



Methodological Evaluation of Power-Distribution Equipment Systems in Uganda: A Randomized Field Trial

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Abstract

Power distribution equipment systems are crucial for agricultural productivity in Uganda, yet their adoption rates vary significantly. A randomized controlled trial (RCT) was conducted among Ugandan farmers to measure the effectiveness of different power distribution models, employing statistical analysis for data interpretation. The RCT revealed that the hybrid solar-diesel model had a higher adoption rate (85%) compared to purely diesel systems (70%), with significant differences statistically significant at $p < 0.01$. The randomized field trial provided robust evidence on which power distribution models are more suitable for Ugandan farmers, facilitating informed decision-making in technology deployment. Farmers should be encouraged to adopt the hybrid solar-diesel systems due to their superior adoption rates and economic benefits. Policy makers should consider subsidies or incentives for these systems. Power Distribution Systems, Randomized Field Trial, Adoption Rates, Hybrid Solar-Diesel, Ugandan Farmers The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, randomized controlled trial, power distribution systems, adoption rates, engineering evaluation, statistical analysis, geographic information systems*

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