African Maintenance Engineering

Methodological Evaluation of Power-Distribution Equipment Systems in Rwanda Using Quasi-Experimental Design to Measure Yield Improvement

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Abstract

Power distribution equipment systems (PDES) play a crucial role in ensuring reliable power supply to households and businesses in Rwanda. A quasi-experimental design was employed to assess the impact of improved PDES configurations. Data collection included surveys and power usage measurements at randomly selected sites before and after intervention. Findings indicate an average increase of 20% in electricity yield per household post-intervention, with significant reductions in outages reported by participants. The quasi-experimental design successfully identified yield improvement through targeted interventions, providing actionable insights for policy makers and stakeholders. Strengthening PDES infrastructure is recommended to enhance reliability and efficiency of power supply systems in Rwanda. Power Distribution Equipment Systems, Yield Improvement, Quasi-Experimental Design, Rural Power Supply The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, power distribution systems, quasi-experimental design, yield improvement, statistical analysis, randomized trials, impact evaluation*

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