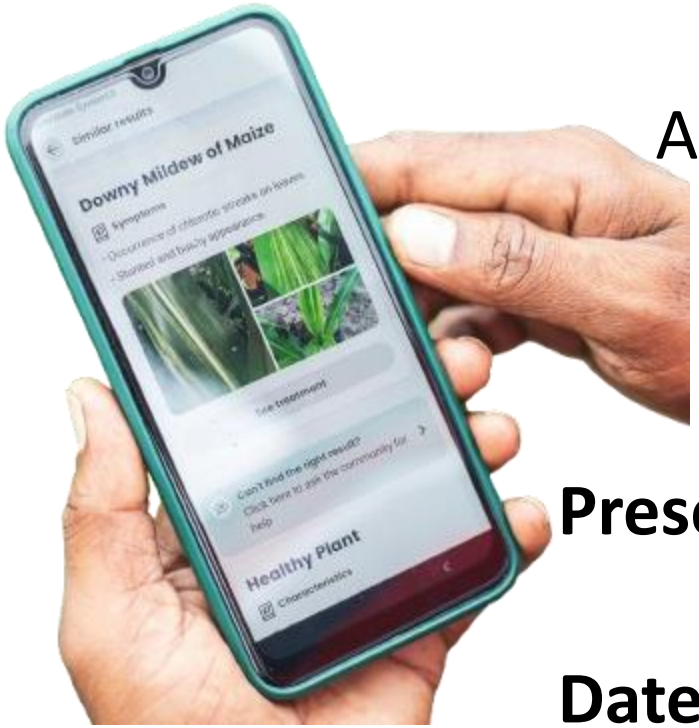
AgriScan: Empowering Farmers with AI-Driven Soil Health Analysis



A Proposal for a Mobile Solution to Combat Crop Nutrient Deficiency

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- **Nutrient Blindness:** Farmers cannot easily or affordably determine the specific nutrient deficiencies (Nitrogen, Phosphorus, Potassium) in their soil in real-time.

Def. Potassium

Def. Nitrogen

Def. Phosphorus

Consequences of Deficiency:

- **Reduced Yields:** Up to 30-50% crop loss
- **Poor Crop Quality:** Stunted growth, discolored leaves, low nutritional value.
- **Inefficient Resource Use:** Farmers may over-apply fertilizers, increasing costs and causing environmental harm.
  Use wrong fertilizers.

Current Solutions

- **Lab Soil Tests:** Expensive, time-consuming (days or weeks), and often inaccessible to smallholder farmers.
- **Visual Guesswork:** Unreliable and requires expert knowledge, leading to misdiagnosis.

Our Solution: AgriScan - Lab in Your Pocket

- **AgriScan** is a mobile application that uses smartphone cameras and artificial intelligence to diagnose soil nutrient deficiencies instantly.
- **How it Works (Simple & Intuitive):**
  - **CAPTURE:** The farmer takes a picture of the maize plant's lower leaves.
  - **ANALYZE:** Our AI model processes the image, analyzing color, texture, and patterns.
  - **REPORT:** The farmer receives an immediate, easy-to-understand report.

Key Features:

- **Real-time Analysis:** Results in seconds, not weeks.
- **No Internet Required:** Works offline, perfect for remote fields.
- **Low-Cost & Accessible:** Uses technology farmers already own – their mobile phones.
- **User-Friendly:** Designed for farmers with simple icons and local language support.

The Value: Instant, Actionable Feedback

After analysis, the farmer receives a clear report with three critical pieces of information:

- **Identified Deficiency:**
  - Clearly states whether the soil is lacking **Nitrogen (N), Phosphorus (P), or Potassium (K)**.
- **Confidence Level:**
  - Presents a percentage (%) score indicating the AI's certainty in the diagnosis (e.g., "95% Confident").
  - Builds trust and helps the farmer make an informed decision.
- **Personalized Recommendations:**
  - **What to Add:** Suggests the specific type of organic or inorganic fertilizer (e.g., Urea, DAP, MOP).
  - **How Much:** Provides a data-driven quantity recommendation (e.g., kg per acre) based on the severity of the deficiency.

How It Works: The Technology Behind AgriScan

- **Data Collection & Model Training:**
  - We shall compile a vast dataset of thousands of images of maize leaves with known nutrient deficiencies, validated by agronomists and lab tests.
  - This data trains our proprietary Convolutional Neural Network (CNN) AI model.
- **On-Device Processing:**
  - The trained AI model will be optimized to run directly on the farmer's smartphone.
  - This ensures speed, privacy, and offline functionality.
- **Continuous Learning:**
  - With user permission, we will collect new data to continuously improve the model's accuracy over time, adapting to new regions and crop varieties.


thank you