ASSOCIATION OF GEOSPATIAL INDUSTRIES

NEWSLETTER

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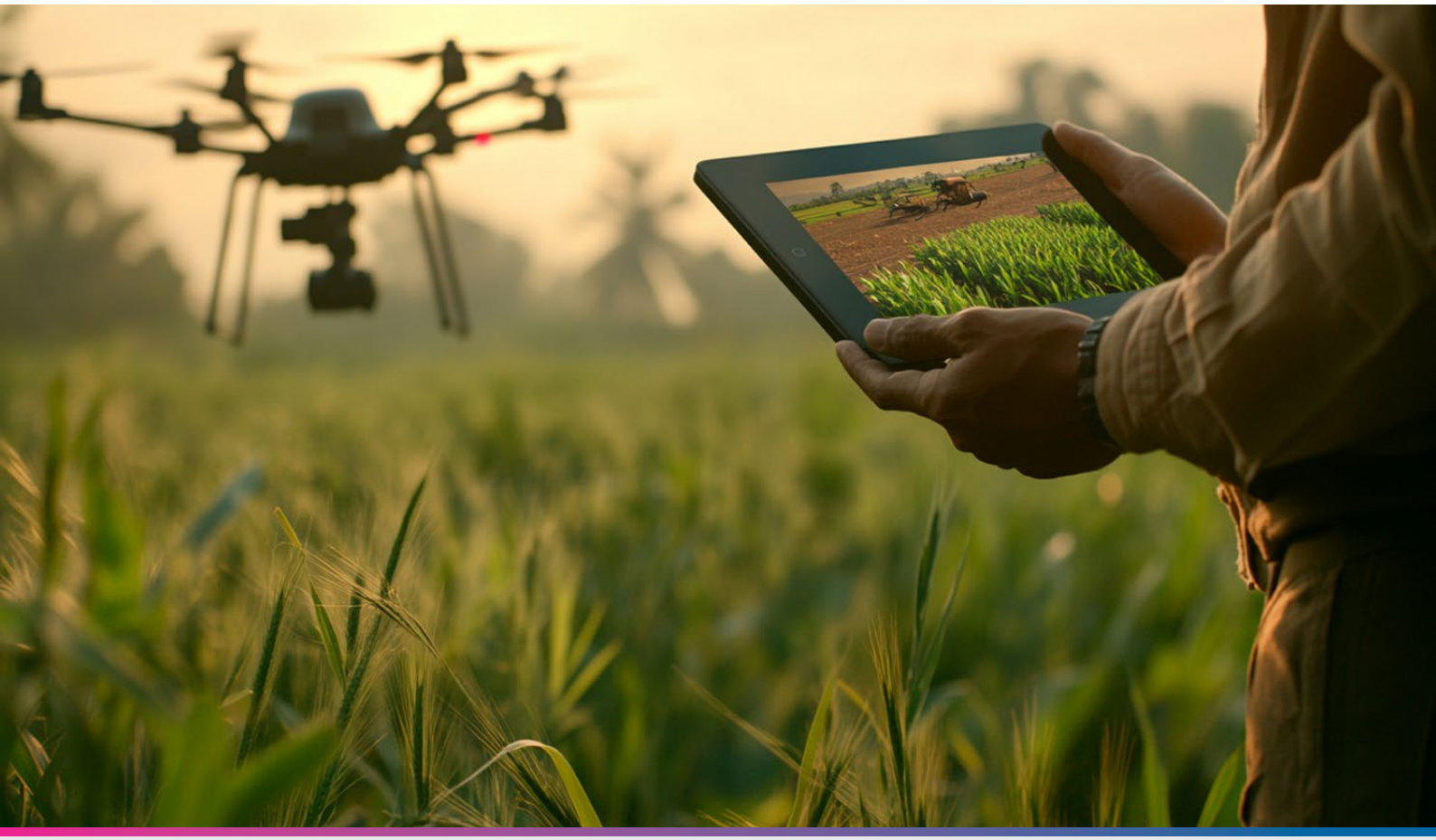

Theme: Connected Farming Using Geospatial

Editors' Note

Agriculture is undergoing a silent transformation. The centuries-old practice of farming by intuition is now being complemented, and often enhanced, by data-driven, connected farming. At the heart of this shift is geospatial technology, integrated with IoT sensors, AI, drones, and mobile platforms.

With connected farming, farmers can monitor crop and soil conditions in real-time, detecting water stress, identifying early signs of disease, and using irrigation techniques tailored to each zone in a field. Satellite imagery, GPS mapping, and sensor-based data also help optimize inputs like water, fertilizers, and pesticides, boosting productivity and reducing wastage, cost, and environmental damage.

India's Soil Health Card Scheme is a standout example, using geo-tagged sampling to help farmers apply nutrients more precisely. Programs like FASAL and CAYE use satellite-based monitoring for yield prediction and crop insurance. The Government of India is reportedly also planning to invest ₹6,000 crore in smart farming initiatives, leveraging AI, IoT, and geospatial data to increase yield while conserving resources.

The benefits are tangible: reduced guesswork, early warnings for pests or diseases, improved quality, and better market alignment. As farming faces the dual pressures of climate change and population growth, connected farming enabled by geospatial precision technologies offers a sustainable, scalable way forward.

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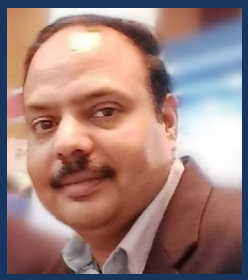
Nikhil Kumar
President



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Message from the President's Desk

Nikhil Kumar
President, AGI

India stands at a defining moment in its agricultural journey. As the sector grapples with intensifying climate impacts, shrinking landholdings, and rising pressure on natural resources, the way forward must be rooted in data, precision, and resilience. In this context, connected farming enabled by geospatial technologies and precision agriculture is not just a technological advancement but a national imperative.

The fusion of space-based intelligence, sensor-driven field data, and advanced GIS platforms is fundamentally transforming how we understand, manage, and optimize farming systems. Today, farmers can monitor crop health in real time, apply inputs with surgical accuracy, and anticipate weather or disease-related risks, thanks to innovations that put location intelligence at the center of agricultural decision-making.

This evolution is deeply aligned with the Government of India's strategic vision reflected in initiatives such as the Digital Agriculture Mission, AgriStack, and the National Geospatial Policy 2022. Together, these frameworks are laying the foundation for an agricultural ecosystem that is not only digitally integrated but also spatially empowered.

At the Association of Geospatial Industries (AGI), we believe the true power of technology lies in its ability to empower those who need it most. In agriculture, this means equipping our farmers, particularly smallholders, with timely, localized, and actionable insights that enhance productivity, reduce risk, and ensure long-term sustainability.

This edition of our newsletter, *"Connected Farming Using Geospatial"*, brings together insights from across the value chain. It showcases scalable solutions, emerging partnerships, policy enablers, and the increasing synergy between India's agri-tech and geospatial sectors. Most importantly, it underscores a growing national consensus that precision agriculture, backed by robust geospatial infrastructure, will be central to India's food and livelihood security in the decades to come.

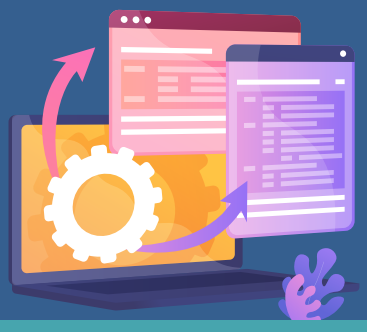
As we look to the future, the path to agricultural transformation must remain inclusive, collaborative, and innovation-led. AGI remains steadfast in its commitment to strengthening this ecosystem by advocating for enabling policies, supporting industry innovation, and fostering dialogue between stakeholders who are shaping India's digital agriculture frontier.

I hope this edition encourages meaningful dialogue and action, and reaffirms our collective commitment to building an agricultural future that is intelligent, climate-resilient, and above all, farmer-first.

Enjoy Reading!

Nikhil Kumar
President, AGI.

Updates from AGI



Webinar on Bridging Satellite Tech and Enterprise Growth

AGI organized a special webinar for member Satpalda, in collaboration with Axelspace, introducing the AxelGlobe Earth Observation platform. The session shed light on how satellite imagery transforms industries such as agriculture, urban planning, forestry, disaster management, and more. The webinar was a fantastic opportunity to understand the impact and benefits of satellite data on businesses, knowledge of small satellite applications in business, and actual usage methods.

AGI Launches Special Committees on Agriculture and Startups

AGI recently launched two special committees: one focused on Agriculture and the other on Startups. The Agriculture Committee aims to integrate geospatial technologies more deeply within the broader agricultural ecosystem, with mandates that include market research, technology promotion, and fostering new applications. Concurrently, the Startup Committee will serve as a dedicated hub for geospatial startups, facilitating connections, collaboration, and growth to drive innovation and contribute significantly to national development by providing essential support and resources.

AGI Agriculture Committee Members	AGI Startup Committee Members
Prashant Joshi, Secretary-General, AGI	Deepak Awari, Vice President, AGI
Anand Raj, Regional Manager – PSSRC, Deere	Vipul Bhati, Co-Founder, Aakashe
Parag Kulkarni, PSSRC Engineer, John Deere	Deb Jyoti Pal, Senior Vice President, GalaxEye Space
Siddhartha Khare, Founder, Bhoomicam	Siddhartha Khare, Founder, Bhoomicam
Bhupesh Gupta, Founder & CEO, GeoNomads Consulting	Bhupesh Gupta, Founder & CEO, GeoNomads Consulting
Javed Shaikh, Technical Director, QuantaSip GIS	Jayanta Poddar, Co-Founder & CTO, Garudalytics
Rajesh A, Execution Head – Geospatial Solutions, Garudalytics	Parikshit Das, Director – Geospatial Sales, Emitech Infosystems Pvt Ltd

On the Radar

Clear Skies Challenge 2025

The "Clear Skies Challenge" invites innovators, developers, and problem-solvers to explore cutting-edge technologies and geospatial data to address these pressing issues. This is a national-level Ideathon and Hackathon focused on air pollution mitigation through AI-powered geospatial solutions.

The program is part of Operation Dronagiri (initiated by DST's Geospatial Innovation Council), with IIT Tirupati Navavishkar I-Hub Foundation (IITTNiF) as the nodal agency. The initiative is supported by IISc Bangalore's Centre for Public Good (data partner), Google (industry partner), A-PAG (Knowledge partner) & TiE Delhi-NCR(Ecosystem partner).

Operation Dronagiri is a strategic initiative under the National Geospatial Policy (NGP) introduced by the Department of Science & Technology (DST) in December 2022. It is designed to demonstrate the tangible benefits of geospatial technology across three key sectors: Agriculture, Transportation & Infrastructure, and Livelihoods & Skilling.

Prizes

- First Prize : ₹2,00,000
- Second Prize : ₹1,50,000
- Third Prize : ₹1,00,000
- Special Awards for Innovation and best team

Target audience: Students, Researchers, Startups and Innovators.

For more details: https://sites.google.com/iittnif.com/2025-hackathon-clear-skies/home

Code 4 Nature Challenge 2025

The Center for Applied Geomatics at CEPT Research & Development Foundation (CRDF) is proud to support the Second Edition of the CODE 4 NATURE Challenge 2025, an inspiring initiative by the Foundation for Ecological Security (FES). CODE 4 NATURE brings together developers, designers, data analysts, environmental enthusiasts, and changemakers from diverse fields to collaborate on technology-driven solutions for conservation and sustainability challenges.

Whether you're a seasoned programmer or simply passionate about nature, this challenge is a unique opportunity to channel your skills into projects that truly matter.

Why Participate?

- Collaborate on real-world environmental problems
- Innovate for impact, awareness, and change
- Network with peers, mentors, and experts in the field

For more details: https://indiaobservatory.org.in/code-for-nature-challenge-2025

Registration link: https://docs.google.com/forms/d/e/1FAIpQLSc3By0kquW9qnd0aEY5Hwrbt1haXTsXkVCg3ReFdK3TUi96Rg/viewform

Interview – John Deere

India's expanding 4G LTE and 5G infrastructure is enabling the next generation of precision agriculture.

Farmers can leverage Precision agriculture's data and advanced algorithms to improve data-driven decision-making, shares Anand Raj, Regional Manager – Strategic Standards and Shared Services (India, SE Asia, Sub-Saharan Africa), John Deere India

John Deere has been a pioneer in agricultural machinery for decades. Could you highlight some of your key services, that directly contribute to the advancement of connected farming practices, particularly those leveraging geospatial technologies?

Founded in 1837, Deere & Company is the world's leading manufacturer of agricultural, construction, and forestry equipment. Its Indian subsidiary, John Deere India, has been a key player in the country for over 27 years, delivering advanced technology solutions to the farming sector. Guided by its higher purpose— "We run so life can leap forward"— John Deere is committed to providing innovative, sustainable solutions that enhance the livelihoods of farming communities worldwide.

John Deere India manufactures tractor variants ranging from 28 HP to 130 HP for both domestic and international markets. Globally, John Deere offers comprehensive mechanization solutions across the entire crop value chain, which includes land preparation, planting, crop care, harvesting, and post-harvest operations.

John Deere Precision Agriculture: Smarter Farming through data and technology

John Deere's precision agriculture solutions empower farmers with real-time data, intelligent automation, and remote connectivity—delivering value across every stage of the crop value chain.

- **Data Management:** Tools like Connect Mobile, HarvestLab™ 3000, and In-Field Data Sharing enable real-time machine and field monitoring, seamless data syncing, and informed decision-making through the John Deere Operations Center™.
- **Remote Management:** Solutions such as Grain Harvest Weight Sharing, Connected Support™, and Operations Center™ PRO Dispatch provide continuous equipment monitoring, remote diagnostics, and proactive support to maximize uptime.
- **Guidance:** Technologies like AutoTrac™, AutoPath™, and Active Fill Control deliver precise, season-long guidance, reducing overlap and increasing operational efficiency.
- **Variable Rate Application:** With tools like GreenStar™ Rate Controller and Rate Controller 2000, farmers can apply inputs precisely where needed, reducing waste and optimizing yield.
- **Field & Water Management:** Solutions such as Surface Water Pro™ Plus and John Deere Mobile Weather help manage irrigation, conserve water, and maintain soil health through automated field and water control.

Together, these innovations reflect John Deere's commitment to sustainable, data-driven agriculture—enhancing productivity, profitability, and environmental stewardship.

Precision Agriculture solutions adoption leads to following key results.

- **Reduce Input Costs** through better machine management and application accuracy.
- **Increase Yields** by improving every aspect of your production process.
- **Run Smoother with Less Stress** by automating repetitive tasks and enabling remote diagnostics.

Could you share a specific example or case study illustrating this impact?

John Deere AutoTrac™ is a GNSS-based guidance solution that enables precision in ploughing, land

preparation, sowing, spraying, and harvesting. By using auto-steering, it ensures machines follow straight or pre-defined paths with high accuracy, improving field efficiency and reducing operator fatigue.

AutoPath™, a complementary feature, automatically generates precise guidance plans for the entire crop season based on exact crop locations or field boundaries. It allows farmers to:

- Eliminate unnecessary field passes.
- Seed singulation, avoiding doubles & misses.
- Seeds precisely between last year's crop rows
- Plant directly on fertilizer strips.
- Spray standing crops without damage.
- Harvest consistently at full capacity.

Together, AutoTrac™ and AutoPath™ form the foundation for smarter, more efficient, and sustainable farming operations.

Beyond hardware, what role do John Deere's software and digital services play in enabling connected farming?

John Deere's precision agriculture solutions combine advanced hardware and software to support every stage of the crop value chain. Their machines use sensors and actuators to collect real-time data, processed by advanced algorithms for real-time monitoring. This helps operators make timely data driven decisions and precise actions.

Grain Harvest Weight Sharing lets farmers monitor harvested grain in real-time, improving communication and reducing idle time during harvest. Grain weights are accessible via John Deere Operations Center Mobile, helping farm managers optimize operations and manage transport vehicles efficiently.

This feature lets operators see the current grain weights of all grain carts in the work group, along with the percent full within the combine harvester display system.

Connectivity infrastructure is vital for the success of connected farming. How it can be better leveraged? Does John Deere have product and services for Indian market for connected machine and services?

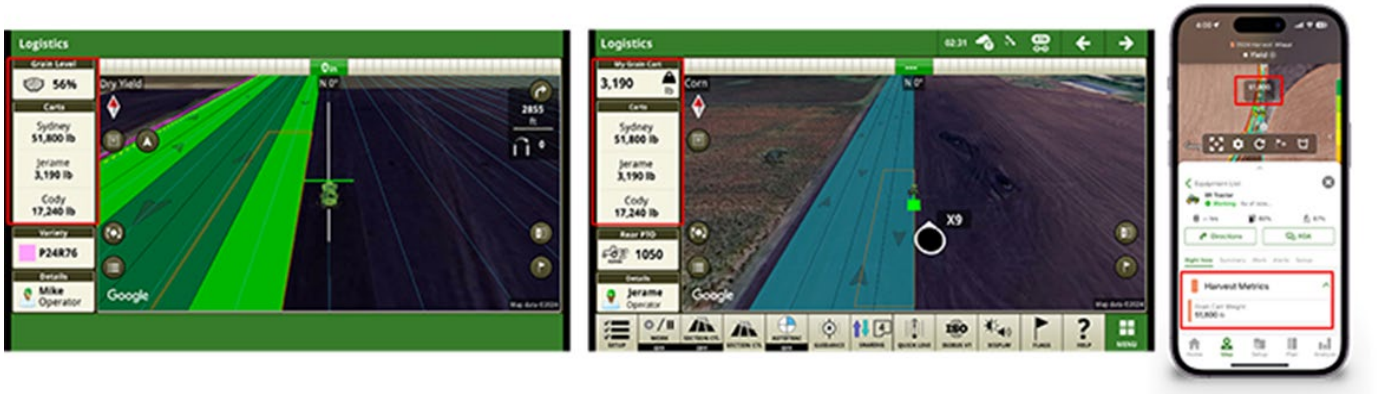
India's expanding 4G LTE and 5G infrastructure, driven by the Department of Telecom, is enabling the next generation of precision agriculture. These high-speed networks support real-time data collection, processing, and low-latency communication between cloud platforms and farm machinery.

JDLink™ leverages this connectivity to give farmers seamless access to their machines—regardless of brand, type, or Its affordable, easy-to-install hardware provides:

- Real-time location tracking
- Machine performance and health data
- Diagnostic trouble codes and maintenance alerts
- Engine hours, fuel levels, and more
- Access to John Deere Connected Support™

With a JDLink™ modem, operators can monitor and manage their equipment remotely. Machine and field data are automatically sent to the John Deere Operations Center™, enabling timely decisions for tasks like tilling, planting, spraying, harvesting, fleet management, and machine maintenance.

- Improve fleet utilization with machine performance management.
- Maintaining equipment made easy by using tools in Operations Center™
- Make better decisions by sharing data with John Deere authorised dealer, trusted advisors, and partners.
- Value added Services through Operations Center™



From John Deere's perspective, what are the most significant opportunities and challenges you see in the widespread adoption of connected farming in India? How crucial are geospatial technologies in realizing the full potential of this approach?

The Government of India, through the Ministry of Agriculture and Farmer Welfare (MoAFW) and the Department of Science & Technology, has introduced policies to foster agricultural innovation and Ag-Tech solutions. Key initiatives include:

- **National Geospatial Policy:** Liberalizing the geospatial sector to encourage private companies.
- **Digital and Geospatial Infrastructure:** Developing infrastructure for private sector innovation.
- **Various Schemes:** Encouraging farmers to adopt advanced farming solutions.

Farmers often rely on traditional knowledge, which can lead to inconsistencies in challenging situations. Farmers can leverage Precision agriculture's data and advanced algorithms to help mitigate these inconsistencies and improve data driven decision-making.

Precision agriculture solutions generate vast amounts of data; However, it requires robust regulatory provisions to protect the intellectual property and data of OEMs, their partners, and customers. Current regulations need improvement in these areas.

The National Geospatial Policy 2022 emphasizes the importance of accessible and high-quality geospatial data for various sectors, including agriculture. How do you see this policy impacting the development and deployment of geospatial solutions in connected farming?

John Deere commends the Government of India for introducing the National Geospatial Policy, a forward-looking initiative that aims to liberalize and strengthen the geospatial ecosystem. This policy has the potential to transform Indian agriculture by enabling greater collaboration between private enterprises, government agencies, and research institutions.

By facilitating access to geospatial data and encouraging innovation, the policy empowers farmers and contractors with advanced tools to make accurate, timely, and reliable decisions—ultimately enhancing productivity and improving livelihoods.

However, to fully realize the benefits of this policy, especially in the agricultural sector, greater clarity is needed for global OEMs regarding intellectual property rights and data privacy protections. Addressing these concerns will encourage technology transfer, investment, and deeper engagement by global players.

We look forward to continued dialogue with policymakers to ensure the policy is successfully implemented and unlocking its full potential for the benefit of the farming communities.

Looking ahead, would you like to share some exciting advancements from John Deere that could transform agricultural practices?

John Deere Precision Agriculture: Value in Every Pass, Every Season

John Deere's precision agriculture solutions harness advanced technologies like AI, machine learning, and computer vision to deliver real-time, data-driven insights that help farmers optimize every step of their operations.

- **See & Spray™:** Uses AI-powered vision systems to target weeds precisely, reducing herbicide use by over 50% while conserving resources and improving efficiency.
- **Exact Emerge™:** Ensures accurate seed placement with sensor-driven algorithms, enhancing crop uniformity, yield, and operational productivity.
- **Exact Shot:** Reduce fertiliser and chemical usage, promoting soil and environment sustainability.

These innovations reflect John Deere's commitment to sustainable, high-performance farming—every pass, every season.

Article – Hexagon

Hexagon Leads the Way in Laser-Guided Precision Farming

In the era of smart agriculture, precision land leveling has emerged as a critical practice for enhancing water efficiency and improving crop yields. Hexagon offers a range of precision farming techniques and technologies that help farmers optimize operations and increase yields. These solutions cover various aspects of the agricultural lifecycle, from planning and data management to automation and autonomous operations. Hexagon's precision farming tools enable data-driven decision-making, improve efficiency, and reduce costs for agricultural operations.

Precision Farming Technique

Laser land leveling solutions from Leica is a precision farming technique used to achieve high-precision land leveling, ensuring the land is perfectly leveled/inclined and smooth. This technique uses Rotating Laser Level to precisely level the land, thus reducing water wastage and improving crop yields.

Benefits

1. **Reduced Labor**: Automated laser-guided equipment minimizes manual labor requirements, thus improving efficiency and saving time, which results in savings.
2. **Optimum Water Utilization**: Laser land leveling helps reduce water wastage by ensuring optimum usage of water.
3. **Increases Crop Yields:** Laser land leveling promotes even crop growth, thus minimizing crop losses due to stagnant or less water.
4. **Improved Soil Health**: Reduces soil erosion and improves water retention, thus contributing to healthier soil.

Working Concept

1. **Surveying:** The land parcel is surveyed to determine its topography; this helps determine the bucket/scrapper height to be maintained across the field.
2. **Rotating Laser Equipment**: A laser transmitter sends a continuous rotating horizontal/inclined laser beam, which is sensed by a receiver mounted on the bucket/scraper. This guides the Control Box mounted on the tractor to control the blade movements of the bucket/scrapper to precisely level the land.

Impact

1. **Sustainable Agriculture**: Laser land leveling promotes sustainable agriculture practices, reducing environmental impact.
2. **Food Security**: By improving crop yields and reducing water waste, laser land leveling contributes to food security.
3. **Economic Benefits**: Increased crop yields and reduced water consumption lead to economic benefits for farmers.

Adoption

Laser land leveling is globally adopted, particularly in regions with limited water resources. Our Indian Government, along with State Governments, has programs towards promotion of this technology by providing subsidy to end users on procurement of the system to improve agricultural productivity and sustainability.

Conclusion

As agriculture transitions into a data-driven, resource-conscious future, laser land leveling with Leica's precision solutions stands out as a foundational technology. It not only increases operational efficiency but also contributes to sustainable farming by conserving water, reducing inputs, and maximizing crop yields. By implementing such precision techniques, farmers are better equipped to meet global food demands while preserving natural resources for generations to come. By ensuring uniform land surfaces with millimeter-level precision, it enables farmers to make better use of water, energy, and inputs, while significantly improving crop outcomes.

In a time when global agriculture faces the dual challenge of feeding a growing population and protecting the environment, tools like Leica's laser land leveling system represent a smart, scalable solution. Whether on large commercial farms or smallholder plots, adopting this precision farming technique not only boosts profitability but also fosters long-term soil health and resource conservation.

Case Study - Esri India

HARSAC Harvests Success: Groundbreaking Agri Reforms Mapped with ArcGIS

Haryana Space Applications Centre (HARSAC)

Industry: Agriculture

Organization Profile:

Haryana Space Applications Centre (HARSAC) is responsible for implementing GIS, Remote Sensing, UAV, and GPS technologies across Haryana State, covering a total of 42,212 sq. km. HARSAC harnesses geospatial technology to benefit the state's citizens and prepares plans, policies, and proposals to guide decision-making authorities in the government of Haryana.

www.hsac.org.in/harsac

Project

Crop Management Solution

Highlights

- Facilitates capture of real-time, ground-truth intelligence on the total crop produced in Haryana.
- Ensures more effective governance in yield management and agricultural income generation.
- Brings more transparency to the lifecycle from seed to market; empowering farmers.
- Leads to substantial financial savings for the state.

Project Summary

Haryana Space Applications Centre (HARSAC) has developed and deployed a Geospatial Technology-based Crop Management Solution to address challenges in agricultural management. This solution empowers farmers, enhances transparency, and strengthens agricultural reforms in Haryana. The solution, which is part of HARSAC's OneMap Gurugram Portal, enables the authority to capture real-time, ground-truth intelligence on the total crop produced in Haryana. It allows the government to precisely record, measure, and analyze agricultural produce, leading to more effective governance in yield management and agricultural income generation. By bringing transparency to the lifecycle from seed to market, farmers feel more empowered. The system has led to significant improvements in yield management, cost reduction, and resource optimization, resulting in substantial financial savings for the state.

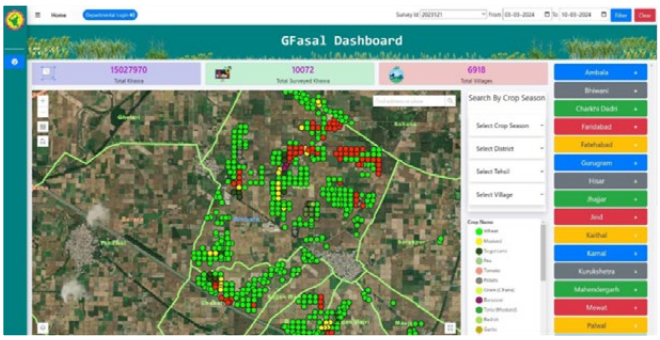
Challenges

Traditional paper-and-pencil surveys in agriculture are prone to errors in measuring farmlands and yields, leading to mismatches in records. Without a digital system, government benefits like subsidies and insurance often do not reach farmers. Additionally, traditional systems struggle with collaboration among different departments.

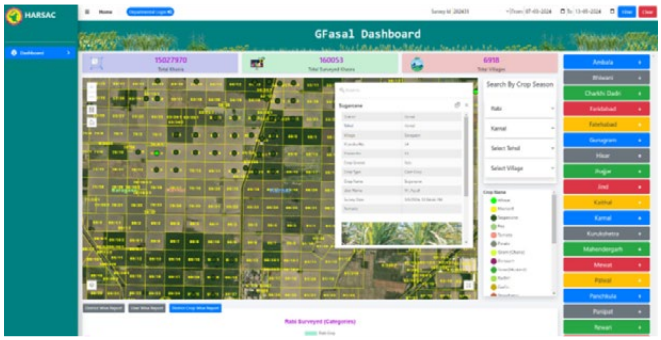
Solution

The Crop Management Solution, built using Esri's Geospatial Technology, enables complete data collection of crop types and conditions across Haryana. It performs precise measurements of farmland size in each district, helping HARSAC manage farmlands and crops more effectively, reduce labor costs, and minimize resource waste. The accurate, up-to-date data allows for the formulation of feasible funding and agricultural development plans. The system encourages farmers to register on a common portal, promoting transparency. Currently, about 1.2 million farmers are registered. This registration facilitates complete knowledge of farmland, easing crop monitoring and management. Farmers receive updated market rates and can schedule appointments to sell produce at government-approved centers, saving time and effort.

GFASAL: Geospatial Governance revolutionizing Farming Activities through Spatial Analysis and Learning. The GIS system allows HARSAC to visualize and analyze field data easily, ensuring integrated agricultural data can be updated and managed through an enterprise geodatabase. The system also serves as a platform for data synchronization, management, and sharing,



Overview of the GFASAL Dashboard



Area 54//13 in Karnal: Sugarcane, Sown on 8th March 2024, with Geotagged

enhancing collaboration among departments and leading to informed decision-making.

A mobile application enables surveyors to measure farmland areas, add attributes, and take pictures of crops using integrated GIS and GPS technologies, ensuring real-time data upload.

The GFasal Dashboard provides district-wise crop details, allowing users to see information on crops surveyed, crop types, and village-level data, promoting transparency from seed to market.

This robust GIS-facilitated system ensures genuine farmers are identified, bogus beneficiaries are excluded, and registration anomalies are reduced. The state's income from agricultural produce is optimized, and government benefits reach the real farmers.

Field surveys, carried out by students, involve using the mobile app. This experience imparts geospatial data knowledge and GIS skills, contributing to future capacity building and making students more employment-ready.

Methodology

The Crop Management Solution employs the following GIS tools and techniques:

1. **Data Collection:** Using mobile applications integrated with GIS and GPS, surveyors collect data on crop types, farmland size, and conditions.
2. **Real-time Data Upload:** Collected data is uploaded in real time to an enterprise geodatabase, ensuring accuracy and timeliness.
3. **Data Visualization:** The GFasal Dashboard provides a visual representation of crop data, enabling easy analysis and decision-making.
4. **Collaboration:** The system facilitates data sharing and synchronization across departments, enhancing collaboration and informed decision-making.
5. **Farmer Portal:** Farmers register on a common portal, where they can access information on market rates, selling outlets, and schedule appointments for selling produce.

Benefits

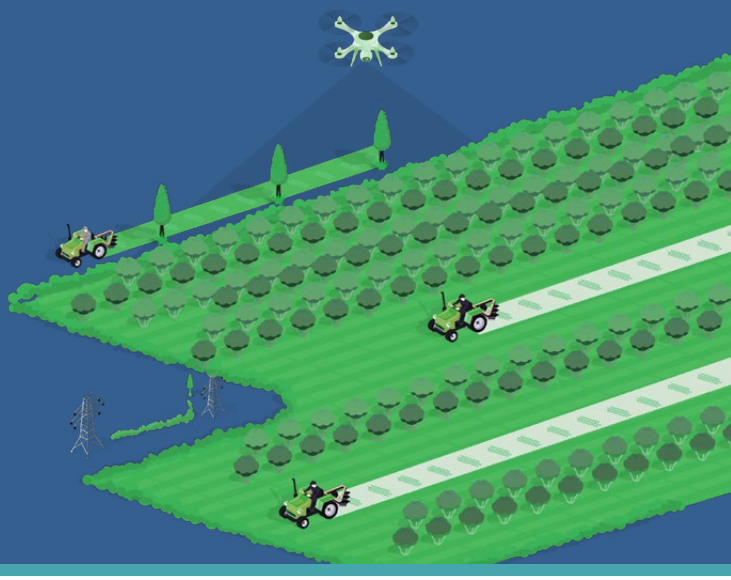
The implementation of the Crop Management Solution has led to significant improvements:

1. **Yield Management:** Accurate measurement and analysis of farmlands and yields.
2. **Cost Reduction:** Reduced labor costs and minimized resource waste.
3. **Transparency:** Enhanced transparency in the agricultural supply chain.
4. **Financial Savings:** The state has saved approximately 300-400 crores.
5. **Farmer Empowerment:** Farmers receive support throughout the crop lifecycle, from production to market.
6. **Social Enforcement/Assessment Impact:** Strengthened social enforcement mechanisms and enhanced assessment capabilities, fostering greater accountability and compliance within the agricultural sector.

The integration of Geographic Information Systems (GIS) in agriculture is transforming traditional farming practices. GIS technology enables precise data collection, a nalysis, and visualization, which are crucial for effective decision-making and resource management. Agriculture plays a vital role in the economy, and efficient crop management is essential to support the livelihoods of millions of farmers. HARSAC, recognizing the need for modernizing agricultural practices, implemented a Geospatial Technology-based Crop Management Solution to overcome the limitations of traditional methods and enhance agricultural productivity and governance. The Crop Management Solution by HARSAC is a pioneering step towards modernizing agriculture in Haryana. By leveraging Geospatial Technology, the state has achieved significant improvements in yield management, transparency, and financial savings.

Article - GarudaUAV

From Baseline to Real-Time: Enabling Precision Agriculture with Connected Technologies



The dawn of civilization began with the emergence of farming, which enabled people to cultivate the lands, secure reliable food sources, and establish permanent settlements. This stability laid the foundation for complex societies and accelerated societal growth. However, farming also brought new challenges like crop pests, livestock diseases, and conflict over natural resources.

Despite significant technological progress, many of these core challenges persist, although in evolved forms. Today, farmers continue to grapple with threats like crop loss due to pests, unpredictable weather patterns, and increasing pressure on natural resources. Therefore, to ensure food security for a rapidly growing population, agriculture must produce more with less.

Modern problems call for innovative solutions. One such solution is connected farming, which integrates digital technologies into agricultural practices to improve crop productivity and sustainability. This approach leverages data-driven tools, IoT (Internet of Things) devices, satellite imagery, and cloud-based platforms to optimise farming operations at every stage – from sowing to harvesting.

Connected Farming for Crop Monitoring at GarudaUAV

As part of our efforts to explore the potential of connected farming at GarudaUAV, we conducted a survey to gather valuable baseline data on crops. By further integrating AI and machine learning, we were able to provide data-driven insights to farmers. These included accurate plant height estimation, identification of crop stress zones, and automated tree counting, among others. The following two case studies provide more details on the practical application of these innovations in the field.

Case Study 1: Okra Crop Height Estimation Using LiDAR

One of the key challenges in agriculture is accurately monitoring plant growth across large fields. Traditionally, crop height estimation depends on manual measurements, which are both time-consuming and prone to error (Figure 1(a)).

LiDAR (Light Detection and Ranging) technology offers a much faster, highly precise, and scalable alternative. In this study, LiDAR was used to capture 3D point cloud data, which was processed to

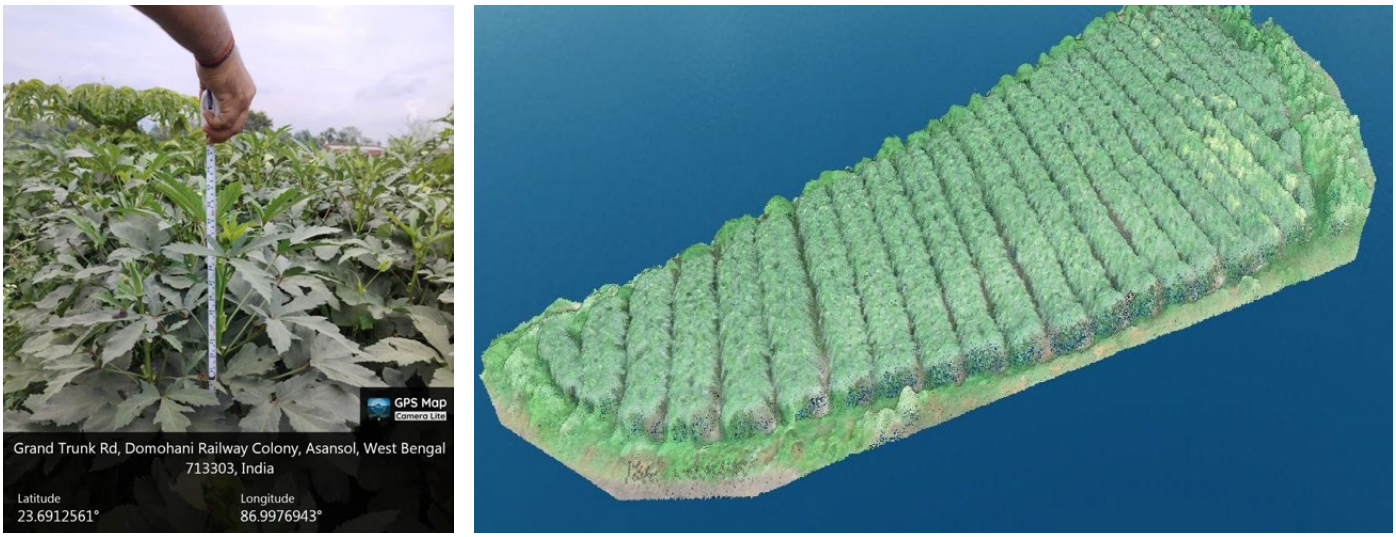


Figure 1: (a) Manual field measurement of okra crop height, a traditional method used in agricultural monitoring; (b) LiDAR-derived Canopy Height Model (CHM), generated by subtracting the Digital Terrain Model (DTM) from the Digital Surface Model (DSM), enabling precise estimation of crop height.

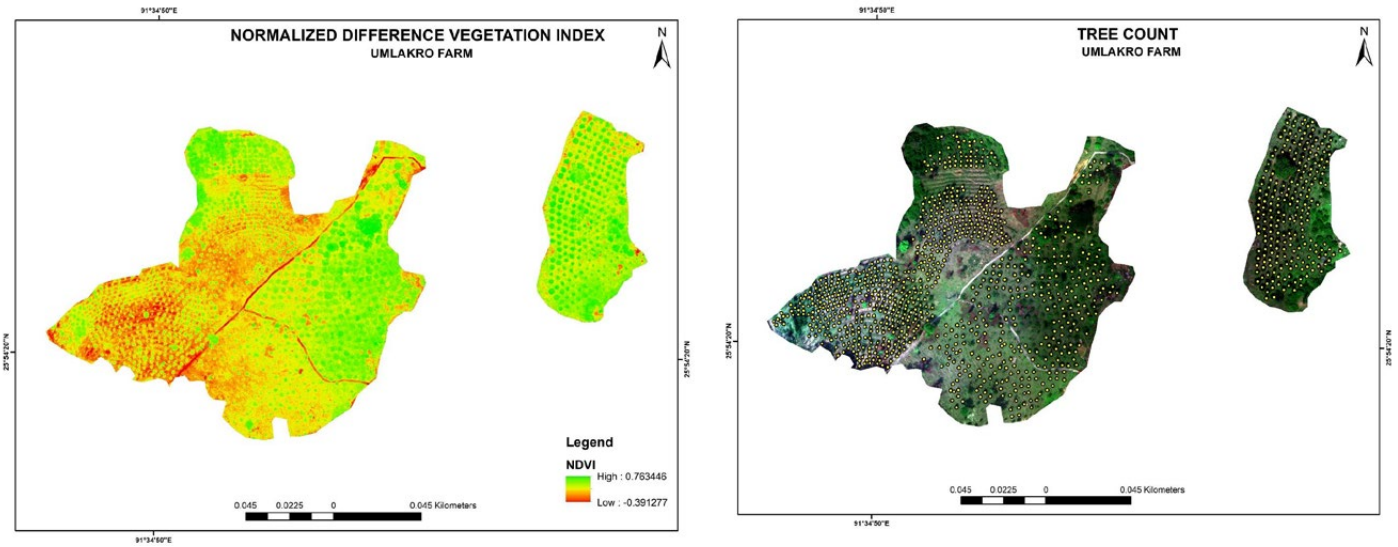


Figure 2: (a) NDVI (Normalized Difference Vegetation Index) map of the Khasi mandarin orchard, highlighting variations in plant health and stress levels based on spectral reflectance data; (b) AI-enabled tree count map, generated from high-resolution multispectral imagery, accurately identifying and quantifying individual trees (n = 1,083), aiding in orchard inventory and biomass estimation.

generate Digital Terrain Models (DTMs) and Digital Surface Models (DSMs). Subtracting the DTM from the DSM produced Canopy Height Models (CHMs) (Figure 1(b)).

CHM provides plant height with exceptional accuracy. The study showed a strong correlation (greater than 0.98) between LiDAR-derived crop heights and manual measurements. The results revealed that okra plants ranged from 0.70 to 0.95 meters in height, with noticeable variations across the field. This enabled farmers to identify uneven growth and respond quickly.

Case Study 2: Multispectral Imaging for Khasi Mandarin Orchards

Early detection of plant stress, nutrient deficiencies, and water scarcity is critical for orchard health and productivity. In this study, multispectral imaging was deployed to assess the health of Khasi mandarin orchards through spectral analysis.

Multispectral drones captured high-resolution imagery across several bands. Key vegetation indices, including NDVI (Normalized Difference Vegetation Index) (Figure 2(a)), NDWI (Normalized Difference Water Index), SAVI (Soil-Adjusted Vegetation Index), and RECI (Red Edge Chlorophyll Index), were computed to map stress zones, assess water availability, and monitor nutrient distribution.

The AI-powered analysis further enabled automated tree detection and counting (Figure 2(b)). It provided an accurate count of 1,083 trees within the orchard. This level of precision in tree counting helps streamline orchard inventory management and monitoring. Additionally, biomass and carbon sequestration potential were estimated, though the carbon sequestration rates were lower due to the young age of the trees.

Key Takeaways:

- **LiDAR technology** enables scalable and highly accurate crop height estimation, supporting better field-level decision-making.
- **Multispectral imaging** provides critical insights into plant health, water stress, and nutrient distribution, aiding precision orchard management.
- **AI-powered tools** like tree detection and crop classification enhance monitoring efficiency and reduce manual labour.
- **The combination of remote sensing and AI** creates a powerful toolkit for smarter, data-driven farming, improving productivity while reducing waste and environmental impact.

Conclusion

Connected farming offers a transformative approach to agriculture by integrating digital technologies for smarter, data-driven decision-making. In this study, baseline data collected through LiDAR and multispectral imaging provided critical insights into crop height, plant health, and field variability, laying the groundwork for more responsive farm management.

While a one-time survey offers valuable snapshots, the true potential of connected farming lies in continuous monitoring through IoT-enabled solutions. Regular data collection via drones, sensors, and remote platforms can detect changes in real time. As connectivity and analytics improve, these systems will empower farmers to achieve higher productivity with reduced inputs. These advancements will enhance resilience to climate-related risks, strengthen food security and contribute to long-term sustainability in agriculture.

Article - Asteria Aerospace

Connected Farming Powered by Drone Technology

Accurate spatial data is at the heart of India's digital transformation. Whether it's smart city development, infrastructure expansion, or disaster risk management—high-precision geospatial data empowers timely, informed decision-making.

Agriculture, today, is undergoing a profound transformation - from intuition-based to insight-led operations. At the heart of this shift lies the concept of connected farming - a digitally unified system where aerial intelligence, cloud platforms, and AI-driven analytics converge to empower faster, more informed decision-making across the agricultural value chain.

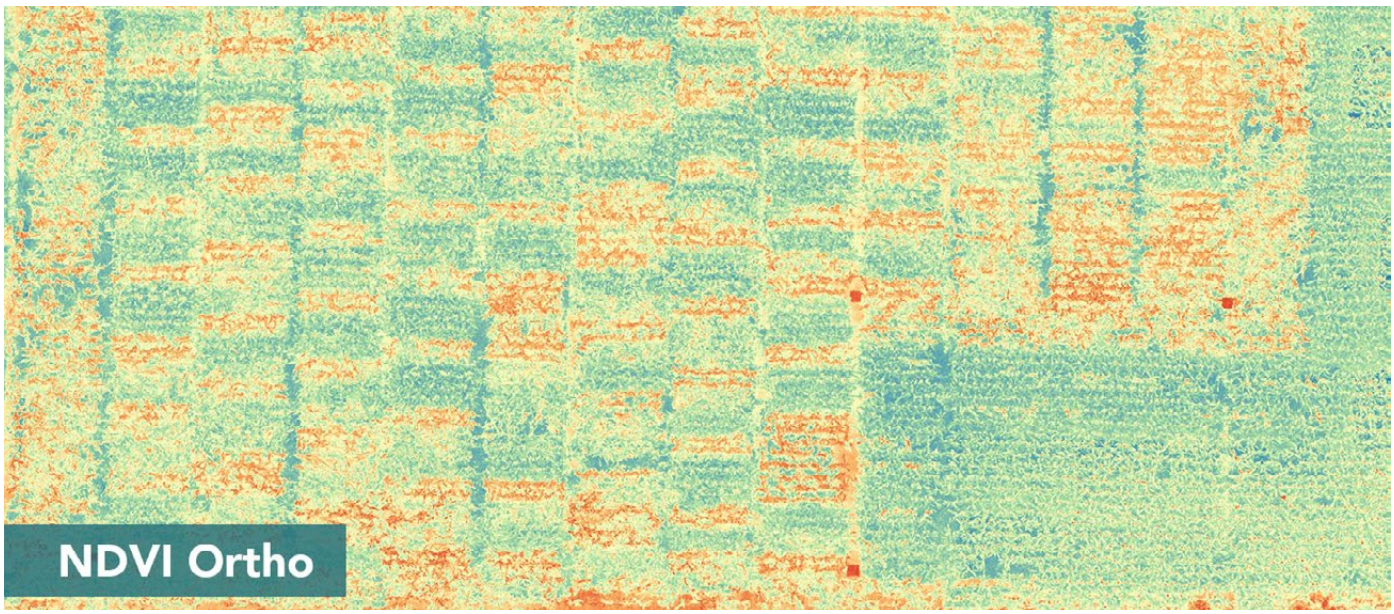
One of the most powerful enablers of connected farming today is drone technology. With their ability to deliver high-resolution, geo-tagged data across vast fields in a matter of minutes, drones are bridging critical gaps in scalability, accuracy, and timeliness, particularly for seed trials, crop research, and input optimization. At Asteria Aerospace, we see this evolution not as a future trend but as a present-day reality.

Rethinking Agriculture with Aerial Intelligence

Conventional crop monitoring practices are often slow, labor-intensive, and limited by scale. Seed development, for example, involves extensive field trials across geographies and seasons to evaluate hybrid performance. In such processes, even small errors in plant stand counts, uniformity assessments, or field boundary measurements can cascade into lost time, inaccurate/extrapolated data, poor variety/hybrid selections, and diminished yield potential.

Drone-based imaging overcomes these bottlenecks by providing consistent, repeatable, and non-invasive crop data collected within tight agronomic windows. High-resolution RGB and multispectral imagery enables the digitization of phenotypic traits such as plant emergence, canopy uniformity, tassel formation, and crop stress. This digitization not only enhances accuracy but also supports sustainability by reducing the need for destructive sampling and overapplication of inputs.

The Power of Integration: From Flight to Decision



The true value of drone technology in connected farming lies not just in data collection, but in its seamless integration with cloud platforms that turn raw aerial visuals into actionable insights. Asteria Aerospace's SkyDeck platform, for instance, delivers end-to-end automation - from flight planning and mission execution to image stitching, spectral analysis, and digital reporting.

This means that agricultural teams - whether in seed R&D or precision farming - can remotely monitor field plots, compare hybrid performance, assess plant health via spectral indices (NDVI, GNDVI, NDRE), and receive analytics-backed summaries for timely decision-making. With accuracy levels of 95%+ in stand counts, uniformity, plant height analysis and <50 cm accuracy in field area mapping, drone-powered data not only enhances operational precision but also builds confidence in every agronomic decision.

Standardization, Scalability, and Speed

One of the most persistent challenges in agricultural research is the ability to scale data collection while maintaining standardization across regions, seasons, and crops. Drone-based workflows inherently solve this. With pre-programmed, autonomous flights and consistent image capture protocols, teams can ensure that every field is measured and monitored using the same parameters, making comparisons valid, audits easier, and outcomes more predictable.

Moreover, the ability to deliver data outputs within 12–24 hours post-survey brings agility to field operations. For seed companies, this enables the early deactivation of underperforming hybrids/ varieties.

Driving Sustainability and Efficiency in the Field

Drones support sustainable agriculture in multiple ways. By precisely identifying plant stress zones, they help target interventions - whether in the form of fertilizers, irrigation, or crop protection - reducing waste and environmental impact. By enabling virtual plot inspections, they lower the need for extensive on-ground scouting, saving fuel and manpower. By digitizing crop traits and automating diagnosis, they replace subjective observations with measurable evidence.

This alignment between efficiency and environmental responsibility is a key reason drone adoption is gaining momentum among agri-input companies and research institutions alike.

Building the Future of Connected Farming

As drone technology matures, its role in connected farming is expanding. In the near future, real-time edge analytics, AI-based trait prediction, and integration with IoT soil and weather sensors will enable a truly interconnected farming ecosystem, where each flight informs not just today's decisions but shapes the next generation of agricultural innovation.

At Asteria Aerospace, we are committed to enabling this future. With DGCA type-certified drones, proven expertise in high-resolution data capture, and SkyDeck's robust data processing capabilities, we are helping agri-tech teams move from reactive observation to proactive optimization.

In a world where every day in a growing season counts, connected farming powered by drone technology is not just a technological leap - it is an operational imperative. And it's already taking flight.

Article - GeoNomads Consulting

Building Climate-Resilient Farms with Geospatial Intelligence

A drone image showing unequal distribution of irrigation water, impacting plant growth, Source: GeoNomads Consulting

As climate change is tightening its grip on the planet, farmers find themselves at the forefront of a crisis they are not responsible for! Erratic rainfall, prolonged droughts, floods, and rising & fluctuating temperatures are no longer exceptions- they are becoming the new norm. Agriculture, having a major dependency on stable climatic conditions, is under significant threat. In this dramatically changing scenario, the concept of climate resilience in farming has gained unprecedented importance — the ability of agricultural systems to prepare for, absorb, and recover from climate-induced shocks.

This is where geospatial intelligence steps in as a powerful combination of satellite imagery, GIS, and real-time analytics, offering farmers a critical toolset to adapt to changing climates. Farmers equipped with geospatial data can make proactive and informed decisions without relying on just assumptions and guesswork. Building climate-resilient farms is not only about technology adoption; it is about safeguarding the future of food security, the backbone of human survival.

The Growing Need for Climate-Resilient Agriculture

Over the past few years, we have been experiencing a sharp increase in the frequency and intensity of extreme weather events. According to the Intergovernmental Panel on Climate Change (IPCC), agriculture will be among the sectors most affected by climate change, especially in agri-based economies like India, where a large population depends on farming for livelihoods.

Droughts are leading to water scarcity, heatwaves reducing crop yields, unseasonal rains damaging standing crops, and new types of pest infestations emerging as ecosystems shift. For farmers, these translate into reduced income, increased debt, livelihood stress, and mounting uncertainties. Traditional farming practices, while rooted in local knowledge, are often inadequate against the scale and speed of these challenges, originating globally yet impacting locally.

Climate-resilient agriculture is not just an aspiration — it is an urgent necessity. It calls for a shift from reactive measures to proactive planning, powered by accurate, real-time data. This is where geospatial technologies come into play.

Geospatial Technology: A Game Changer

Geospatial technology — encompassing satellite remote sensing, Geographic Information Systems (GIS) and drone-based data collection — offer a multi-dimensional view of agricultural landscapes. They enable farmers, researchers and policymakers to observe, analyze and predict complex environmental patterns with remarkable accuracy.

- **Remote Sensing:** Satellites equipped with multispectral sensors can monitor vegetation health, soil moisture, water stress, and land-use changes. This data allows early detection of drought conditions, pest outbreaks, or water-scarce areas long before they are visible to the naked eye.
- **GIS Interventions:** Geographic Information Systems are essential for integrating, analysing, and visualizing spatial data. By mapping soil types, topography, rainfall patterns, and land use/land cover (especially crop cover), GIS helps in identifying vulnerable zones and supports precise crop planning.
- **Weather Forecasting and Early Warning Systems:** Advanced weather models, when coupled with GIS platforms, have the potential to deliver hyperlocal forecasts and early warnings about extreme events, enabling farmers to take timely protective measures.
- **Drone Surveillance:** Drones provide very high-resolution images in real-time, enabling farm-level insights into plant health, pest infestations and irrigation issues. They are particularly useful for small holdings where satellite data may lack sufficient detail.

In combination, these technologies transform the way farms are managed, turning uncertainty into operational insights.

Practical Applications

Drought Risk Mapping: Using satellite data and GIS, regions prone to water scarcity can be identified. Farmers can be guided to adopt water-saving techniques like drip irrigation and drought-resistant crop varieties, ensuring better preparedness against dry spells.

Flood Vulnerability Mapping: Heavy rainfall and floods can devastate crops. GIS models that map flood-prone areas help design better drainage systems, suggest alternative cropping patterns, or provide recommendations for building resilient infrastructure.

Precision Agriculture: Geospatial tools support micro-level decision-making, optimizing the use of resources like water, fertilizers, and pesticides. Precision farming not only improves yields but also reduces environmental stress, contributing to long-term sustainability.

Crop Insurance and Risk Assessment: Remote Sensing-based yield estimation is revolutionizing agricultural insurance. The Government of India's flagship scheme, Pradhan Mantri Fasal Bima Yojana (PMFBY), utilizes satellite and drone data to assess crop losses quickly and fairly, expediting crop insurance claims and reducing disputes.

Carbon Farming Initiatives: As carbon credit markets expand, geospatial data is used to quantify carbon sequestration in agricultural lands. Farmers practicing conservation agriculture or agroforestry can benefit from new income streams while contributing to climate mitigation and sustainability.

Global Success Stories

In Africa, geospatial tools are empowering farmers to adapt to increasingly erratic weather. For example, in Kenya, the Kirinyaga Agricultural Management Information System (Kiri AMIS) uses satellite data and mobile platforms to deliver customized advisories to farmers, significantly improving crop yields and resilience.

Similarly, in India, the recently launched Krishi-DSS platform by the Ministry of Agriculture & Farmers' Welfare integrates satellite data, soil information, and weather forecasts to provide region-specific advisories. This government-backed initiative demonstrates the potential of geospatial intelligence in supporting millions of farmers with operational insights at scale.

Challenges and the Way Forward

Despite its promise and capabilities, the widespread adoption of geospatial technology in farming faces several challenges:

- **Data Accessibility:** High-resolution satellite data can be expensive, and access to real-time data remains limited in many regions.
- **Technical Literacy:** Many farmers, especially small and marginal, are unfamiliar with interpreting geospatial information and require training and support. Furthermore, mapping very small landholdings itself is a challenge.
- **Cost Barriers:** The initial investment in technology - drones, GPS equipment, software licenses - can be prohibitive without adequate financial assistance.

To overcome these barriers, the following steps are necessary:

- **Capacity Building:** Training and capacity-building programs to improve farmers' digital and data literacy are crucial.
- **Public-Private Partnerships:** Collaboration between governments, private sector, NGOs and volunteers can bring down costs, improve technology accessibility and dissemination.
- **Affordable Solutions:** Open-source platforms & satellite data, low-cost sensors and mobile-based advisory services can help democratize access to geospatial intelligence.

With conscious efforts, the benefits of geospatial technology can reach even the most marginalized farmers, helping build resilience at the grassroots level.

Conclusion

Let's first accept that climate change is real and it is reshaping the landscape of agriculture. Therefore, farmers need new tools to navigate the consequential uncertainties. Geospatial intelligence supports the empowerment of farmers with the knowledge they need to anticipate risks, plan accordingly, and adapt effectively with a proactive approach.

Building climate-resilient farms is not just about adopting technology; it is about building a future where farmers can thrive despite the challenges that lie ahead. With the right support and widespread access to geospatial tools, we can ensure that farms remain productive, ecosystems stay healthy, and food security is safeguarded for generations to come. And that's what we call Sustainable Agriculture.

Article - Kesowa

Empowering FPOs: The Potential of An Integrated Drone Data Call Center Solution

As India's agricultural landscape rapidly digitizes, Farmer Producer Organizations (FPOs) are searching for scalable, technology-driven solutions to boost productivity, streamline logistics, and manage risks. Integrating a Drone Data Call Center concept with national digital platforms like AgriStack and the DIGIPIN addressing system could unlock transformative benefits for millions of smallholder farmers.

AgriStack: The Backbone of Digital Agriculture

AgriStack is India's ambitious digital agriculture platform, developed by the government to centralize and streamline all critical farming data. It creates a unified digital identity for every farmer, linking Aadhaar, land records, crop details, and financial information into a single, secure database. Through AgriStack, farmers can easily access government schemes like PM-KISAN, crop insurance, and Kisan Credit Cards, ensuring direct benefit transfers and reducing bureaucratic delays. The platform also supports digital crop surveys, real-time weather and market advisories, and integration with emerging technologies such as AI and IoT, enabling smarter, data-driven decision-making and policy planning for Indian agriculture.

DIGIPIN: Precision Addressing for Rural India

DIGIPIN is India's new digital addressing system, developed by the Department of Posts in partnership with IIT Hyderabad and NRSC, ISRO. It divides the country into approximately 4m x 4m grids, assigning each a unique 10-character alphanumeric code based on latitude and longitude. Unlike traditional PIN codes, DIGIPIN offers precise, location-based identification—even in remote, rural, or unstructured areas—enabling seamless delivery of services, logistics, and emergency response. As an open-source, offline-capable system, DIGIPIN is foundational for geospatial governance and can be integrated with GIS applications, supporting initiatives like Address-as-a-Service (AaaS) and digital public infrastructure.

Envisioning Precision Agriculture at Scale

Hyperlocal Crop Monitoring

Imagine a future where high-resolution drone imagery, seamlessly linked to AgriStack's Crop Sown Registry, delivers:

- Plant-level health analytics using NDVI/NDRE indices aligned with precise plot boundaries
- Early detection of nutrient deficiencies and pest outbreaks via AI-driven image analysis
- Targeted interventions that reduce input costs and improve yields (Drone based spraying)

If realized, such a system could enable FPOs to act proactively—minimizing crop losses and optimizing resource use across their member base.

Reimagining Supply Chain Efficiency

DIGIPIN-Enabled Logistics

By leveraging DIGIPIN's granular geocoding, an envisioned solution could help FPOs:

- Map optimal harvest routes using drone-generated yield forecasts, reducing transportation costs and post-harvest losses
- Geotag warehouses and aggregation points for real-time inventory tracking and efficient stock management
- Facilitate transparent market linkages by certifying produce origin and quality, building trust with buyers

This integration could dramatically cut logistics costs and open new market opportunities for FPOs.

Advancing Financial Inclusion

Geospatial Validation for Credit and Insurance

With AgriStack's digital farmer and land records, plus drone-verified crop data, FPOs could:

- Support collateral-free lending by providing banks with up-to-date, plot-level crop health and yield data
- Automate insurance claims through rapid, AI-powered damage assessments after weather events or disasters

Such a system could make formal finance and insurance more accessible, reducing risk for farmers and lenders alike.

Building Disaster Resilience

Integrated Early Warning and Response

Envision drone networks, synchronized with DIGIPIN's precise location data, providing:

- Real-time flood and drought mapping to identify at-risk plots and assets
- Automated advisories for irrigation, harvest, or relief, delivered directly to FPOs and their members
- Rapid post-disaster assessment to prioritize recovery and compensation

This could empower FPOs to respond faster and more effectively to climate and weather risks.

Existing GIS Use Cases in Indian Precision Farming

GIS (Geographic Information Systems) is transforming Indian agriculture by enabling precision farming practices that optimize input use, enhance yields, and promote sustainability. In Tamil Nadu, GIS-based soil health cards are used to recommend site-specific fertilizer doses for rice and maize, leading to 15–20% savings in fertilizer costs and yield improvements. The Andhra Pradesh Micro-Irrigation Project leverages GIS for mapping soil moisture and topography, resulting in 30–50% water savings and increased productivity in crops like sugarcane and groundnut.

In Maharashtra, the Remote Sensing Application Centre (MRSAC) uses satellite-based GIS tools for real-time crop monitoring and yield forecasting, enabling farmers to adjust practices and reduce input costs. GIS also supports variable-rate application (VRA) of fertilizers, precision irrigation management, and early detection of crop stress or disease using NDVI and thermal imagery from drones and satellites. These technologies help farmers identify field variability, optimize resource allocation, and take timely action against pests or water stress. As a result, GIS-driven precision agriculture is helping Indian farmers achieve higher efficiency, lower environmental impact, and greater resilience to climate change, marking a significant step forward in the modernization of Indian farming.

A Roadmap for FPO Digital Transformation

To realize this vision, FPOs and stakeholders could consider:

1. **Digital Infrastructure Setup**

   Enrolling members in AgriStack

   Tagging FPO assets and land parcels with DIGIPIN codes

2. **Technology Integration**

   Establishing secure data flows between drones, AgriStack, and FPO management systems

   Training FPO staff in digital tools and data interpretation

3. **Workflow Digitization**

   Implementing AI-powered dashboards for decision support

   Enabling mobile access for real-time field insights

Kesowa is committed to collaborating with FPOs, government agencies, and agri-fintech partners to pilot and refine this integrated solution, ensuring it is robust, scalable, and farmer-centric.

Conclusion: Shaping the Future of Connected Farming

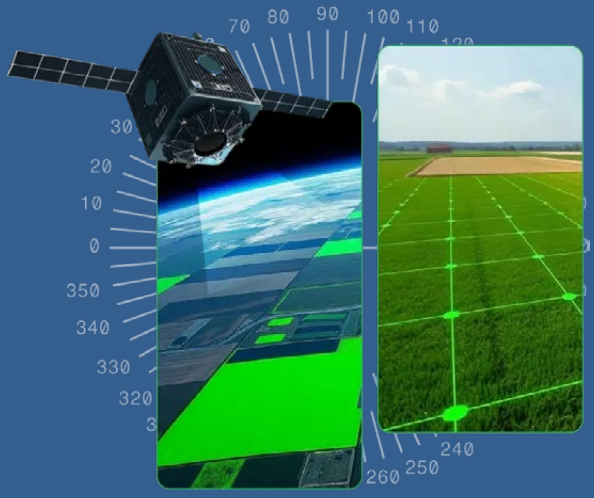
Integrating GIS Data with AgriStack and DIGIPIN has the potential to:

- **Help Farmers plan crop seed purchase** and reduce farmer stress by obtaining insurance
- I**ncrease yields and reduce costs** through data-driven farming
- **Enhance market access** with transparent, certified supply chains
- **Build climate resilience** with rapid, geospatially-enabled disaster response

As India's digital public infrastructure matures, FPOs that embrace such innovations will be at the forefront of the next agricultural revolution—delivering prosperity and security to millions of farmers.

Article - Bhoomicam

Empowering Connected Farming with AI-Powered Geospatial Intelligence



Bhoomicam, founded in October 2022 by Prof. Siddhartha Khare, Faculty at the Geospatial Engineering section of the Civil Engineering Department, IIT Roorkee, is a pioneering deep tech Geospatial AgriTech startup. It is transforming India's agricultural ecosystem by integrating AI and satellite data into scalable, actionable SaaS platforms that enable precision farming, supply chain efficiency, and smart financial decision-making.

At the heart of Bhoomicam's innovation is BhoomiCrop Analytics, a satellite-driven crop intelligence platform offering real-time crop health insights, weather analytics, and localized advisories delivered via WhatsApp in regional languages. This solution directly supports FPOs, government agencies, and agritech companies by equipping them with precise, field-level insights to plan interventions, manage large farmer networks, and optimize resource allocation.

Bhoomicam's B2B model is designed to be plug-and-play, offering modular APIs and dashboards that seamlessly integrate with existing systems. FPOs use the platform to monitor fields across member clusters, prioritize field visits, and deliver customized advisories to hundreds of farmers. Government bodies leverage the tools for district-level crop tracking, weather-based alerts, and planning input subsidies. Private agritech firms utilize the VRA maps and crop health layers to fine-tune product delivery, advisory content, and marketing strategies, improving both outreach and impact.

A key feature, the Variable Rate Application (VRA) Map, enables zone-wise optimization of fertilizers and pesticides, cutting costs and enhancing yields sustainably. The multi-parameter crop monitoring dashboard provides a centralized view of phenology, crop stress, and environmental risk at the field level, making data-driven decisions simple and scalable. In the Geospatial FinTech domain, Bhoomicam's BhoomiScore empowers financial institutions with a satellite-based creditworthiness metric. By evaluating crop productivity, land health, and historical yield trends, BhoomiScore allows banks and insurers to assess loan and insurance applications accurately, reducing dependency on manual surveys and improving access to finance for underserved farmers.

Bhoomicam's API-based SaaS architecture is already in commercial use by agri-input firms, digital agriculture platforms, and FPO tech aggregators. Custom APIs deliver insights such as crop health alerts, irrigation needs, and farm-level yield risk, helping B2B clients serve farmers more intelligently and efficiently.

Real-World Impact

- **1,000+** hectares monitored across India
- 1**0+ FPOs** and agribusiness clients onboarded
- **20–30%** reduction in input cost reported via VRA-based interventions
- **500+ farmers** directly benefiting from satellite-based insights and advisories

Conclusion

Bhoomicam is at the forefront of connected farming—bridging high-end geospatial analytics with ground-level action. Through scalable tools tailored for FPOs, public agencies, and private companies, Bhoomicam is making precision agriculture and financial inclusion accessible for India's smallholder farmers, driving resilience, transparency, and profitability in the agri-value chain.

Startup Showcase – GalaxEye Space

Leading DeepTech Innovation

GalaxEye Space is an IIT Madras incubated space tech startup currently based out of Bangalore. Their team consists of over 50 brilliant individuals who hail from globally prestigious institutes such as ISRO and IITs, along with seasoned industry experts and leaders who advise on both Technology and Business fronts. GalaxEye has had a remarkable journey, marked by significant milestones and achievements that underscore its commitment to innovation and its impact on India's deep-tech landscape.

Some of their recent successes include:

IDEX Partnership – June

GalaxEye joined hands with iDEX under the Ministry of Defence, accelerating the development of indigenous ISR capabilities. This partnership strengthens India's defense innovation ecosystem and validates GalaxEye's mission to deliver advanced Earth observation technologies tailored for national security and mission-critical applications across all terrains and conditions.

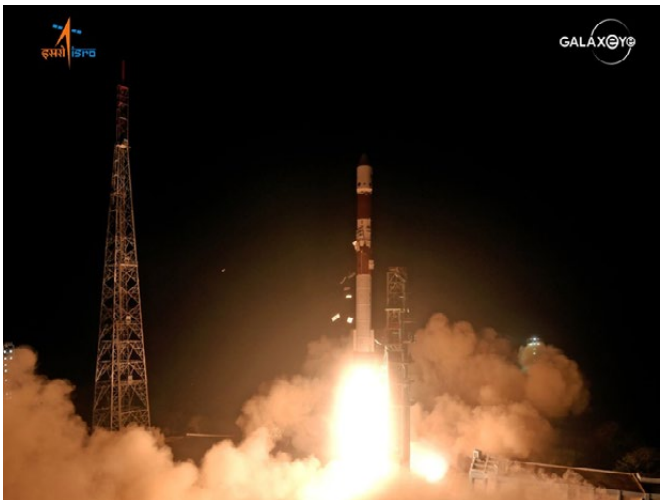
Featured on Mann Ki Baat – August

GalaxEye was featured on Prime Minister Narendra Modi's Mann Ki Baat, recognizing its visionary leap from IIT Madras to building next-generation satellites. This moment spotlighted Indian innovation on a national stage, inspiring young minds and reinforcing the role of deep-tech startups in shaping India's strategic space future.

Series A Closure – November

Successful closure of GalaxEye's Series A funding round, attracting leading investors from defense, AI, and space-tech domains. This capital will propel the commercialization of GalaxEye's multi-sensor satellite, deepen R&D efforts, and accelerate global market entry for its high-resolution, all-weather Earth observation data services.

POEM Mission – Successful Launch – December



GalaxEye's payload successfully launched aboard ISRO's PSLV-C60 under the POEM platform. This historic mission validated the in-orbit performance of critical sensor components, marking a pivotal milestone toward India's first SAR + Optical fusion satellite. It showcased GalaxEye's hardware-readiness and deep-tech leadership in the global space ecosystem.

2.4 km SAR-Optical Drone Image Capture – June
GalaxEye captured and processed its longest drone image, a 2.4 km SAR-optical strip, using Drone Sensor 2. Captured in a single flight and processed fully in-house, this milestone validates the scalability and reliability of GalaxEye's imaging stack, marking a critical step toward end-to-end multi-sensor imaging at scale.

In the Spotlight

Maharashtra Launches MahaAgri-AI Policy 2025–2029 to Embed Geospatial Intelligence in Precision Farming

In mid-June 2025, the Maharashtra Cabinet, chaired by CM Devendra Fadnavis, approved the MahaAgri-AI Policy 2025–2029, earmarking ₹500 crore for the first three years of implementation. This ambitious program is designed to integrate geospatial intelligence, AI, IoT, drones, computer vision, robotics, and predictive analytics into agriculture, ushering in a new era of real-time, data-driven, and climate-resilient farming.

Objectives of the MahaAgri-AI Policy

- **AI + Geospatial-Driven Farming**

  Utilize satellite imagery, drones, IoT sensors, and remote sensing AI to monitor crop health, forecast yields, map soils, and optimize input use.

- **Agricultural Data Exchange (A-DeX)**

  A federated data platform integrating systems like Mahavedh, CropSAP, AgriStack, Bhuvan, FASAL, AgmarkNet, and private datasets to provide actionable spatial intelligence.

- **Vistaar – Regional AI Advisory Platform**

  Launching Vistaar, an AI-powered chatbot/ IVRS/web portal delivering real-time agronomic advice, weather alerts, market info, and pest alerts in Marathi (and other regional languages).

- **Blockchain-Enabled Traceability**

  Implementing QR-code and geotagged blockchain systems to track export-quality produce - starting with grapes, bananas, pomegranates - from farm to consumer.

- **Innovation & Research Ecosystem**

  Establishing an AI & AgriTech Innovation Centre, with R&D hubs at four State Agricultural Universities in collaboration with IITs/IISc, to incubate technologies in robotics, precision irrigation, and spatial AI.

Institutional Framework & Funding

- **Three-tier governance:** State-Level Steering Committee (SLSC), State-Level Technical Committee (SLTC), and an AI & AgriTech Innovation Centre.
- **Centre setups with dedicated funding lines:**
  - ₹30 crore for the Innovation Centre
  - ₹5 crore for the Geospatial Engine
  - ₹10 crore each for A-DeX and Vistaar
  - ₹20 crore earmarked for statewide events, including an Annual Global AI in Agriculture Summit, district-level hackathons, and capacity building.

Phased Rollout Plan

The implementation will occur in four phases:

1. **Phase I (first 3 months):** Institutional setup and platform design
2. **Phase II (within the next year):** Pilot projects in select districts for tools like drones, chatbots, and geospatial systems
3. **Phase III (2026 onwards):** Statewide scaling and integration with national frameworks such as AgriStack and Bhashini
4. **Phase IV (by 2029+):** Independent evaluation, refinements, and sectoral expansion.

Conclusion

With the MahaAgri-AI Policy 2025–2029, Maharashtra becomes the first Indian state to institutionalize state-level precision agriculture powered by geospatial intelligence and AI. By combining advanced spatial analytics, farmer-centric advisory services, transparent tracing mechanisms, and public-private innovation channels, the policy sets a national benchmark for climate-resilient, data-driven, and inclusive agriculture.

Resource Corner

India's agriculture is undergoing a digital transformation, from intuition-based decisions to data-driven precision. The Government of India's flagship initiatives demonstrate the many benefits of location-specific interventions.

Digital Agriculture Mission

Launch: 2024

Ministry: Ministry of Agriculture & Farmers' Welfare (MoA&FW)

Outlay: ₹2,817 crore

Objectives: To establish a unified digital public infrastructure (Agristack), provide reliable crop-related information to farmers, technology-enabled services, and technical and administrative assistance.

Technology Components: Agristack (farmer registry, geo-referenced maps, crop registry), Krishi Decision Support System, comprehensive soil fertility/profile maps, AI/ML, IoT, drones, remote sensing, blockchain, cloud systems, mobile applications.

Data Availability / Access Mode: Centralized databases linked to land records; pilot digital crop surveys across 400 districts in FY 2024–25; access limited to authorized government systems.

Geographic Coverage:

Pan India pilots (≈400 districts) in FY 2024–25; full

Soil Health Card Scheme

Launch: 2015.

Ministry: MoA&FW.

Outlay: Initial outlay of ₹568 crore; funds amounting to ₹1706.18 crore released to various States/UTs so far.

Objectives: To issue soil health cards biennially detailing 12 nutrient and soil parameters, with crop-specific fertilizer recommendations, thus promoting balanced fertilization, reducing input costs, enhancing yields, and encouraging integrated nutrient management.

Technology Components:: GPS-based soil sampling, mobile soil testing labs, GIS nutrient mapping, digital Soil Health Card portal.

Data Availability / Access Mode: Farmer-specific data available via soilhealth.dac.gov.in; public dashboards at the state level.

Geographic Coverage:

All states and UTs; >24.7 crore cards issued across the first two cycles.

FASAL (Forecasting Agricultural Output using Space, Agro Meteorology & Land-based Observations)

Launch: Institutionalized under MNCFC in 2012.

Ministry: MoA&FW; executed by Mahalanobis National Crop Forecast Centre (MNCFC).

Outlay: Not specified.

Objectives: To provide in-season and pre-harvest forecasts on crop area and production, inform procurement, buffer stocking, pricing, drought planning, and trade policies, and offer real-time monitoring on crop health and disaster impact.

Technology Components: IRS satellite remote sensing, agro-meteorological models, GIS, ground observations, and data analytics.

Data Availability / Access Mode: Forecast bulletins and crop maps distributed to MoA&FW and state agriculture departments; restricted access.

Geographic Coverage: National, state, and district levels covering nine crops: rice, wheat, pulses, cotton, jute, sugarcane, etc.

CAYE (Crop Acreage & Yield Estimation)

Launch: Piloted under NADAMS and Digital Agriculture initiatives since circa 2018.

Ministry: MoA&FW via MNCFC/DACFW.

Outlay: Not specified.

Objectives: Scientific yield and acreage estimation using satellite indices (NDVI, LAI) and crop simulation models, supporting insurance mechanisms like PMFBY with data-verified area estimates, improving drought planning, agricultural budgeting, and crop statistics' accuracy by blending remote sensing and models.

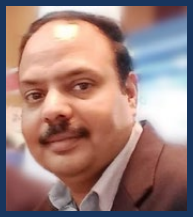
Technology Components: Satellite imagery (NDVI, LAI), GIS analytics, remote sensing, crop simulation, validation surveys.

Data Availability / Access Mode: Maps and periodic reports shared with state agriculture departments and MNCFC; restricted access.

Geographic Coverage: Piloted in Karnataka, Maharashtra, and Andhra Pradesh with planned national scaling.

AGI Office Bearers 2024-26

President
Nikhil Kumar
President - Geospatial, MapmyIndia



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