# SMART INDIA HACKATHON

- **Problem Statement ID: 1639**
- **Problem Statement Title: Sustainable Fertilizer Usage Optimizer for Higher Yield**
- **Theme: Agriculture, FoodTech & Rural Development**
- **PS Category: Software**
- **Team Name: Flankers**

JECRC UNIVERSITY
BUILD YOUR WORLD

# Sustainable Fertilizer Usage Optimizer for Higher Yield

## Idea Title and Proposed Solution:

- Idea Title: AI-Powered Sustainable Fertilizer Optimizer
- Proposed Solution:
- Develop an AI-powered platform that analyzes real-time soil data, crop type, and weather patterns to recommend optimal fertilizer usage.
- Integrate IoT sensors for continuous soil monitoring and use weather forecasting models to enhance fertilizer application timing.
- Include offline capabilities, multilingual support, and real-time alerts to make the solution widely accessible to farmers across India.

FERTILIZER

# TECHNICAL —— APPROACH

## Technologies Utilized:

- Frontend: React.js for web interface
- Backend: Node.js with Express.js
- Database: MongoDB for storing soil, crop, and weather data
- AI/ML Models: Python for fertilizer recommendations
- IoT Sensors: To monitor real-time soil health parameters (pH, moisture, nutrients)
- Weather API: OpenWeatherMap for real-time weather forecasting
- Methodology:
- Data flow: Farmer inputs → Soil/Crop/Weather data collection → AI model processing → Fertilizer recommendations → Real-time feedback to farmers.
- Use flowcharts to visually explain the data flow, from IoT sensors to AI processing and recommendations.

# Feasibility and Viability

## Feasibility:

- Technologically feasible using AI, IoT, and weather forecasting technologies.
- Scalable, cost-effective solution, accessible to small farmers with affordable IoT sensors.

## Challenges:

- Data availability: Incomplete soil health data in some regions.
- Farmer adoption: Farmers might resist new technologies.

## Overcoming Challenges:

- Collaborate with local agricultural bodies for data collection and validation.
- Offer localized interfaces and training programs to make the app user-friendly.
- Provide incentives for farmers to adopt the app, such as government scheme integration.

# Impact and Benefits

## Target Audience Impact:

- Enables farmers to make informed, data-driven decisions regarding fertilizer application.
- Improves crop yields while promoting sustainable soil health management.

## Social, Economic, and Environmental Benefits:

- Economic: Increases farmers' incomes by optimizing fertilizer usage and reducing costs.
- Environmental: Prevents soil degradation and reduces the risk of fertilizer runoff, protecting the environment.
- Social: Fosters a community-driven platform, allowing farmers to share knowledge and access government schemes.
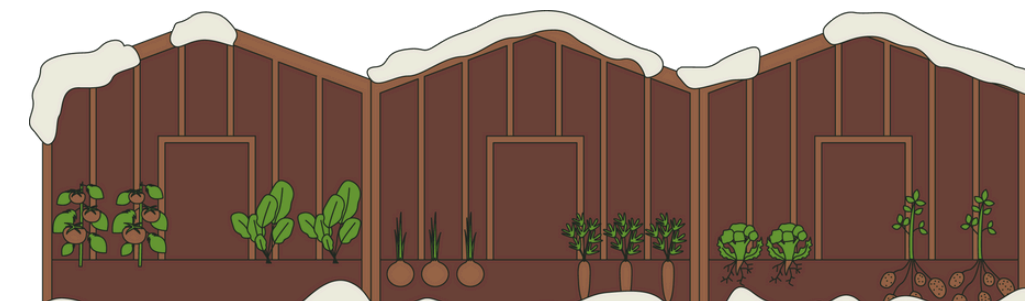
# ⚒ Innovation and Uniqueness ⚒

- Introduces a community-driven experience-sharing platform where farmers can share success stories and tips.
- Offline document downloads ensure farmers have access to guidelines and best practices, even without internet connectivity.
- AI-based integration with government schemes to recommend subsidies and incentives relevant to individual farmers.
- Multilingual support ensures the app is accessible in regional languages, using AI-powered real-time translation.
- Real-time weather alerts help farmers time their fertilizer applications based on current weather data, improving efficiency
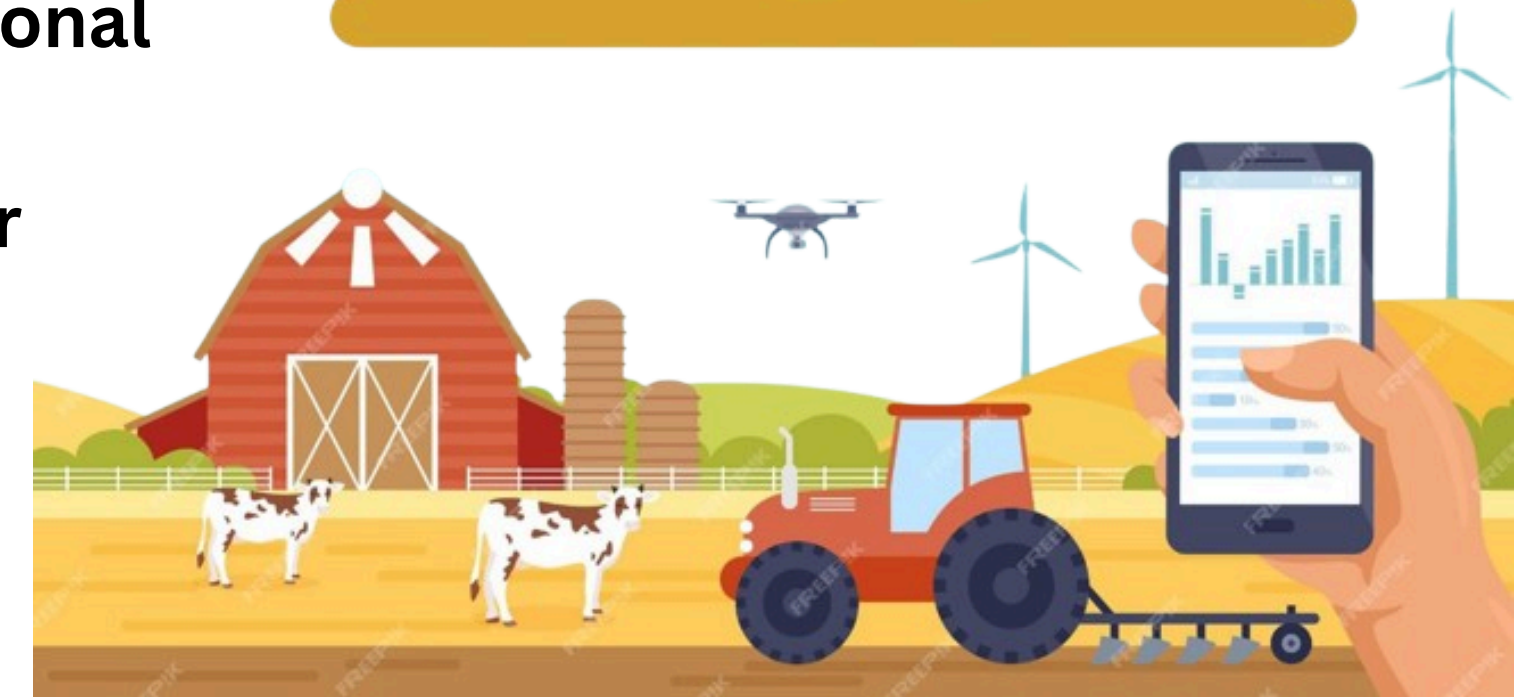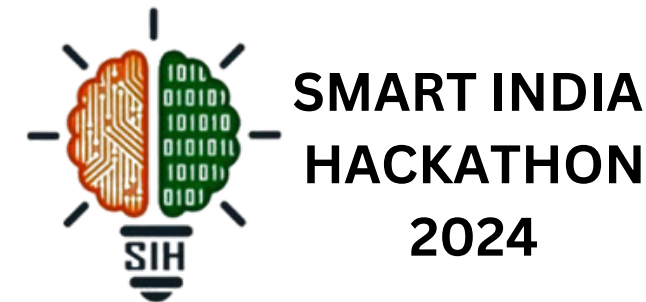
# Team Member Details

**Team Leader Name: Kundan Solanki(B.Tech.)**                    **C.S.E.**                **III**

**Team Member 1 Name: Saif Sahun(B.Tech.)**                    **C.S.E.**                **III**

**Team Member 2 Name: Yug Nadheria(B.Tech.)**                    **C.S.E.**                **III**

**Team Member 3 Name: Arnavee Mohanty(B.Tech.)**                    **C.S.E.**                **III**

**Team Member 4 Name: Drashti Verma(B.Tech.)**                    **C.S.E.**                **III**

**Team Member 5 Name: Pratibha Kanwar(B.Tech.)**                    **C.S.E.**                **III**