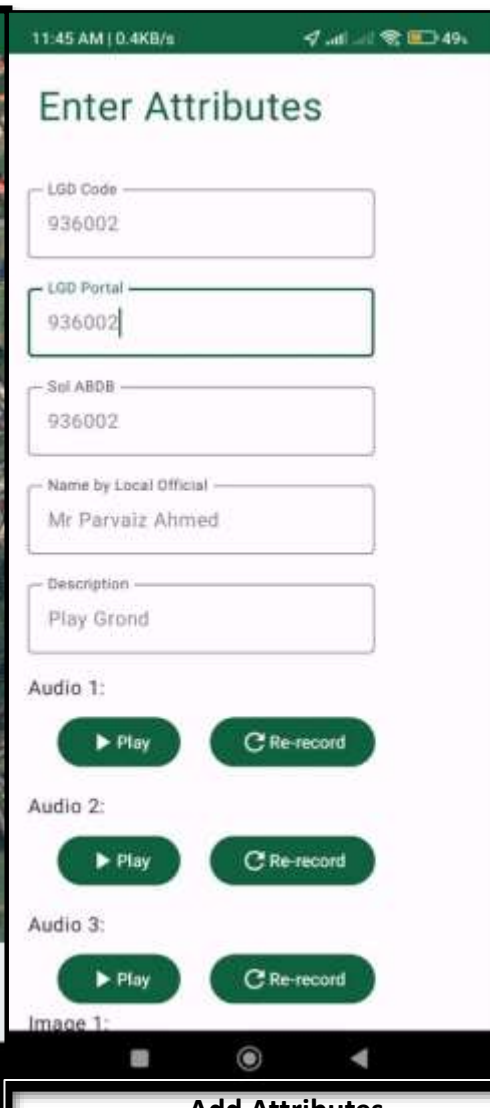
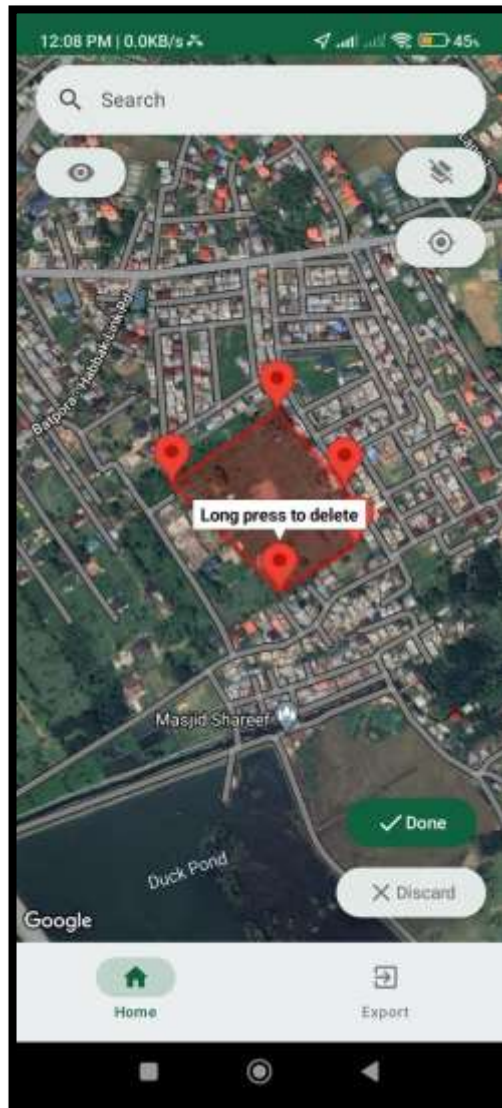
Variable rate application in agricultural fields is essential for:

- Identification of yield trends in different field areas
- Implementation of variable rate technology based on productivity of each field zone
- Detection of problem areas that require special attention

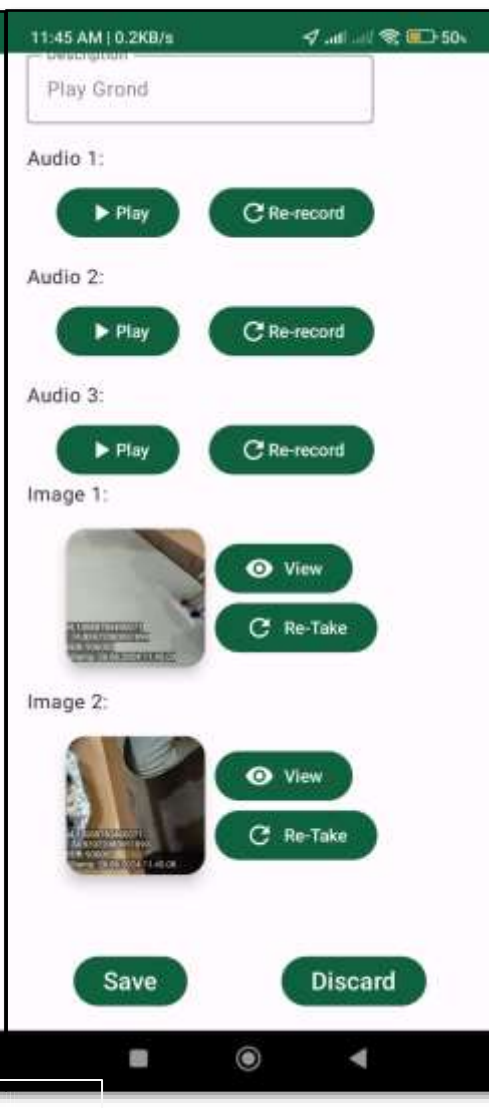




Add Feature – Point, Line, Polygon

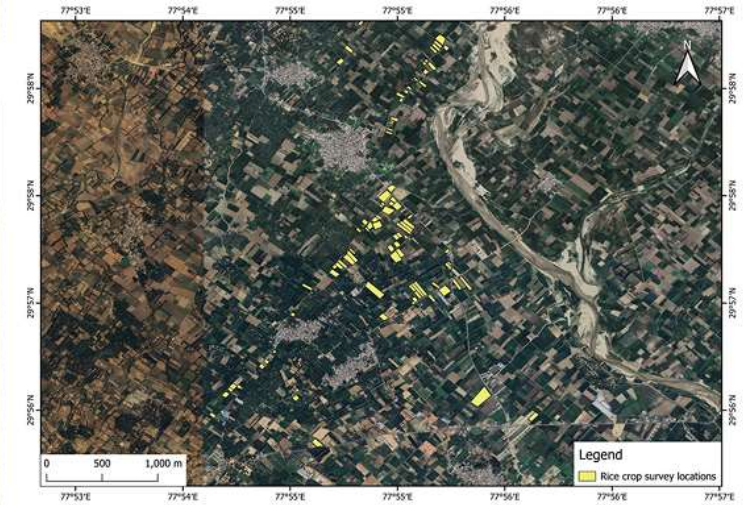
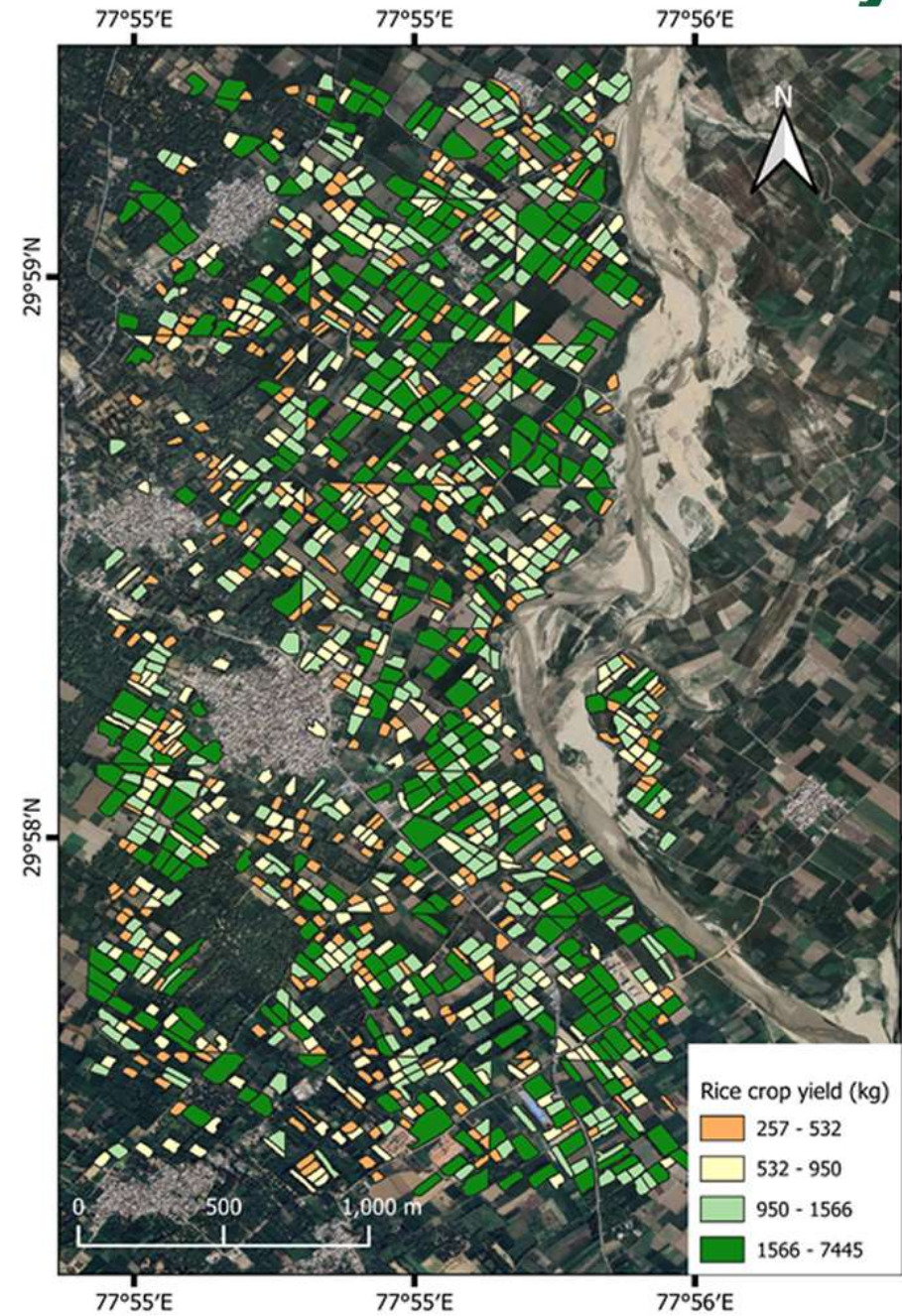


Add Attributes –
• LGD Code
• ABDB Name
• Tehsil Name
• District Name
• Description
• Local Officer Name
• Other Necessary Details

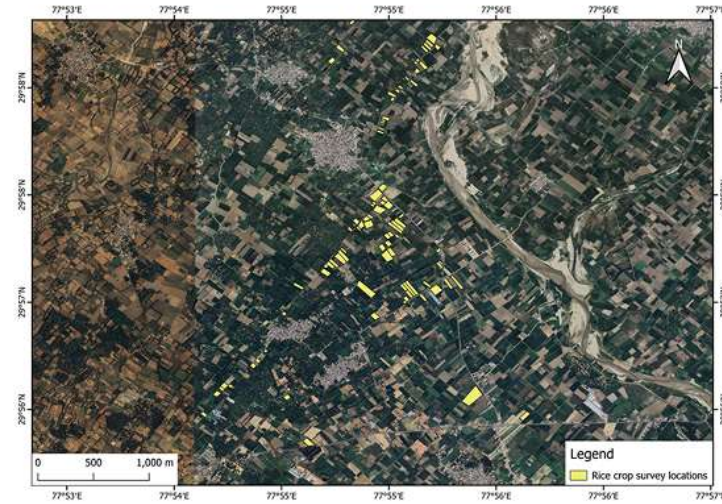
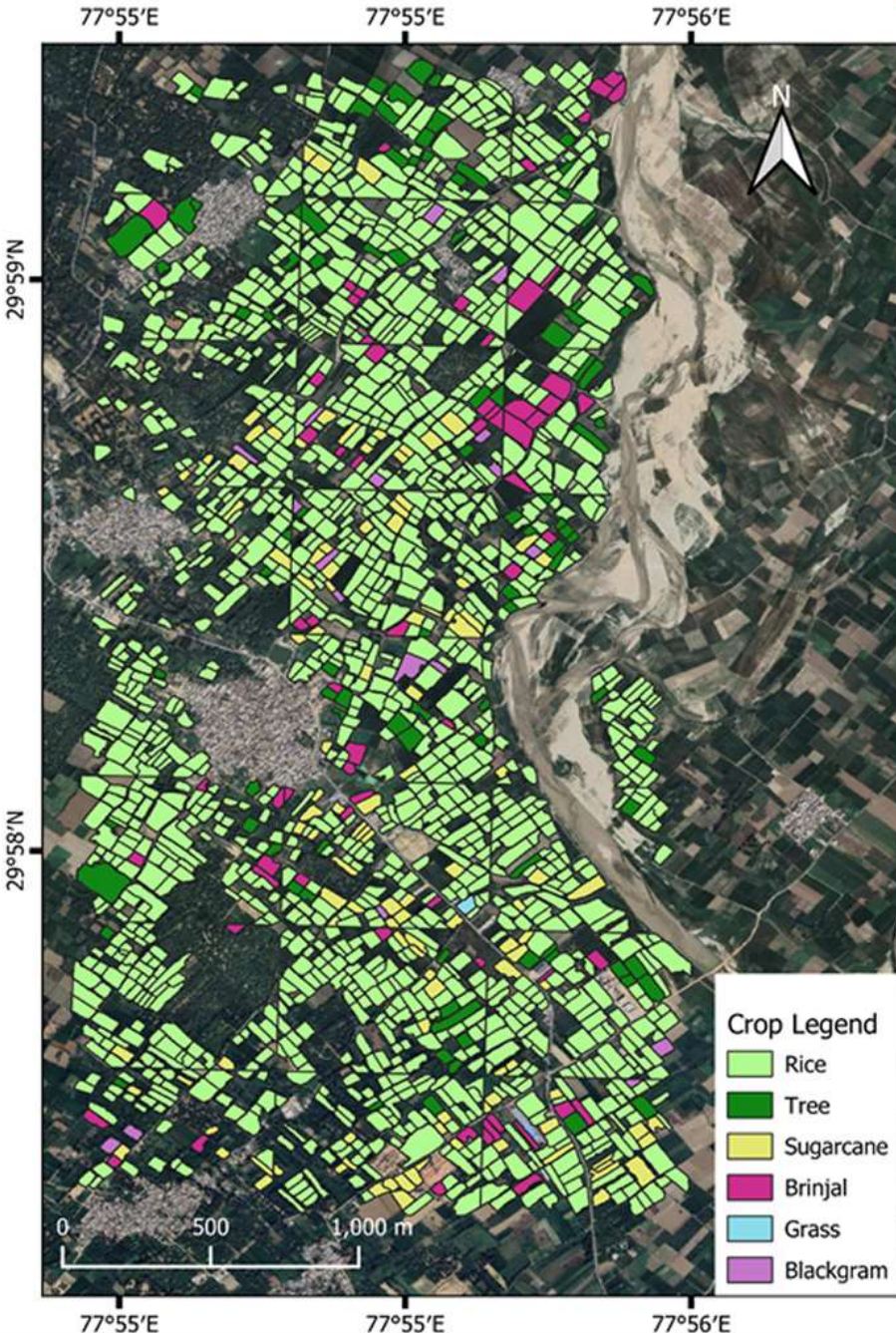


Add Attachments –
• Audio bytes
• Geotagged Images

Satellite based Paddy Crop Yield Estimation (KHARIF 2024)



Satellite based Paddy Crop Classification (KHARIF 2024)

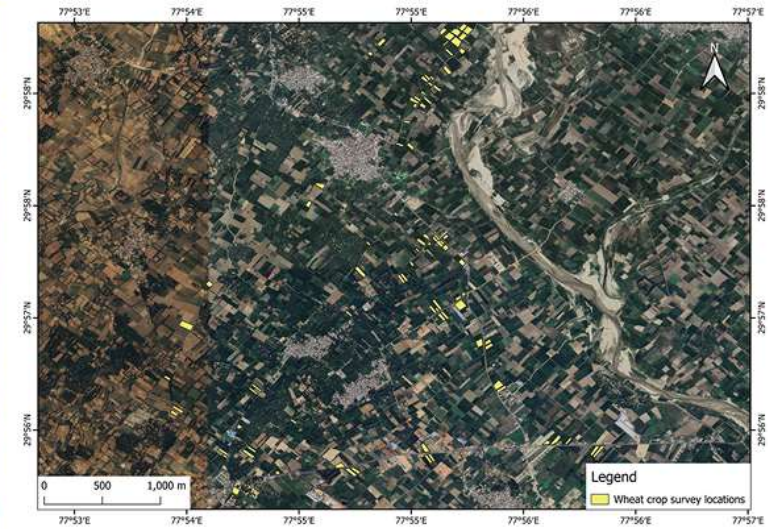
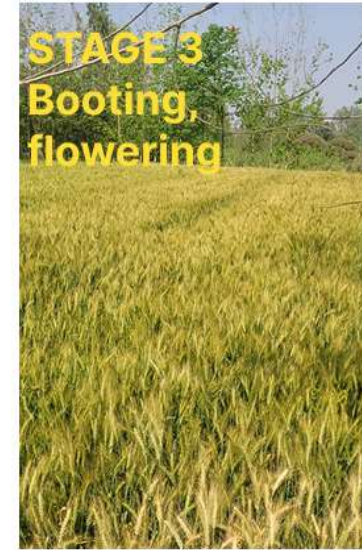
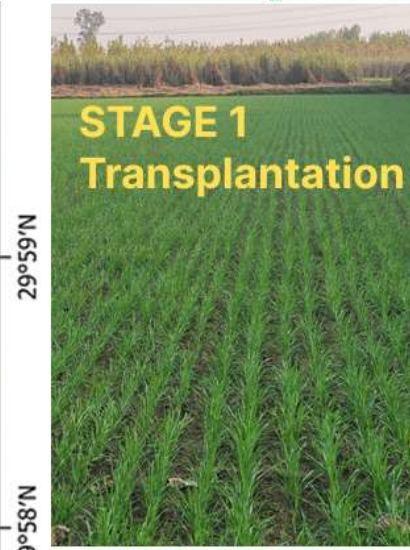
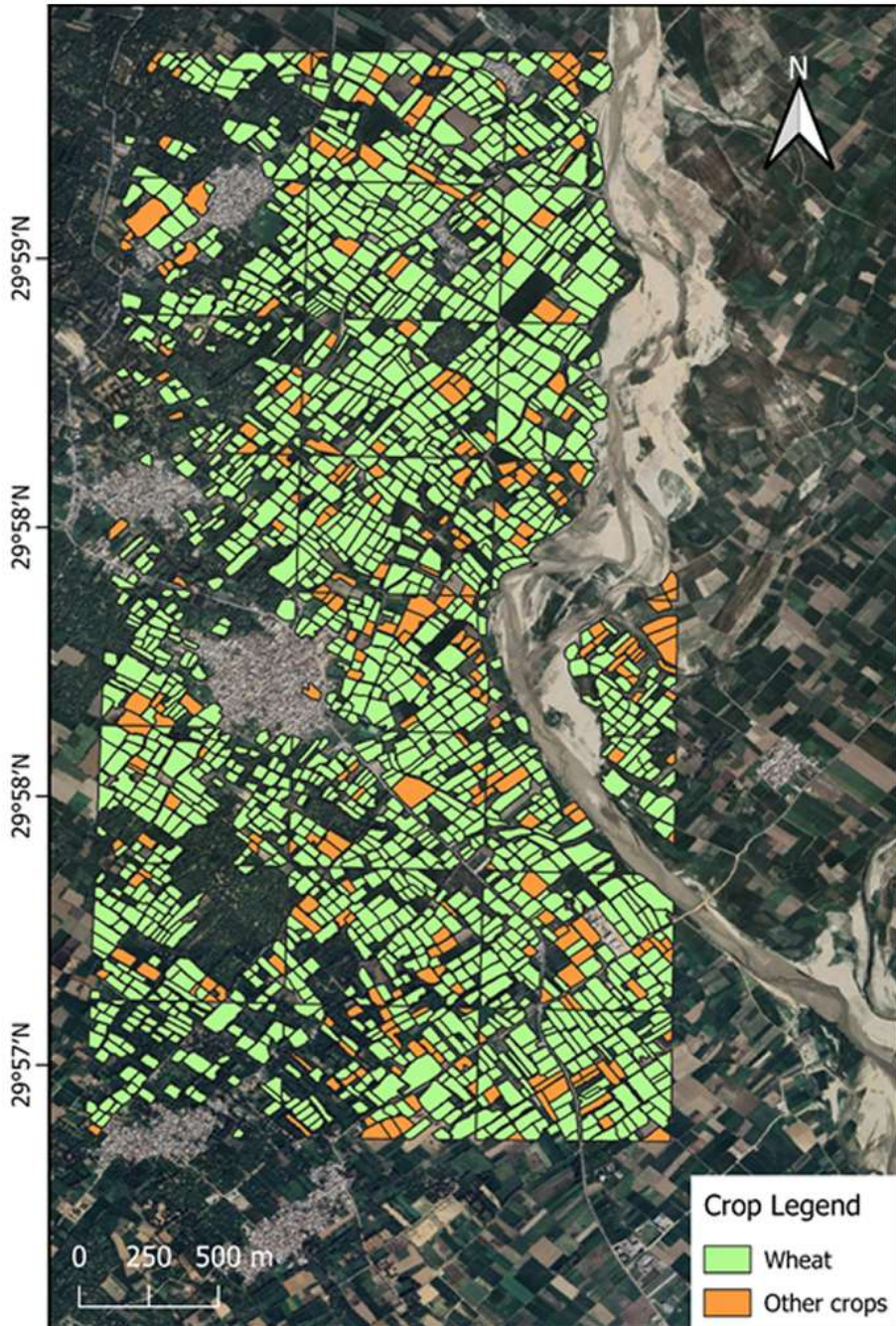


Paddy Crop Area Estimation
3680653.954 square meter
(909.509 acres)

- Crop Type Identification
- Crop Specific Acreage Estimation
- Connected with Field Application for Ground Data Collection
- Automatic Land Parcel Segmentation using Deep Learning



Satellite based Wheat Crop Classification (Rabi 24-25)



Wheat Crop Area Estimation
6756906.492 square meter
(1669.66796 acres)

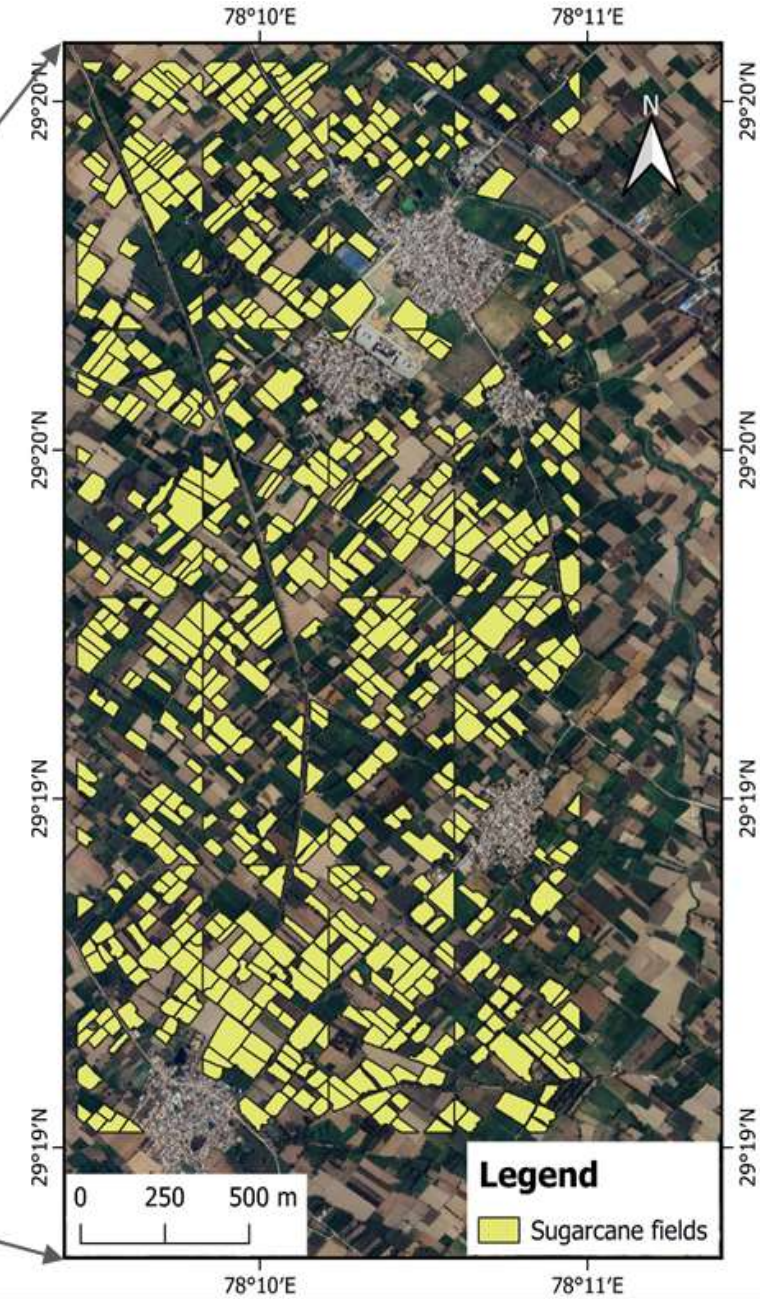
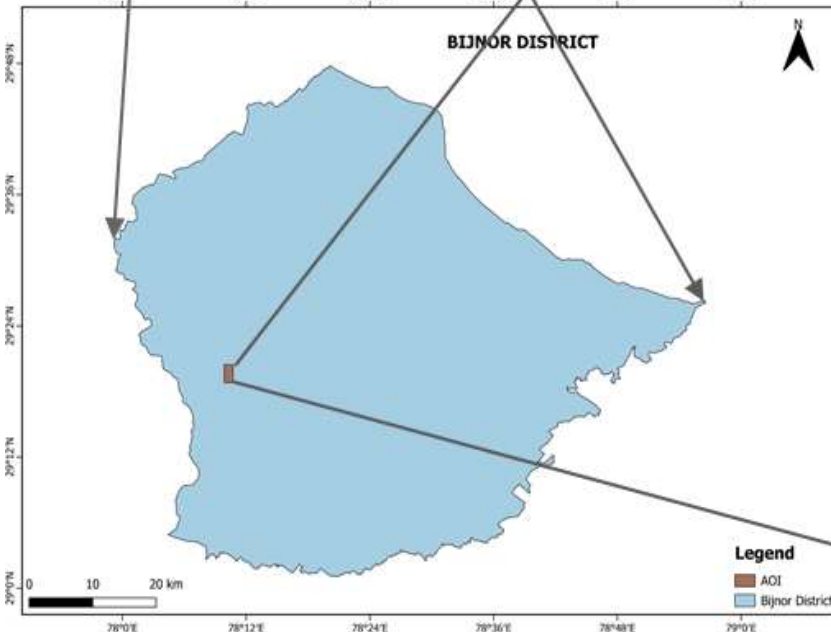
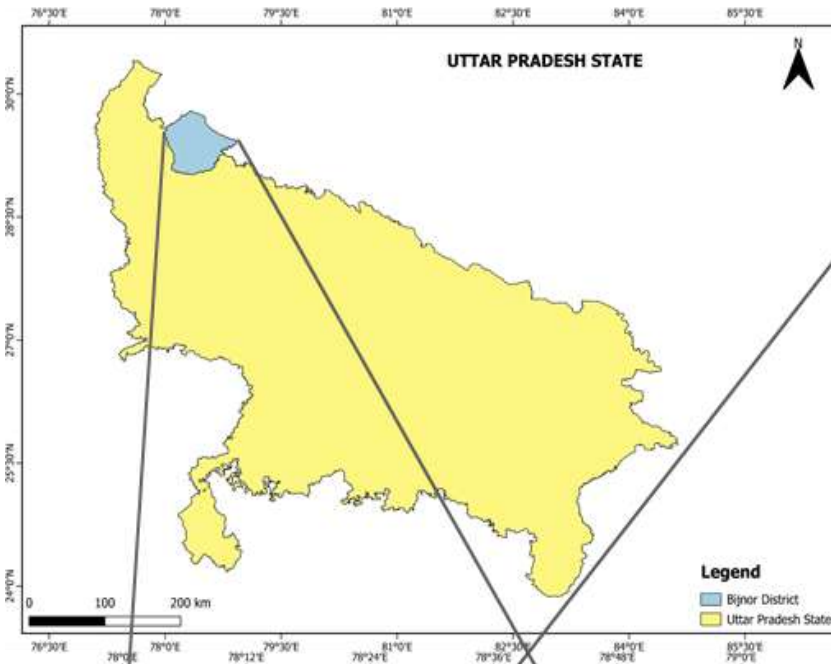
- Crop Type Identification
- Crop Specific Acreage Estimation
- Connected with Field Application for Ground Data Collection



Sugarcane crop classification using satellite data – Bijnor (2024)

Sugarcane crop area:
1825218 sq. m
(451.02 acres)

Total AOI area:
5102147 sq. m
(1260.76 acres)



Cropped and uncropped area identification using Satellite Data



- https://goswamishreyas.github.io/Field_cropped_area/

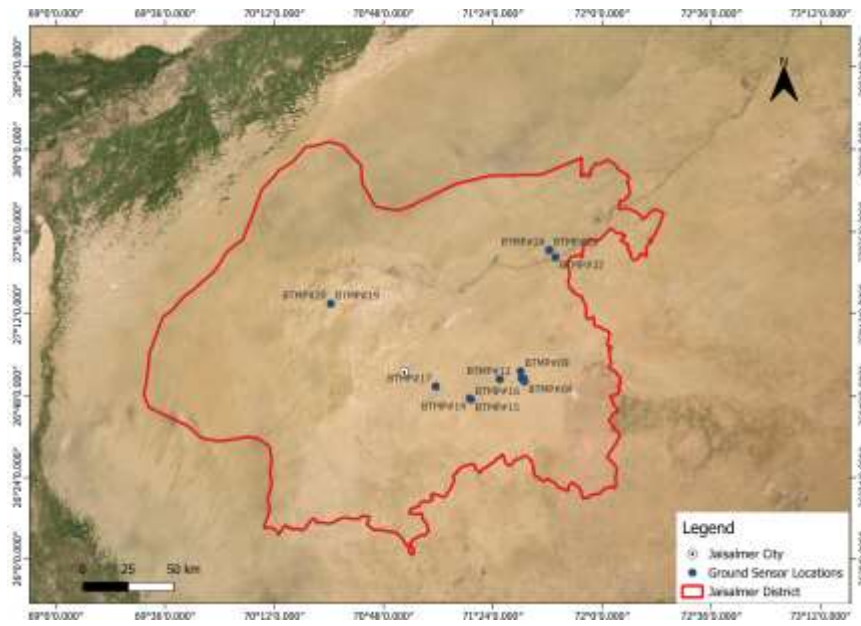
Newly Launched!

Hardware Solution - Ground Sensors

Our new hardware solution brings precision farming to the next level. Bhoomicam Ground Sensors capture real-time data such as soil moisture, soil temperature, and other key parameters directly from the field. Paired with our interactive dashboard, Clients can easily visualize, monitor, and analyze these insights to make smarter, data-driven decisions for improved productivity and sustainability.

Explore Now





Dashboard: Sensor Management

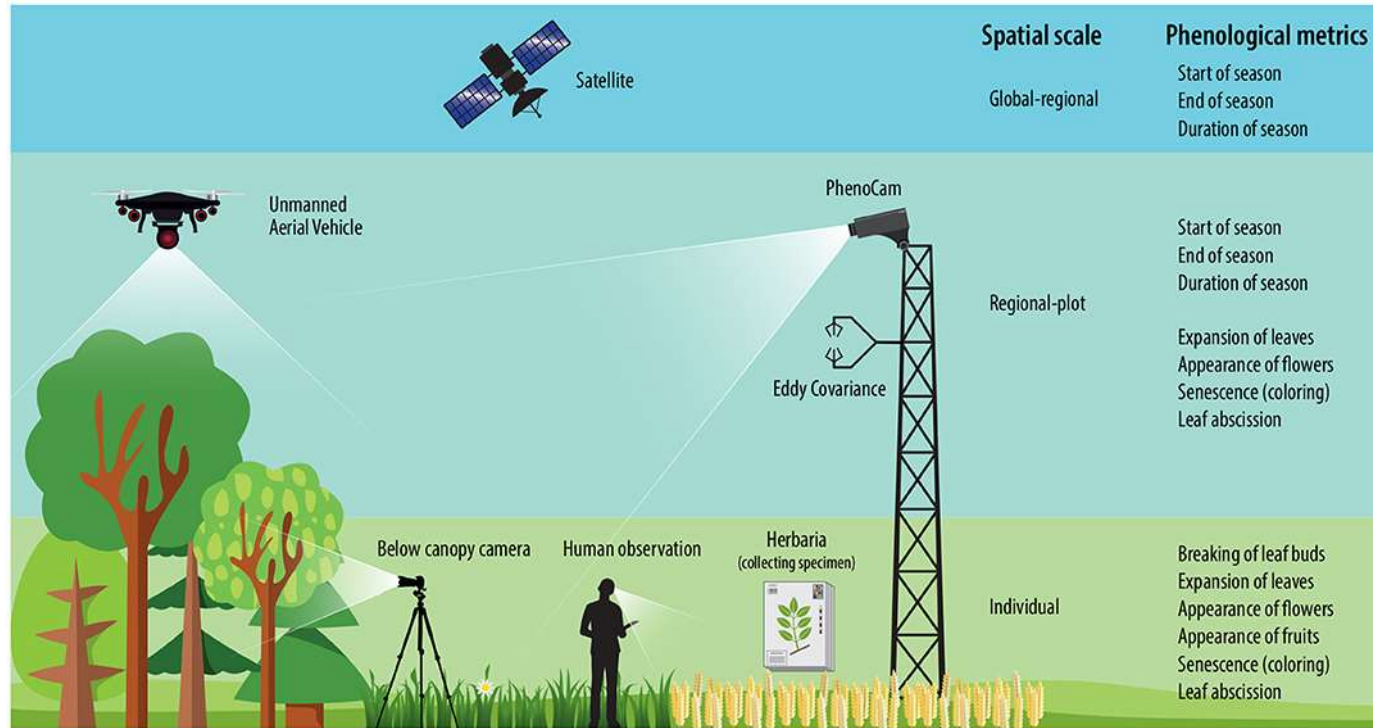
ID	Sensor Name	Field Name	Coordinates	Field Status	Value
01	ST10001	Field 1 - Sensor	26.270000000000000 72.270000000000000	Active	100.00
02	ST10002	Field 1 - Sensor	26.270000000000000 72.270000000000000	Active	100.00
03	ST10003			Active	100.00
04	ST10004			Active	100.00
05	ST10005			Active	100.00
06	ST10006			Active	100.00
07	ST10007			Active	100.00
08	ST10008			Active	100.00
09	ST10009			Active	100.00
10	ST10010			Active	100.00

How many: 10 / 10 of 10



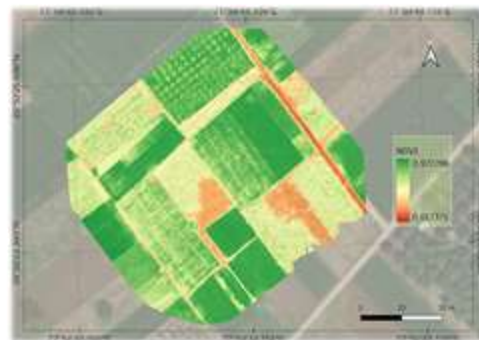
Advance Solutions

Project: Artificial intelligence (AI)-powered android platform for monitoring crop health using satellite, UAV, and **PhenoCam** data



Near Remote Sensing Platforms

- For the first time in India, permanent plots will be outfitted with the PhenoCam network for agricultural monitoring.
- Establishment of a standard and open-source methodology for climate-based crop growth management at high temporal resolution.
- A network of stations for long-term crop monitoring. This study will be used as a baseline to give farmers with site-specific suggestions for India's irrigated and rainfed regions.



PhenoCam Site Installed in Krishi Vigyan Kendra Roorkee



PhenoCam at IITR



Rain Gauge*



Data Logger*



Weather Station*



2 Apr 2024, 4:21 pm

Cold Storage Management

⇒ Simplified warehouse management

⇒ Simplified Amad (Entry) & Nikasi (Retrieval)

⇒ Auto-generated receipts

⇒ Export data in PDF & Excel

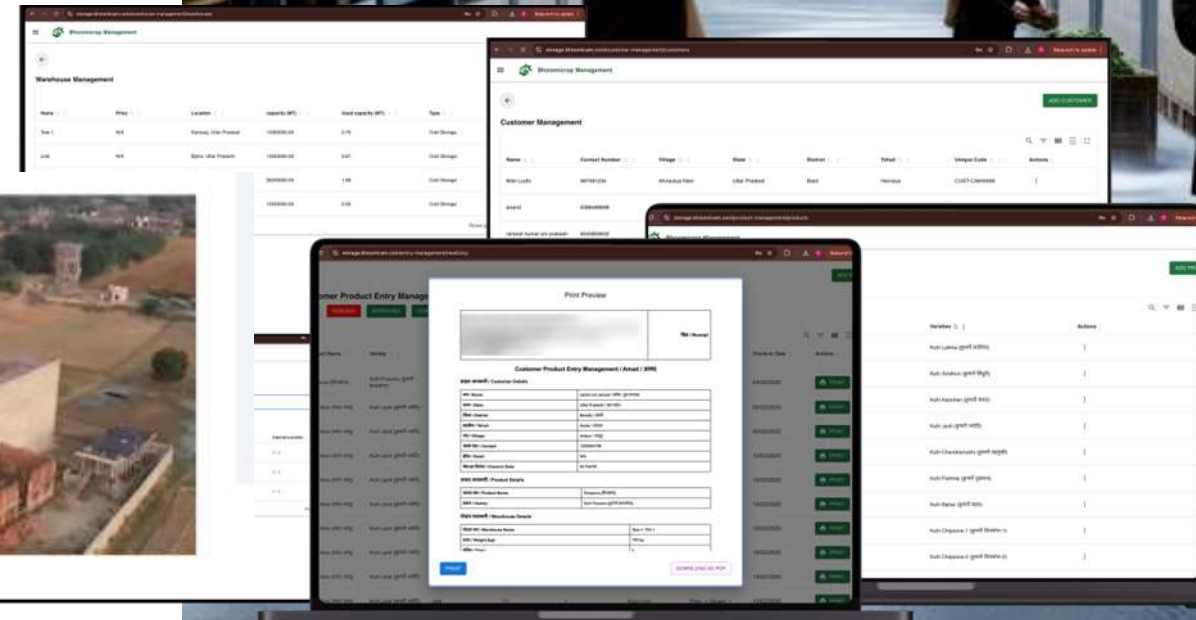
⇒ Accessible 24/7 Web-based Platform

⇒ Auto Alerts on WhatsApp

Deployed in
two cold storage
units

4000+
Potato Farmers
information is getting
managed

~3 Cr
Loan Management

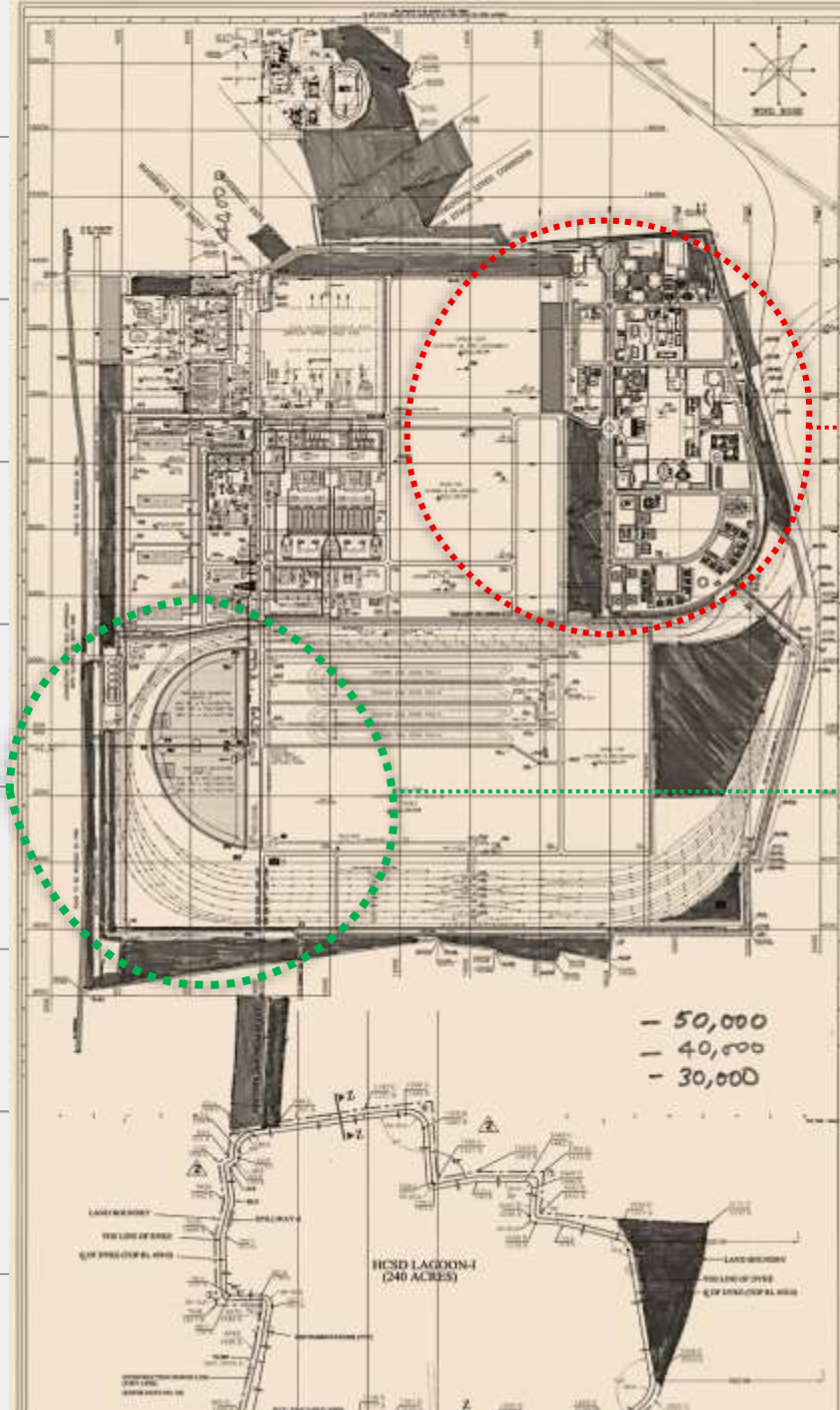


PLANT au on



Carried out in Collaboration with Dr. Siddhartha Khare
Faculty of Civil Dept., IIT Roorkee &
Founder of BhoomiCam Pvt Ltd

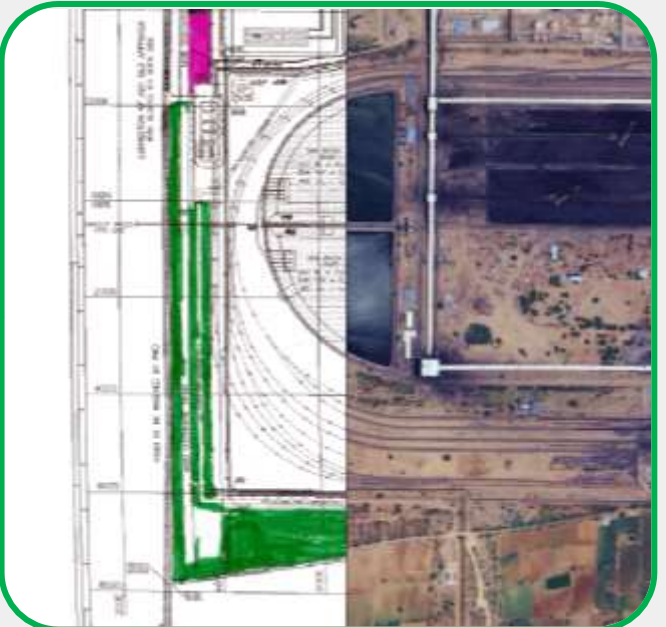




Overlaying the map over Google Satellite basemap



Township



Cooling Tower

Georeferencing of plantation map

8 Flights

Drone Survey

11-12 Oct
2025

■ **Trinity f90+**
Fixed-wing VTOL

■ **1200+**

Acres

Area Covered

■ **5 Bands**
Multispectral

■	Red
■	Green
■	Blue
■	NIR
■	Red-Edge

■ **500+**

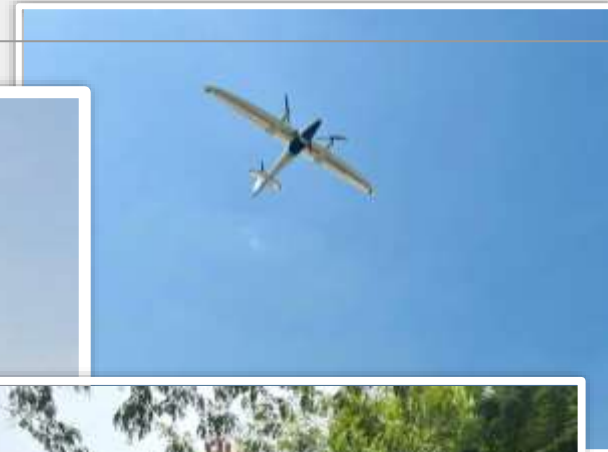
sample
Tree species; DBH

■ **120 meters**
Flying Height

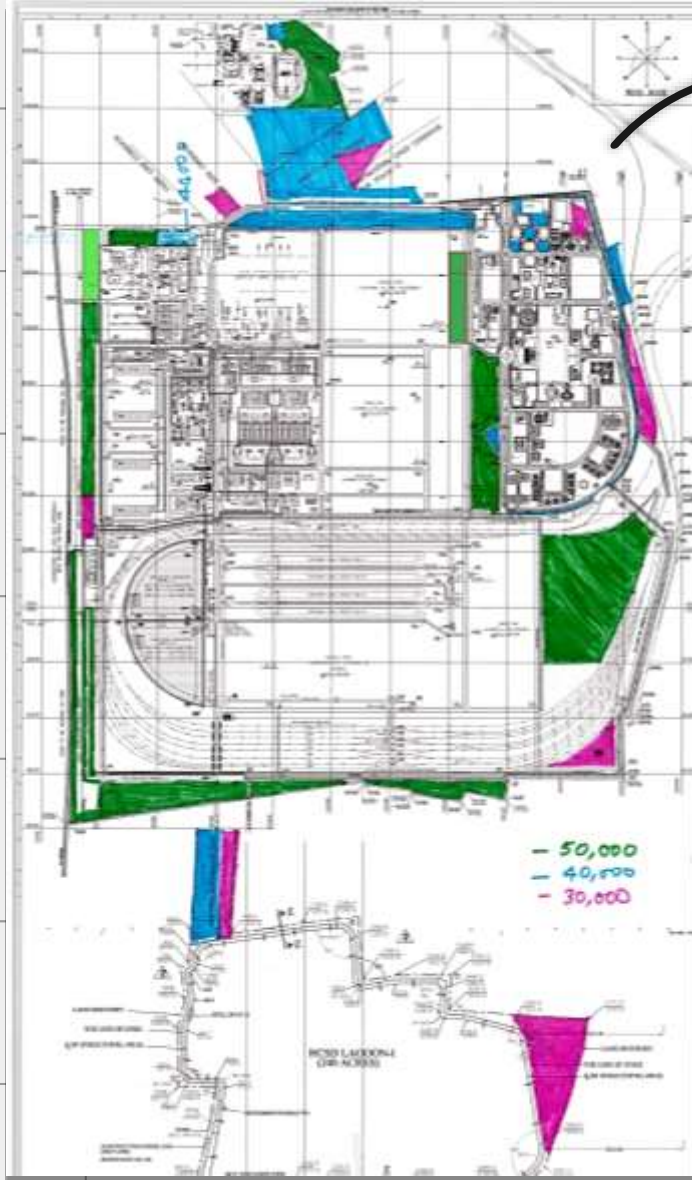


Drone Survey

Field Images






High-quality Orthomosaic



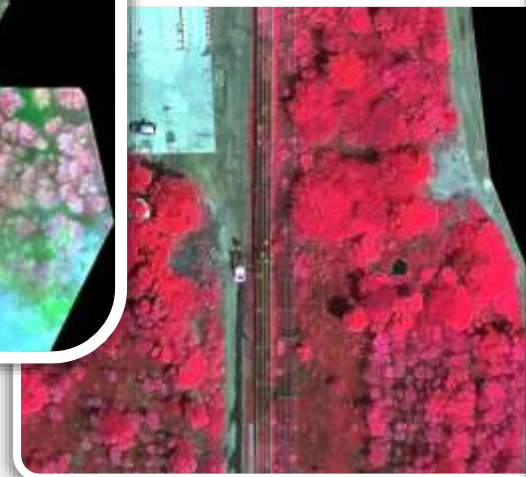
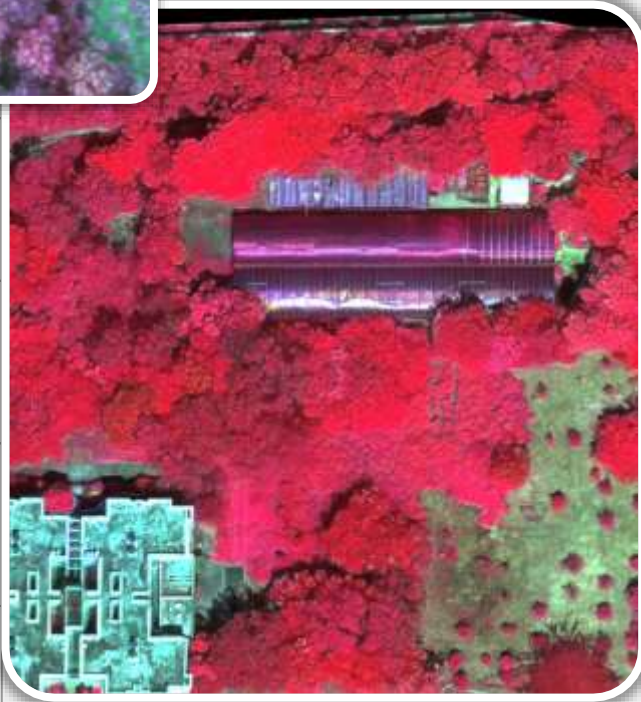
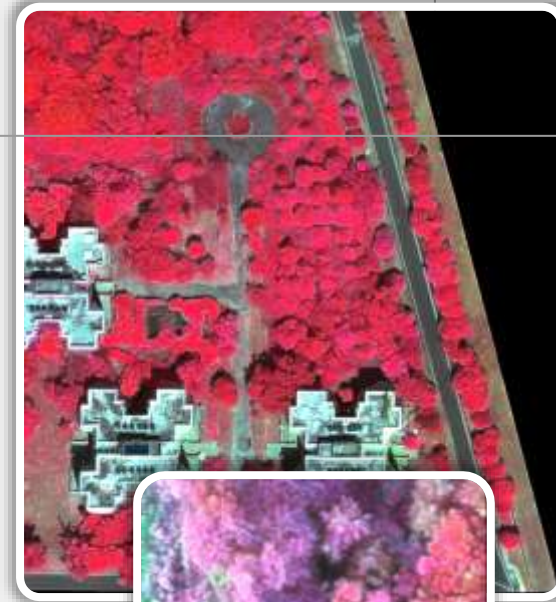
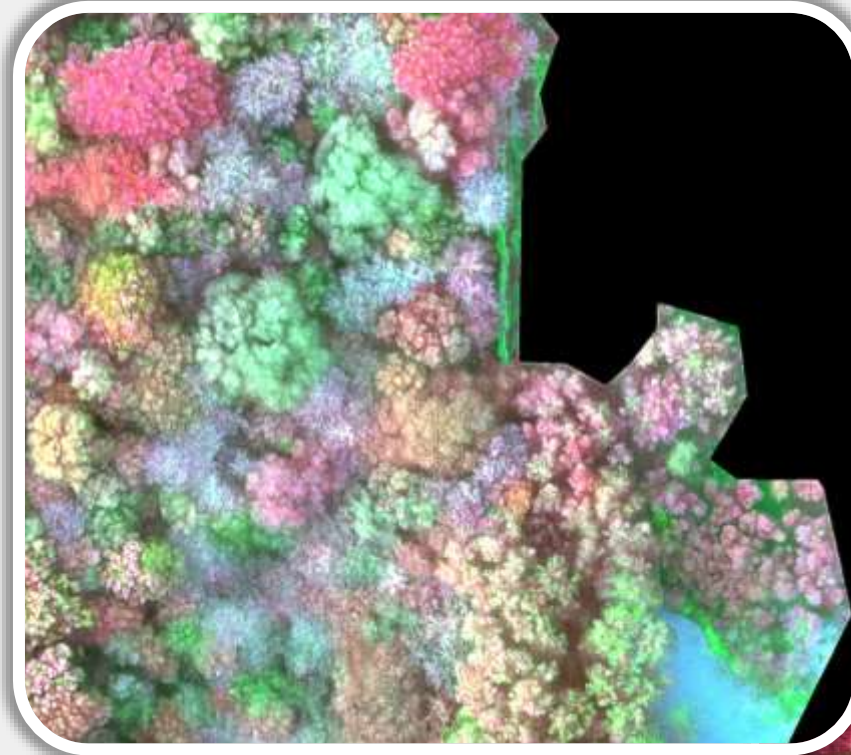
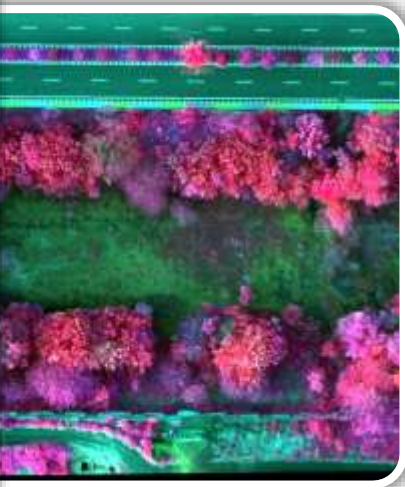
False color composite (FCC)

Instead of true color RGB, FCC assigns **non-visible bands**, like Near-Infrared, to a visible RGB channel to make vegetation health clearly visible.

Channel	Bands
	Infrared
	Red
	Green



False color composite (FCC)



↑ Brighter the Red,

↑ Healthier the vegetation
(Denser)

In-situ tree data

Diameter measurement at site



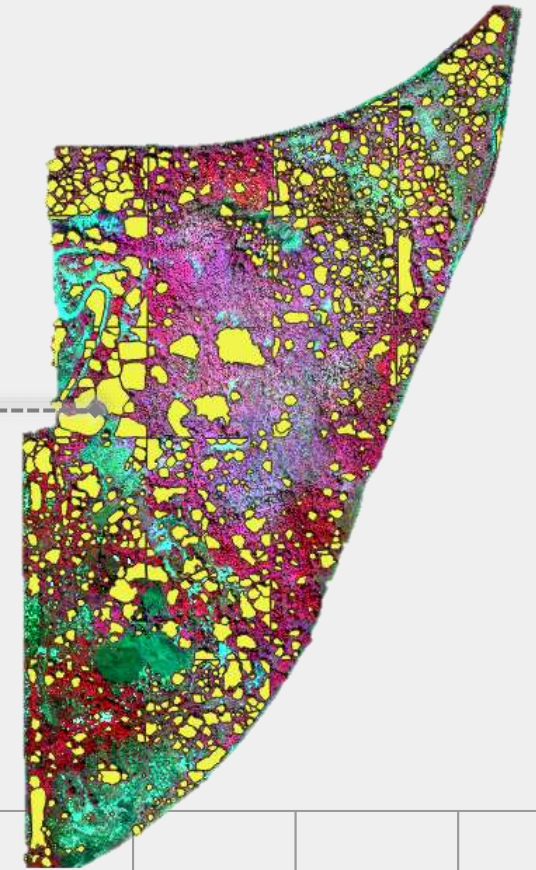
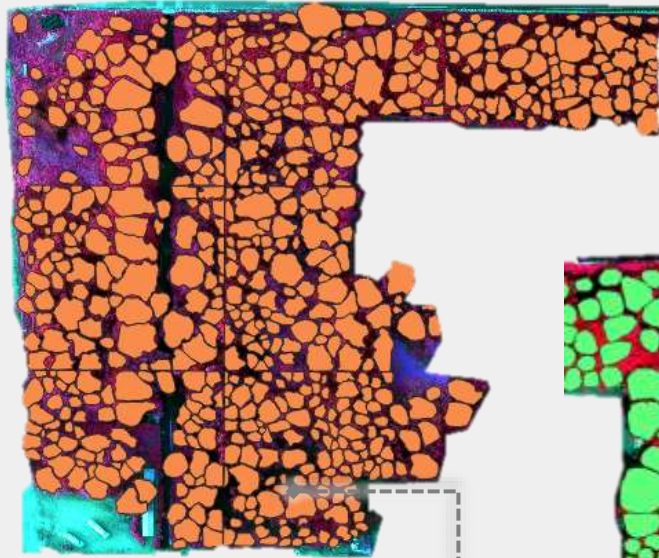
500+ ground data for training

Tree Species
+
Lat / Long Coordinate
+
Diameter (DBH)

Automated segmentation

Machine
Learning

ML Models (SAM 2 etc) were used for automatic segmentation process after training and annotation

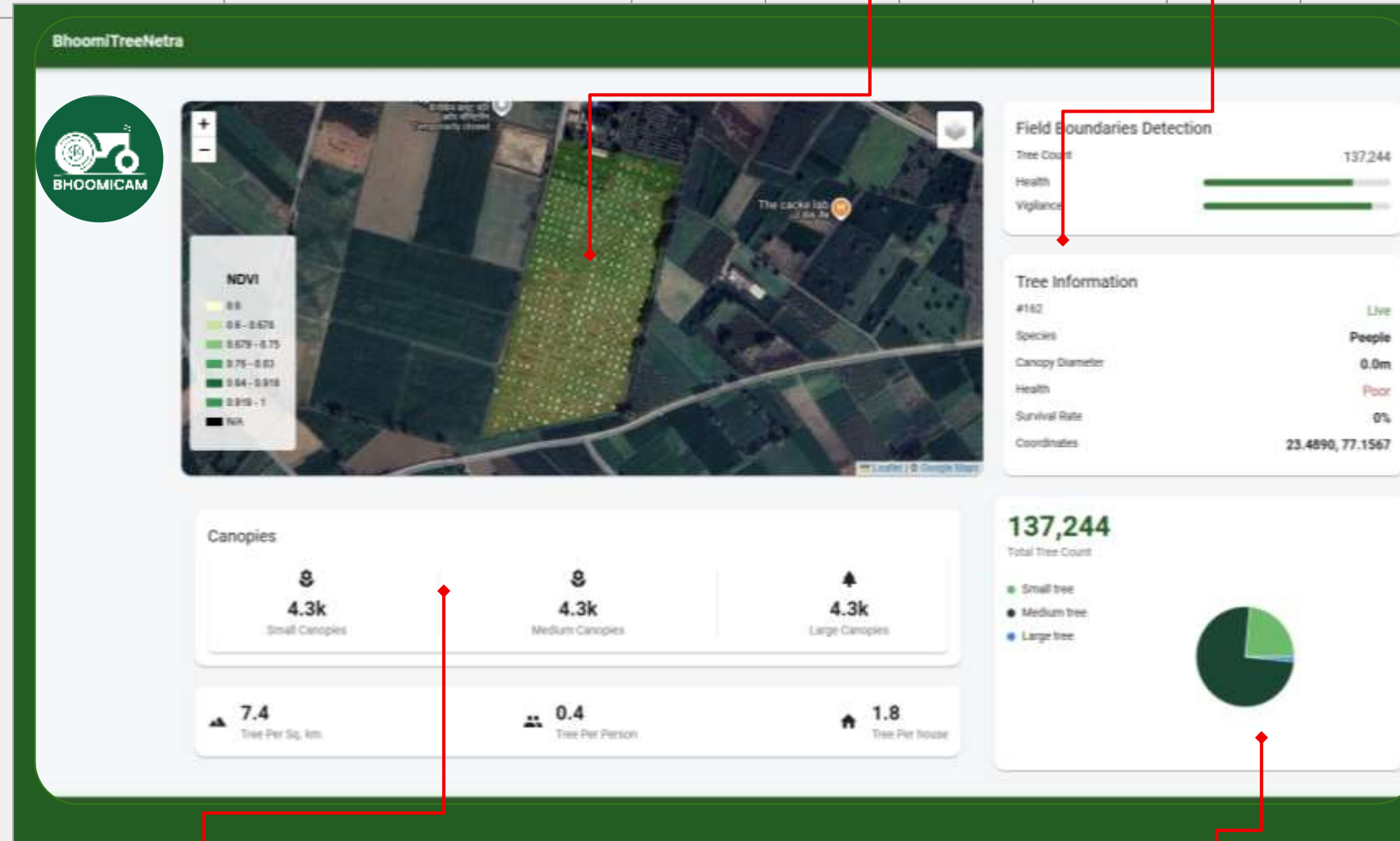


Canopy Masks

Web-Tool Interface

- Plantation Status
- Tree Distribution
- Canopy Variation
- Species Classification
- Health Monitoring
- Count

The **integrated dashboard** visualizes plantation status, tree distribution, and canopy variations, etc.



Interactive Map

Health Indicators

Canopy Information

Infographics

Next Steps

Satellite Data Acquisition

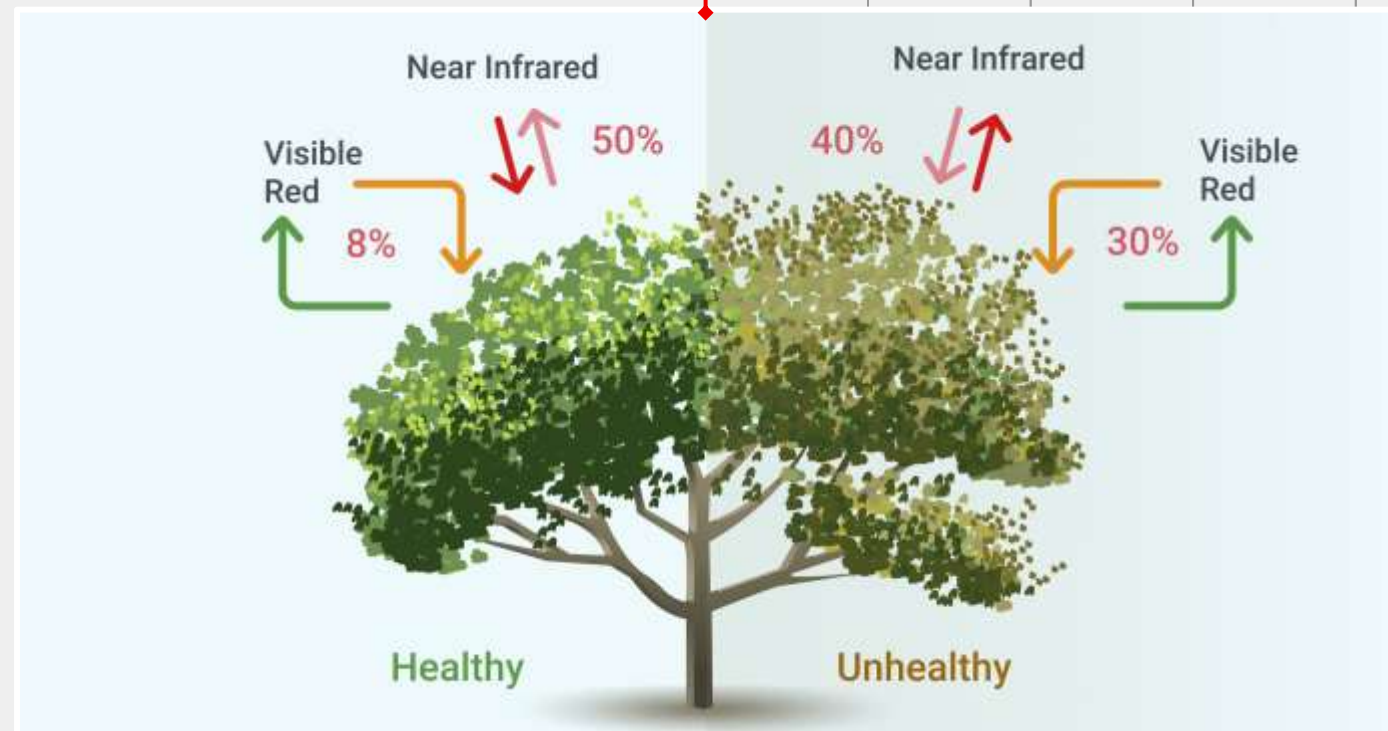
NDVI Calculation for Health

Tree counting

Species Classification

NDVI
Normalized Difference
Vegetation Index

NDVI is an indicator of photosynthetically active biomass i.e., measure of vegetation health.





Dashboard Solution For Urban Tree Ecology Monitoring

Funded by Habitat Nature Based Solution Company, Montreal, Canada



Coniferous and Deciduous Classification

This application is to classify coniferous and deciduous trees in Montreal Island. Use the interface to compare different Machine Learning Algorithms for Sentinel-2A and Rapid-eye images.

Select Year
2019

Select a Location
Anjou

Visualization of Tree and building Area classification, Montreal.

Select an image
Sentinel-2

Machine Learning Model
RF

Compare Rapideye (Random Forest) and Sentinel-2 (Random Forest) 2019 images

Class
Coniferous
Deciduous

RapidEye 2017

00:27.65





Bhoomicam Analytics App



Website



BHOOMICAM
A Geospatial Agri-tech Company

Thank You

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National Geospatial Awards FOSSEE, IIT Bombay, under National Mission on Education Through ICT



10 MOST PROMISING AGTECH STARTUPS - 2025		
Company	Management	Description
AgriNet Technologies Mithal agrinet.com	Tarunjeet Singh Sharma Founder & CEO	The company enhances food value chains by improving safety, transparency, and fairness through an AI-powered Sea2 platform that offers automated, real-time food quality assessments for agribusinesses.
AgriStar Pans agrestar.in	Shardul Sheth Co-founder & CEO	Offers agricultural inputs and services to farmers, featuring a mobile application and website through which farmers can access a variety of agricultural products, such as seeds, fertilizers, pesticides, and equipment.
ADD Munshi add.in	Swapnil Pawar Co-Founder & CEO	The firm dedicated to transforming the agricultural sector with innovative tech solutions, using IoT, AI, Blockchain, and precision farming techniques, it enables farmers to enhance productivity, reduce waste, and adopt sustainable practices.
Bhoomicam Rockey bhoomicam.com	Dr. Siddhartha Khare Founder	The analytics platform provides AI-powered geospatial solutions using SaaS platform and API services for crop monitoring, weather analytics, and customized advisories.
Bizak Gargan bizak.in	Nikhil Tripathi Co-Founder	A B2B marketplace for trading agricultural commodities, designed for suppliers and buyers in the agriculture sector, seeks to address the information imbalance and enhance accountability within agricultural commodity transactions.
Crofarm Gargan crofarm.com	Vivek Khanna Founder & CEO	An agri-tech startup focused on building farmer communities to deliver fresh, safe, and nutritious food while reducing produce waste through a sustainable supply chain.
Fazal Bangalore fazal.co	Azadea Verma Founder	An IoT-SaaS platform for precision horticulture provides tailored actionable intelligence for farms, crops, and growth stages, enhancing efficiency, boosting yields, and improving product quality.
Kiviva Gargan kiviva.in	Dhananjay Madhav Keshal Founder	An integrated ecosystem that connects farmers, agribusinesses, and agricultural experts, offering advanced tools, real-time data analysis, and a collaborative network to enhance knowledge exchange and development in agriculture.
Nijacart Bangalore nijacart.com	Karthikeswara KK Founder & CEO	The agtech firm is transforming the ecosystem by developing commerce, finance, and fulfillment solutions for stakeholders, innovating products and customer segments, and addressing complex supply chain challenges.
WayCool Foods Chennai waycool.in	Karthik Jayaraman Co-Founder & Managing Director	Specializes in agri-commerce, leveraging advanced technology to manage the food supply chain with a focus on natural farming, sustainability, organic agriculture, agri-tech innovations, soil health, and ESG criteria.

