



Methodological Evaluation of Power-Distribution Equipment Systems in Tanzania: Quasi-Experimental Design for Yield Improvement

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Abstract

Power-distribution equipment systems (PDES) play a critical role in agricultural productivity in Tanzania, where they can enhance yield by ensuring consistent power supply to irrigation pumps. A mixed-methods approach combining surveys, interviews, and yield data collection was employed. Quasi-experimental techniques were used to compare treated (equipped with PDES) versus control farms over a two-year period. Field experiments showed that equipped farms achieved an average 20% higher crop yields compared to controls, particularly in maize and beans crops. The quasi-experimental design demonstrated significant yield improvements attributable to the installation of PDES. These results suggest substantial potential for increasing agricultural productivity. PDES should be prioritised as a cost-effective investment for farmers aiming to enhance crop yields, with further research needed on long-term sustainability and economic benefits. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u + \epsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: African development, power distribution systems, yield enhancement, quasi-experimental design, econometrics, agricultural productivity, rural electrification

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