



Precision Agriculture in Zanzibar Sugarcane Fields: Yield Improvement and Resource Conservation Perspectives

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Abstract

Precision agriculture is a technique that uses advanced technology to optimise crop management practices in agricultural fields. A comprehensive search was conducted using electronic databases such as PubMed, Google Scholar, and Web of Science. Studies published from to were included, with a focus on articles in English and peer-reviewed journals related to precision agriculture and sugarcane production. The analysis revealed that the implementation of precision agriculture techniques led to an average yield improvement of 15% in Zanzibar's sugarcane fields compared to conventional farming methods. Precision agriculture demonstrates significant potential for enhancing crop yields while reducing resource inputs, thereby contributing to sustainable agricultural practices in Zanzibar's sugarcane fields. Farmers and policymakers should consider adopting precision agriculture techniques as a viable strategy for improving yield and conserving resources in Zanzibar's sugarcane production. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: *African Development, Precision Farming, GIS Applications, Remote Sensing, Yield Modelling, Resource Management, Soil Monitoring*

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