



# Precision Agriculture Sensors in Nigerian Rice Farming Communities: Yield Enhancements and Soil Health Monitoring

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## Abstract

Precision agriculture sensors are increasingly used to optimise crop management in various agricultural settings globally. In Nigeria, rice farming communities face challenges related to yield variability and soil health monitoring due to climate change and inconsistent farming practices. A mixed-method approach was employed, combining field trials with remote sensing techniques. A linear regression model was used to predict yield based on sensor readings of soil moisture and nutrient content. Uncertainty in predictions was quantified using standard errors from the model's output. The sensors demonstrated a significant positive correlation ( $R^2=0.85$ ) with actual rice yields, indicating their reliability in predicting optimal planting conditions. Soil health monitoring revealed that varying soil pH levels affected nutrient uptake and crop yield variability by up to 15%. Precision agriculture sensors offer a reliable method for optimising rice farming practices in Nigeria, contributing to sustainable agricultural productivity and environmental stewardship. Farmers should adopt these sensors as part of their routine monitoring systems. Policies should support the integration of precision agriculture technologies into national agricultural strategies. Precision Agriculture, Rice Farming, Soil Sensors, Yield Prediction, Precision Management

**Keywords:** *African Agriculture, Precision Farming, Geospatial Analysis, Sensor Technology, Soil Science, Data Analytics, Remote Sensing*

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