



Precision Agriculture Practices for Maize Yield Enhancement in Ugandan Villages: Comparative Analysis

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Abstract

Precision agriculture involves the use of advanced technologies such as GPS, drones, and sensors to optimise crop management practices for increased yields and resource efficiency. A comparative analysis was conducted across three Ugandan villages, where farmers were randomly assigned to control (traditional practices) or intervention groups (precision agriculture techniques). Data collection included yield measurements, soil moisture levels, and farmer surveys on adoption rates. Precision agriculture led to an average yield increase of 15% compared to traditional methods. Variance in yield improvements between VRA and precision irrigation was significant, with VRA showing a higher growth rate than precision irrigation alone ($p < 0.01$). The study confirms the effectiveness of precision agriculture techniques in enhancing maize yields in Ugandan conditions. Farmers should be provided with training and support to adopt these technologies, which can help improve food security in rural areas. Precision Agriculture, Maize Yield Enhancement, Uganda, Variable Rate Application, Precision Irrigation Model estimation used $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \{ \theta \} \operatorname{sumiell} (y_i, f\theta(\xi)) + \lambda l \operatorname{Vert} \theta r \operatorname{Vert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: African Geographic Information Systems (AGIS), Geographical Positioning System (GPS), Remote Sensing (RS), Sensor Networks, Precision Farming, Yield Forecast Modelling, Agroecosystem Analysis

ABSTRACT-ONLY PUBLICATION

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