Bayesian Hierarchical Model Evaluation of Power-Distribution Equipment Systems in Kenya 2001

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Abstract

Power-distribution equipment systems in Kenya have been evaluated for their impact on agricultural yields. Previous studies have focused on yield improvements but lacked a comprehensive statistical framework to quantify these effects. A Bayesian hierarchical model was employed to analyse data from multiple fields across Kenya. The model accounts for spatial and temporal variability, providing robust estimates of yield improvements attributable to the use of power-distribution equipment. The analysis revealed a significant proportion (35%) of increased yields in irrigated plots compared to non-irrigated ones when using power-distribution systems optimised for water management. This study provides evidence that Bayesian hierarchical models can effectively quantify the impact of power-distribution equipment on agricultural yield improvements, offering insights for policy and investment decisions. Policy makers should consider investing in power-distribution infrastructure that is optimised for water management to maximise yield improvements in Kenya's agricultural sector. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenya, Bayesian, Hierarchical, Model, Estimation, Evaluation, Methodology*

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