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# AI for Bharat Hackathon

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Problem Statement : Empowering Small-Scale Farmers with Digital Tools for Better Decision-Making

## Brief about the Idea

KrishiSahayak is a comprehensive, multilingual, AI-powered mobile platform designed to empower over 160 million Indian farmers with real-time agricultural intelligence. The platform integrates with Government of India's Digital Public Infrastructure (DPI) including IMD weather services, AGMARKNET market prices, AgriStack farmer registry, and Bhashini for 22+ Indian languages.

The solution provides farmers with 7-day weather forecasts, location-based crop recommendations using GAEZ v4 framework, crop rotation planning, government scheme discovery, real-time mandi prices, disease detection via AI vision models, IoT device integration, and a voice-powered AI agent for natural language queries in their native language.

## What Makes KrishiSahayak Different

- Deep DPI Integration: First platform to integrate all major Government DPIs – IMD, AGMARKNET, AgriStack UFSI, and Bhashini – creating a unified farmer experience
- Voice-First AI for Low Literacy: Bhashini-powered voice agent in 22+ languages enables farmers with limited digital literacy to access critical information through natural conversation
- Offline-First Architecture: Critical features work without internet connectivity, addressing India's rural connectivity challenges with cached weather, schemes, and crop data

# Core Features

## Weather Intelligence

7-day IMD forecasts, nowcast alerts, agromet advisories

## Crop Recommendations

GAEZ-based suitability, rotation planning, yield prediction

## Government Schemes

Central and state scheme discovery, eligibility checking

## Market Intelligence

Real-time AGMARKNET mandi prices, trend analysis, alerts

## AI-Powered Tools

Disease detection, voice agent (22+ languages), IoT integration

# User Journey Flow

## 1. Registration & Onboarding

Farmer signs up via AgriStack UFSI → Profile creation with farm details

## 2. Daily Weather Check

View 7-day forecast → Receive alerts → Plan activities (sowing, irrigation)

## 3. Crop Planning

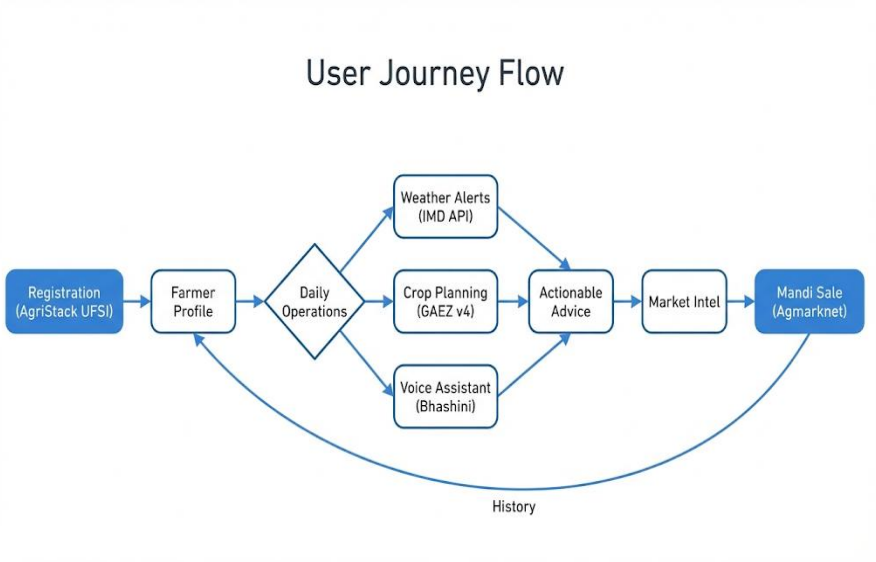
Get recommendations → Plan rotation → Estimate yields → Track inputs

## 4. Voice Assistance

Ask questions in native language → Get instant answers via voice/text

## 5. Market Intelligence

Check mandi prices → Find nearest mandi → Decide harvest timing



# Key Features Dashboard

## Farmer Dashboard

Unified view of farm status, weather alerts, upcoming activities, yield predictions

## Voice Interface

Push-to-talk interface with conversation history, language selector, text fallback

## Disease Detection

Camera-based capture, AI analysis, treatment recommendations, expert referrals

## Admin Portal

Document upload, scheme management, vector search, user analytics, audit logs

# System Architecture

## Frontend Layer

Angular Progressive Web App, optimized for low-end devices

## Backend Services

Spring Boot microservices (User, Weather, Crop, Scheme, Mandi, IoT, Admin)

## AI/ML Services

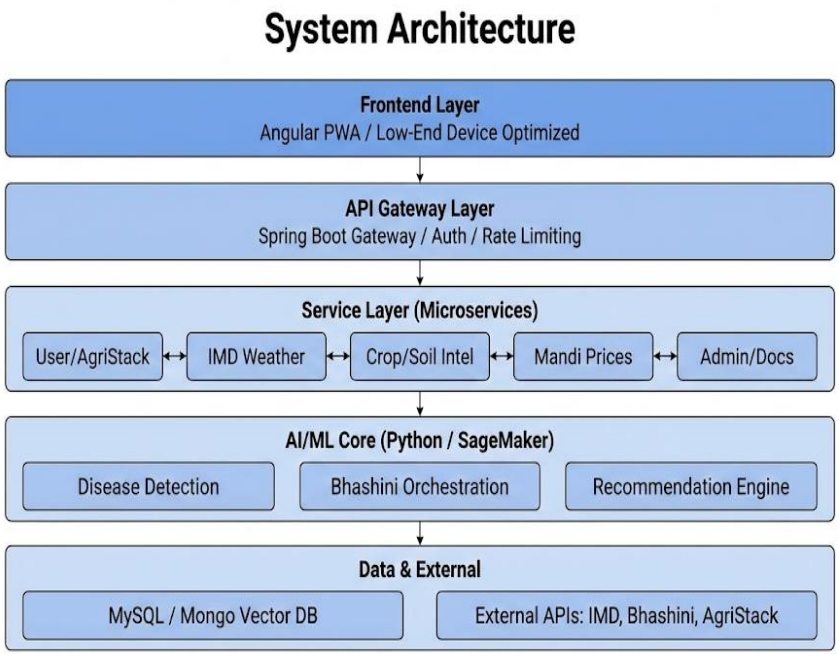
Python (disease detection, yield prediction, recommendations, voice orchestration)

## Data Layer

MySQL (transactional), MongoDB (vector search), Redis (caching)

## External Integrations

IMD Weather, AGMARKNET, AgriStack UFSI, Bhashini APIs



# Technology Stack

## Frontend

Angular 18, TypeScript, Progressive Web App, Service Workers

## Backend

Spring Boot 3.x (Java 17), Spring Cloud, Spring Security, REST APIs

## AI/ML

Python 3.11, TensorFlow/PyTorch, FastAPI, scikit-learn, pandas

## Databases

MySQL 8.0, MongoDB 7.0 (vector search), Redis 7.0

## DevOps & Cloud

AWS (EC2, RDS, S3, Lambda), Docker, Kubernetes, CI/CD pipelines

# Implementation & Expected Impact

## Deployment Strategy

AWS Infrastructure (EC2, RDS, S3), Kubernetes orchestration, CI/CD pipelines

## Scalability

Designed for 1M+ concurrent users with horizontal scaling and 99.5% uptime SLA

## Expected Impact

15-20% increase in crop yields through optimized planning and timely interventions

## Financial Benefits

Better market prices via timing optimization, reduced input costs through precision farming

# AWS AI Services Integration

### Amazon SageMaker

Training and deploying ML models for disease detection and yield prediction

### Amazon Bedrock

Powering voice agent with foundation models for intelligent conversations

### Amazon Rekognition

Image analysis for crop disease detection and pest identification

### AWS Lambda

Serverless functions for real-time data processing and API orchestration

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## Thank You