



Methodological Evaluation of Power-Distribution Equipment Systems in Tanzania: Panel Data Estimation for Yield Improvement Analysis

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Abstract

The power-distribution equipment (PDE) systems in Tanzania are crucial for rural electrification but their performance and efficiency vary significantly. A fixed effects regression model will be employed to estimate the impact of PDE configurations on electricity delivery reliability and cost-effectiveness across different regions of Tanzania. The dataset includes annual survey results from to covering all four provinces. Panel data analysis indicates a positive correlation between well-maintained PDE systems and consistent power supply, with an estimated improvement rate of up to 15% in electricity reliability per year. The findings suggest that strategic investments in PDE maintenance can significantly enhance the efficiency of rural electrification projects in Tanzania. Local governments should prioritise regular maintenance as a key strategy for improving power distribution systems' performance and reducing operational costs. The maintenance outcome was modelled as $Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + v_{it}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Tanzania, Sub-Saharan, Panel Data, Fixed Effects, Econometrics, Efficiency, Yield, Rural Electrification

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