SMART INDIA HACKATHON 2025

- **Problem Statement ID** - 25030
- **Problem Statement Title** - AI-Based Crop Recommendation For Farmers
- **Theme** - Agriculture, FoodTech & Rural Development
- **PS Category** - Software
- **Team Name** - Code Catalyst

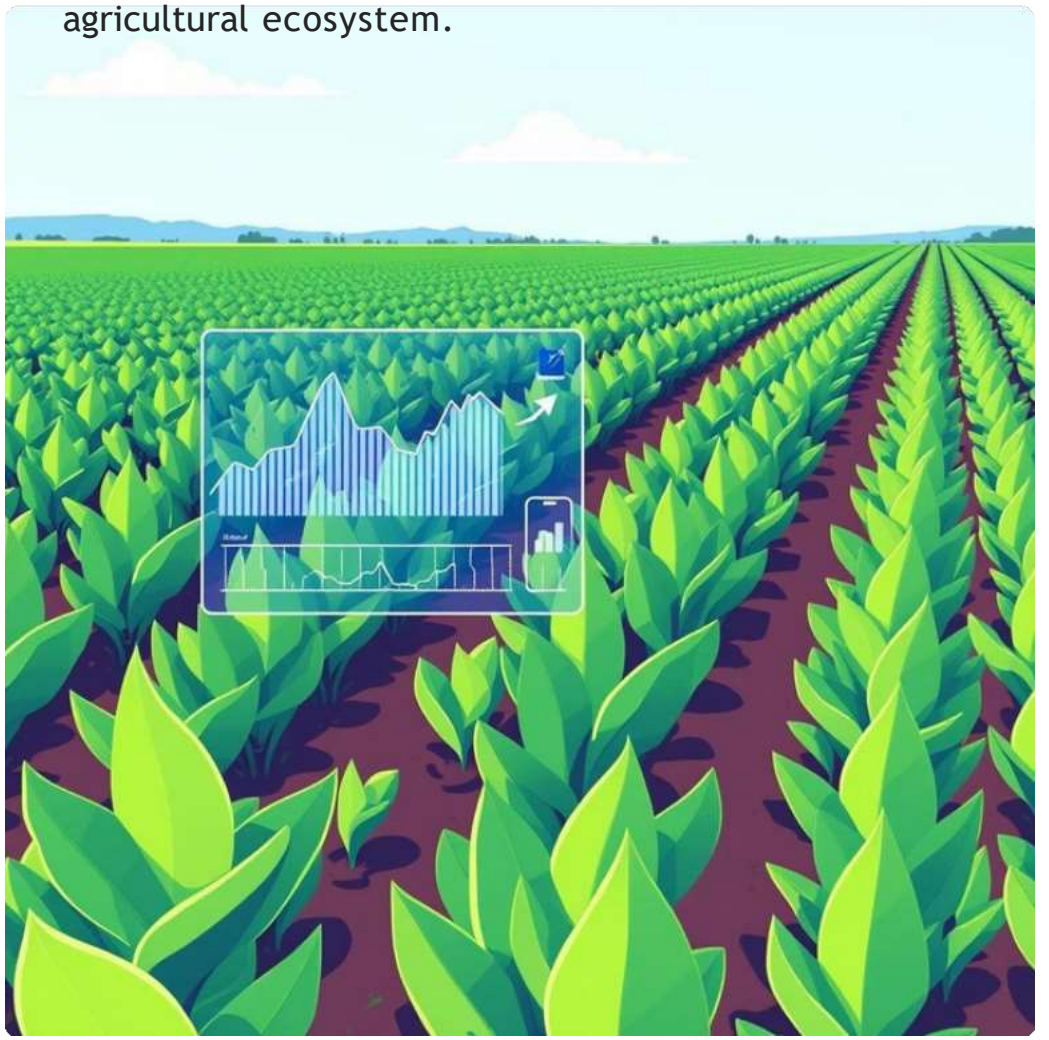
The Challenge: Suboptimal Farming

- Traditional practices lead to low yields & financial losses.
- Inefficient resource use (water, fertilizer).
- Lack of data-driven tools for small farmers.
- Climate change and soil degradation intensify risks.

Our Solution:

A digital platform using Machine Learning for precise crop recommendations.

- Analyzes 7 key environmental and soil parameters.
- Suggests profitable and sustainable crops.
- Empowers farmers with accessible, data-driven insights.
- Bridges the information gap for a connected agricultural ecosystem.



Technical Approach: From Data to Recommendation

1

1. Data Input

Farmer provides Soil Data (N, P, K, pH) & Temperature.

2

2. Data Processing

Input data pre-processed for feeding into the model

3

3. ML Model

Random Forest model trained on 2200+ records predicts the best crop.

4

4. Recommendation

Optimal crop displayed on user-friendly interface.

Technology Stack

- **Frontend:** HTML, CSS, JS
- **Backend:** Flask (Python),
- **ML Model:** Scikit-learn, Pandas
- **Deployment:** Render

Key Features & Kisaan Mitra's Edge

High-Accuracy Recommendations

7-parametermodel (N,P, K, pH, Temp, Humidity, Rainfall) ensures scientific, precise advice.

Simple & Accessible Interface

Designed for all farmers,regardlessof digital literacy, with multiple vernacular language support.

Zero-Cost for Farmers

Builton open-sourcetechnologies, making it free and accessible to every farmer.

Extensible Platform

Architectureallows easyaddition of future modules like fertilizer, pest detection, and market prices.

Impact & Viability: Cultivating a Better Future

Profound Impact

- **Increased Farmer Profitability:** Optimized crop selection leads to higher yields and income.
- **Sustainable Agriculture:** Promotes soil health and reduces resource depletion.
- **National Food Security:** Improves productivity, contributing to a stable food supply.
- **Data-Driven Policy Making:** Aggregated data informs government resource allocation.

Feasibility & Viability

- **Strong Government Alignment:** Supports "Digital India" and "Doubling Farmers' Income."
- **High Adoption Potential:** Leverages growing smartphone and 4G penetration in rural India.
- **Technically Feasible:** Proven, robust, low-cost technology stack.
- **Scalable & Non-Disruptive:** Integrates seamlessly without overhauling existing systems.

Future Roadmap & Conclusion

Phase 1: Pilot Launch

Pilot in2-3districts(500+farmers), 10+ vernacular languages.

Phase 2: Feature Expansion

Fertilizer Recommendation &real- time Mandi (Market) Price API.

Phase 3: Advanced Development

Native Android app, AI-powered Pest & Disease Detection (camera).

Thank You

GitHub Link: **htt ps://github.com/Aakash-1857/Crop-Recommendation-System**