



Evaluation of Power-Distribution Equipment Systems in Tanzanian Rural Areas: A Randomized Field Trial on Yield Improvement

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Abstract

Power distribution equipment systems (PDES) play a crucial role in rural areas of Tanzania by providing reliable electricity to support various economic activities and improve living standards. A randomized field trial was conducted in six villages across Tanzania's rural areas. Participants were randomly assigned to different PDES configurations, with control groups receiving standard equipment as a baseline measure. The study revealed that the optimised PDES configuration increased agricultural yields by an average of 15% compared to the control group, although there was considerable variability among villages. This randomized field trial demonstrated that tailored PDES systems can significantly enhance agricultural productivity in Tanzanian rural settings. The findings provide a roadmap for policymakers and implementers seeking to improve energy access and utilization in these areas. Policies should prioritise the adoption of optimised PDES configurations based on this study's results, with ongoing monitoring and adjustments to ensure continued effectiveness and cost-efficiency. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, Rural electrification, Randomized controlled trial, Power-distribution systems, Energy access, Sustainable development, Economic empowerment*

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