



# Evaluation of Power-Distribution Equipment Systems in Ghana: A Randomized Field Trial for Risk Reduction Evaluation

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### Abstract

This study aims to evaluate the effectiveness of power-distribution equipment systems in Ghana, focusing on reducing risks associated with power outages and system failures. A randomized controlled experiment was conducted across five regions in Ghana, each region receiving one of three tested power-distribution systems. Equipment failure rates were recorded over a twelve-month period to evaluate system reliability. During the trial, Region B showed significantly lower equipment failure rates compared to Regions A and C ( $p < 0.05$ ), indicating that System X is more resilient to operational disruptions. The findings suggest that optimised deployment of power-distribution systems can substantially reduce risk levels in Ghanaian infrastructure. Based on the results, it is recommended that policymakers prioritise the adoption and implementation of the most effective systems identified in this study for ensuring consistent electricity supply across Ghana. Power Distribution Equipment, Randomized Field Trial, Risk Reduction, Ghana The maintenance outcome was modelled as  $Y \{ \} = \beta_0 + \beta_1 X \{ \} + u_i + v \epsilon \{ \}$ , with robustness checked using heteroskedasticity-consistent errors.

### Keywords:

Sub-Saharan

Geographic

Terms:

Methodological

Randomized

Evaluation

Risk

Operational

System Reliability

Controlled

Trial

Terms:

(RCT)

Metrics

Assessment

Efficiency

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