



Precision Farming in Urban Slums: Adoption and Impact Study in Nairobi, Kenya

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Abstract

This study addresses a current research gap in Computer Science concerning Adoption of Precision Farming Techniques in Urban Slums of Nairobi, Kenya: Three-Year Impact Study in Kenya. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A mixed-methods design was used, combining survey and interview data collected over the study period. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Adoption of Precision Farming Techniques in Urban Slums of Nairobi, Kenya: Three-Year Impact Study, Kenya, Africa, Computer Science, original research This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{rVert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: *African Geography, Precision Agriculture, GIS Applications, Participatory Rural Appraisal, Remote Sensing Technology, Spatial Analysis, Data Mining Techniques*

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