



JAYAWANT SHIKSHAN PRASARAK MANDAL'S  
**RAJARSHI SHAHU COLLEGE OF ENGINEERING**  
Tathawade, Pune-411033



An Autonomous Institute, Affiliated to Savitribai Phule Pune University,  
Approved by AICTE, UG Programs Accredited by NBA, 'A' Grade Accreditation by NAAC

Organize

# INSTITUTE INNOVATION CELL (IIC)



## Innovate for the Future of Farming!

“Dr. Verghese Kurien”

# Agri Hackathon

## 2026

Presentation Date & Time:

3<sup>rd</sup> March to 25<sup>th</sup> March 2026

Eligibility for Team: 5 Students from any branches

4:00 pm to 5:00 pm

(Daily Working Day)

Venue: IIC Center, B Building

Submit the idea:

[innovation\\_coordinator@jspmrscoe.edu.in](mailto:innovation_coordinator@jspmrscoe.edu.in)

# Objectives

1. Considering India's growing population, climate change, and the current uncertainties, the future of agriculture holds the potential and power to reshape our lives.
2. This is college level hackathon where innovators, students, faculty, startups, and others would be competing against each other at different stages.
3. Each winner will receive a prize along with preference in incubation & funding by our agribusiness incubators.
4. Key stakeholders from any department, along with young minds, creative startups, and innovative thinkers, will come together at the hackathon to develop fast, frugal, and impactful solutions to address today's most pressing challenges.
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6. We are bringing together fresh perspectives, disruptive approaches, and cutting-edge research & knowledge. We believe in collaborative impact. Hackathon to be held in RSCOE IIC invites collaboration & participation from across the all department.

**Submit your idea and be a part of the Agri-Tech revolution!**

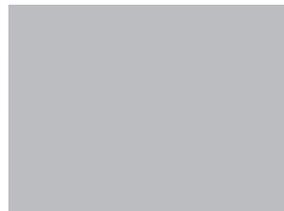
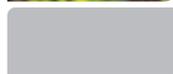
**Eligibility Criteria: Students or Faculty**

**Must be working on one of the 7 Agri-Sectors:**

## Agri-Sectors:

### Technologies for Restoring Soil Health Degradation

- Smart Water Management Including Quality, Automation and Fertigation
- Farm Mechanization: Use of AI and Robotics in Agriculture
- Agro Processing and Value Chain Including Marketing and Export
- Innovations in Renewable Energy in Agriculture and Farm Waste Management
- Plant Protection: Pest and Disease Forecasting and Management
- Innovations in Climate Resilient, Digital and Sustainable Agriculture



# Technical Themes

**The Pune Agriculture Hackathon is divided into following technical themes (Participants are required to submit their projects based on one of the following technical themes or problem statements.)**

## 1. Innovative Technologies for Restoring Soil Health Degradation

Soil degradation poses a serious threat to agricultural sustainability, food and nutritional security, and environmental stability across the globe. Unsustainable cultivation practices, over use of chemical fertilizers and pesticides, erosion, salinization, loss of soil organic carbon and reduced microbial activity have collectively led to declining soil productivity and resilience. Addressing this challenge requires the integration of modern technologies with sustainable management practices to restore and maintain soil health.

Under this theme, participants are invited to propose innovative, technology-driven, and sustainable solutions aimed at restoring, monitoring, and enhancing soil health. The objective is to harness advancements in science and technology to regenerate degraded soils, promote soil biodiversity and ensure long-term agricultural productivity.

## Indicative Focus Areas

- Development of smart soil monitoring systems using IoT, AI, sensors, and data analytics
- Application of biofertilizers, bio-stimulants and beneficial microbes for soil rejuvenation
- Use of remote sensing, GIS and machine learning for soil mapping and predictive health assessment
- Innovative approaches for soil carbon sequestration and regenerative agricultural practices
- Techniques for controlling soil erosion, managing salinity and restoring organic matter
- Recycling agricultural and organic waste into soil amendments through circular economy models
- Decision-support systems and digital platforms for precision soil management and advisory services

## Expected Outcomes

**The proposed innovations should aim to:**

- Restore and enhance the biological, chemical, and physical health of soils
- Promote resource-efficient, climate-resilient, and environmentally friendly farming systems
- Develop scalable and cost-effective models for sustainable soil management



## 2. Innovation in Smart Water Management Including Quality, Automation and Fertigation

Water is the most critical resource for agricultural production, yet its scarcity and inefficient use remain major global challenges. Changing climate patterns, declining water quality and unscientific irrigation practices have intensified the need for smarter, sustainable and technology-enabled water management solutions. This theme aims to encourage innovative, technology-driven approaches for achieving efficient, precise and sustainable water use in agriculture. Participants are invited to develop ideas and prototypes that integrate automation, real-time monitoring and intelligent fertigation to optimize irrigation efficiency, crop productivity and resource conservation.

### Indicative Focus Areas

- Development of smart irrigation systems using IoT, sensors and automation technologies
- AI-and data-driven irrigation scheduling and water management decision-support tools
- Real-time monitoring systems for irrigation water quality and distribution efficiency
- Precision fertigation systems for optimizing nutrient use and minimizing losses
- Integration of renewable energy sources (solar or hybrid) in automated irrigation systems
- Design of low-cost smart water management devices and mobile applications for farmers

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### Expected Outcomes

**Proposals under this theme should focus on:**

- Improving water use efficiency and crop productivity through automation and precision management
- Ensuring water quality and nutrient balance for sustainable farming
- Promoting scalable and affordable technologies adaptable to diverse agricultural systems



### 3. Farm Mechanization: Use of AI and Robotics in Agriculture

Farm mechanization plays a vital role in improving agricultural productivity, timeliness of operations, and reducing labour drudgery. However, traditional mechanization practices often lack precision, adaptability and intelligence required for modern sustainable farming systems. The integration of Artificial Intelligence (AI), robotics and automation is reshaping agriculture by enabling data-driven, efficient and precision-based operations across the entire value chain.

This theme aims to encourage innovative applications of AI and robotics in farm mechanization to address key challenges such as labour scarcity, rising costs and the need for sustainable intensification. Participants are invited to develop prototypes, tools or systems that bring intelligence, automation and efficiency to diverse agricultural operations.

#### Indicative Focus Areas

- Development of AI-enabled autonomous tractors, drones and field robots for precision farming
- Robotic systems for sowing, weeding, spraying and harvesting operations
- Use of machine vision and deep learning for crop health monitoring, pest detection and yield estimation.
- Automation in post-harvest handling, grading and sorting of produce
- Smart mechanization solutions for protected cultivation and greenhouse operations
- Design of low-cost, modular and scalable robotic tools suitable for smallholder farmers

#### Expected Outcomes

**Proposals under this theme should focus on:**

- Enhancing efficiency, precision and sustainability in agricultural operations
- Reducing dependence on manual labour and improving operational safety
- Promoting affordable and adaptable AI-based mechanization models for all farming scales



## 4. Agro Processing and Value Chain Including Marketing and Export

Agro processing and value addition play a pivotal role in enhancing farmers' income, reducing post-harvest losses and creating market-oriented agricultural systems. Strengthening the agri-value chain through innovation, technology and efficient logistics is essential for transforming primary produce into high-value products and promoting global competitiveness in agricultural exports. This theme aims to promote innovative, technology-based and market-driven solutions for improving efficiency, transparency and profitability across the agricultural value chain—from production and processing to marketing and export. Participants are encouraged to design scalable and sustainable models that bridge the gap between farm and market through integration, innovation, and entrepreneurship.

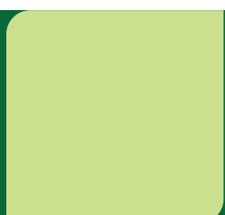
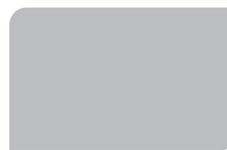
### Indicative Focus Areas

- Development of low-cost, energy-efficient agro processing technologies and equipment
- Digital platforms for traceability, quality assurance and market linkage
- Innovative packaging, storage and cold chain management solutions
- Value addition through food processing, bio-based products and functional foods
- Blockchain and AI applications for supply chain transparency and export facilitation
- Models for farmer–industry integration, cooperative marketing and export promotion

### Expected Outcomes

**Proposals under this theme should focus on:**

- Enhancing value addition, reducing post-harvest losses and improving profitability
- Strengthening agri-supply chains through digital innovation and logistics optimization
- Promoting sustainable and globally competitive agri-processing and export models



## 5. Innovations in Renewable Energy in Agriculture and Farm Waste Management

The growing energy demand in agriculture and the need for sustainable waste management call for innovative, renewable and eco-efficient solutions. Conventional energy use and improper waste disposal not only increase production costs but also contribute to environmental degradation. Harnessing renewable energy and converting farm residues into valuable resources are vital for achieving sustainable, climate-resilient and circular agricultural systems.

This theme invites innovative technologies and models that promote the integration of renewable energy sources and efficient waste utilization in agriculture. Participants are encouraged to develop scalable, cost-effective and environmentally friendly solutions that enhance energy efficiency, reduce emissions and convert waste into wealth.

### Indicative Focus Areas

- Solar, wind, and bioenergy applications for irrigation, cold storage and farm operations
- Biogas, biochar and compost production from agricultural and livestock waste
- Energy-efficient equipment and automation for farm-level operations
- Waste-to-energy technologies and circular bioeconomy models for rural sustainability
- Smart monitoring systems for optimizing renewable energy use in agriculture
- Integration of renewable energy solutions with precision farming and digital technologies

### Expected Outcomes

**Proposals under this theme should focus on:**

- Enhancing energy self-sufficiency and sustainability in agricultural systems
- Promoting effective and eco-friendly management of crop residues and organic waste
- Developing replicable models for renewable energy adoption and waste valorisation



## 6. Plant Protection: Pest and Disease Forecasting and Management

Pests and diseases continue to be major constraints in achieving sustainable crop productivity and food security. Climate change, intensive cropping systems and the introduction of invasive species have further complicated plant protection strategies, leading to significant yield losses and economic damage. Early detection, accurate forecasting and timely management of pest and disease outbreaks are therefore critical to resilient and sustainable agriculture.

This theme seeks innovative, data-driven and sustainable solutions for pest and disease monitoring, forecasting and management. Participants are encouraged to develop intelligent systems, decision-support tools and eco-friendly technologies that minimize chemical dependency and enhance crop protection efficiency.

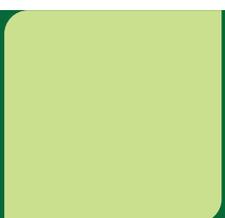
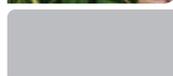
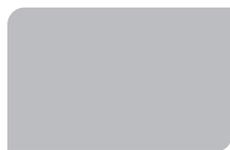
### Indicative Focus Areas

- AI and machine learning models for pest and disease prediction based on weather and crop data
- Smart sensor networks, drones and remote sensing tools for early detection and surveillance
- Mobile applications and digital platforms for real-time advisory and decision support
- Biocontrol agents, botanical formulations and precision pesticide delivery systems
- Integrated pest management (IPM) models emphasizing ecological and sustainable approaches
- Predictive analytics for regional pest and disease outbreak risk assessment

### Expected Outcomes

**Proposals under this theme should focus on:**

- Enhancing accuracy and timeliness of pest and disease forecasting
- Reducing losses and input costs through precision-based plant protection
- Promoting sustainable, eco-friendly and farmer-centric pest management systems



## 7. Innovations in Climate Resilient, Digital and Sustainable Agriculture

Climate change poses unprecedented challenges to global agriculture, affecting productivity, resource availability and livelihood security. Building climate-resilient and sustainable agricultural systems requires innovative solutions that integrate advanced digital technologies with eco-friendly and adaptive farming practices. Digital transformation and data-driven decision-making offer new opportunities to enhance resilience, efficiency and sustainability across the agricultural value chain.

This theme invites innovative and technology-enabled solutions aimed at fostering climate-resilient, digitally empowered and sustainable agricultural systems. Participants are encouraged to develop models, platforms and tools that enhance adaptability, reduce vulnerability and promote resource-efficient and environmentally responsible farming.

### Indicative Focus Areas

- Digital platforms and AI-based tools for climate-smart decision support and risk management
- Remote sensing, GIS, and data analytics for climate monitoring and adaptive crop planning
- Climate-resilient cropping systems and sustainable land use models
- Smart weather forecasting, early warning and advisories for farmers
- IoT and automation solutions for precision and resource-efficient agriculture
- Renewable energy integration and circular bioeconomy approaches for sustainability
- Application of digital technologies for plant breeding and crop improvement
- Digital technology applications in crop management for precision, monitoring, quality production and enhanced productivity

### Expected Outcomes

**Proposals under this theme should focus on:**

- Enhancing resilience of farming systems to climate variability and extremes
- Promoting digital innovation for sustainable resource management and productivity
- Developing scalable, inclusive and environmentally responsible agricultural models



## Organizing Committee

**Mrs. Dipali Magdum**  
Convenor, IIC

**Dr. Nidhi Jain**  
Member, IIC

**Mrs. Vijay Barkade**  
Member, IIC

**Mrs. Surbhi Singh**  
Member, IIC

**Mrs. Meghana Pathnkar**  
Member, IIC

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Member, IIC

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Member, IIC

**Dr. Sachin Argade**  
CEO, IIF

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