

Methodological Evaluation and Yield Improvement Diagnostics for Power-Distribution Equipment in Rwanda

A Quasi-Experimental Data Set, 2000–2026

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ABSTRACT

Background: The reliability and efficiency of power-distribution equipment are critical for sustainable development, yet longitudinal performance data from operational networks in sub-Saharan Africa remain scarce. This gap hinders evidence-based asset management and targeted infrastructure investment.

Purpose and objectives: This data descriptor presents a structured, quasi-experimental dataset designed to methodologically evaluate the performance of distribution equipment and diagnose yield improvement potential. The primary objective is to provide a robust empirical foundation for engineering analyses of failure rates, maintenance efficacy, and upgrade interventions.

Keywords: *Power-distribution networks, Sub-Saharan Africa, Quasi-experimental design, Yield improvement, Grid reliability, Rwanda, Diagnostic analytics*

Article Highlights

- Presents a novel quasi-experimental dataset for power-distribution equipment in Rwanda, 2000–2026.
- Enables causal analysis of maintenance and upgrade interventions on grid reliability.
- Core analytical model employs a difference-in-differences specification with cluster-robust inference.
- Provides a methodological framework for evidence-based asset management in similar contexts.

Analytical Approach

The dataset is structured for a difference-in-differences analysis, comparing treatment and control groups to isolate the causal effect of specific engineering interventions on equipment yield.

This data descriptor provides the foundation for rigorous, causal analysis of infrastructure performance.

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