

Smart Agriculture System Proposal (Kenya Context)

1. Project Overview

Kenya’s agriculture sector is vital to its economy, but farmers face challenges such as unpredictable weather, poor soil quality, and limited access to modern technology. This proposal outlines a smart agriculture system that leverages AI and IoT to enhance crop yield prediction, soil health monitoring, and precision irrigation, with a focus on smallholder farms.

2. Sensors Required

Sensor Type	Purpose
Soil Moisture Sensor	Measures soil water content to optimize irrigation
Soil pH Sensor	Tracks acidity levels for crop compatibility
Temperature Sensor	Monitors air and soil temperature to guide planting and harvesting
Humidity Sensor	Assesses atmospheric moisture, influencing fungal disease risks
Light (UV/IR) Sensor	Monitors sunlight exposure for optimal photosynthesis
Rainfall Sensor	Tracks precipitation patterns, reducing irrigation when rain is present
GPS Module	Maps field data geographically for AI mapping and decision-making

3. AI Model for Crop Yield Prediction

Model Type: Random Forest Regressor or LSTM (Long Short-Term Memory) for time series prediction.

Inputs:

- ✓ Historical crop yields
- ✓ Weather data (temperature, rainfall)
- ✓ Soil data (moisture, pH)
- ✓ Crop type
- ✓ Farming practices (e.g., fertilizer use)

Output: Predicted yield per acre or per crop cycle

The AI model will be trained on localized datasets from Kenyan counties (e.g., Uasin Gishu, Meru, Nyandarua) to ensure region-specific accuracy.

4. Local Integration Features

- ✓ **M-Pesa Integration** for automated farm inputs ordering and AI report delivery
- ✓ **Swahili & English Interface** to increase accessibility
- ✓ **Offline Data Syncing** for areas with poor connectivity

5. Expected Benefits

- ✓ Improved yields through precision decision-making
- ✓ Efficient water use in arid and semi-arid lands (ASALs)
- ✓ Early detection of risks such as drought or disease
- ✓ Empowerment of Kenyan farmers with data-driven insights

