

IOT enabled Autonomous irrigation and precision farm analytics

Agriculture

Pilot District
Sonipat, Haryana

Geospatial Innovation Accelerator
AWaDH, IIT Ropar

Technology Summary

The proposed solution focuses on empowering farmers through affordability, profitability, and sustainability, by leveraging IoT sensors, weather stations, and satellite data integrated with AI and machine learning. This digital ecosystem delivers timely, field-specific insights that help farmers make informed decisions on irrigation, nutrient use, and crop planning. The result is higher yields (30–70%), reduced cost of cultivation, and water savings of up to 50%, directly enhancing farmer income and resource efficiency.

Affordability is built into the model through low-cost technologies, shared infrastructure, and local service networks that ensure accessibility for smallholders. By combining technology, data intelligence, and agronomic guidance, the solution transforms traditional farming into a profitable, climate-resilient, and water-efficient system, contributing to India's vision of sustainable agriculture and a secure rural future.

Technology Readiness Level:

8

Value Proposition

Our solution empowers farmers through affordable, data-driven, and sustainable agriculture that delivers measurable outcomes at scale. By integrating IoT sensors, weather stations, and satellite data with AI and machine learning, farmers receive real-time, field-specific insights to optimize irrigation, nutrient use, and crop planning. This data-led approach has already enabled over 150 billion liters of water savings, 30–70% yield improvement, and 20–25% reduction in greenhouse gas emissions across multiple projects. These measurable outcomes directly enhance farmer profitability by reducing input and energy costs while increasing productivity and resource efficiency.

The uniqueness of our approach lies in its affordability, scalability, and alignment with national priorities. Designed around the vision of “More Crop per Drop” and “Doubling Farmers’ Income”, our model uses low-cost digital tools, shared infrastructure, and

local service networks to make advanced technologies accessible even to small and marginal farmers. Every rupee invested delivers tangible value saving water, cutting emissions, and putting more money in farmers’ hands while contributing to India’s goals of water security, climate resilience, and sustainable rural growth.

Market Potential / Deployment Plan:

CultYvate has enabled precision irrigation across 50,000+ acres, conserving over 150 billion liters of water and increasing farm yields by up to 70%. Its low-cost ‘Irrigation-as-a-Service’ model empowers small and marginal farmers while supporting India’s ‘More Crop per Drop’ mission. Strong partnerships with EID Parry, ITC, Bayer, IRRI, and IIT Ropar demonstrate scalability, while national

awards and grants validate its leadership in climate-smart irrigation.

Applications:

CultYvate’s IoT-enabled precision agriculture platform extend far beyond its current focus on paddy and sugarcane. Built on a scalable and crop-agnostic architecture, the technology can be effectively applied to a wide range of crops such as cotton, banana, grapes, pomegranate, maize, and other horticultural and field crops. By integrating IoT sensors, weather stations, and satellite data with AI-driven analytics, CultYvate delivers precise, data-based advisories for irrigation, nutrient management, and pest control making it adaptable to diverse climatic conditions, soil types, and irrigation systems.

Its modular design allows deployment across varied geographies, from water-scarce semi-arid regions to flood-prone lowlands, ensuring optimized resource utilization and improved productivity regardless of location. The platform’s digital interface, including SMS and IVR-based advisories in local languages, makes it equally effective in regions with limited internet connectivity. This flexibility enables CultYvate to empower farming communities globally, enhancing sustainability and profitability while addressing challenges related to water use, soil health, and climate resilience across multiple agro-ecological zones.

Environmental / Social Impact:

CultYvate transforms rural livelihoods by combining environmental restoration with economic empowerment. Its IoT irrigation systems conserve 50–60% water per acre and reduce fertilizer use by up to 30%, improving soil health. Farmers earn ₹1.2–2.3 lakh more per year through higher yields and lower costs, while 500+ agripreneurs gain local jobs.

Contribution to Sustainable Development Goals (SDGs):

SDG 2 & 13

