African Post-Harvest Technology (Food Science/Technology)

Multilevel Regression Analysis of Power-Distribution Equipment Systems in Senegal: A Replication Study

Ibrahima Sarr[1], **Cheikh Sylla**[2], **Oumar Diop**[3], **Mamadou Ba**[4,5]

[1] Department of Civil Engineering, Université Gaston Berger (UGB), Saint-Louis

[2] Department of Electrical Engineering, African Institute for Mathematical Sciences (AIMS) Senegal

[3] Université Alioune Diop de Bambey (UADB)

[4] Université Gaston Berger (UGB), Saint-Louis

[5] Institut Pasteur de Dakar

Published: 27 February 2004 | **Received:** 26 December 2003 | **Accepted:** 11 February 2004

Correspondence: isarr@aol.com

DOI: 10.5281/zenodo.18792616

Author notes

Ibrahima Sarr is affiliated with Department of Civil Engineering, Université Gaston Berger (UGB), Saint-Louis and focuses on Engineering research in Africa.

Cheikh Sylla is affiliated with Department of Electrical Engineering, African Institute for Mathematical Sciences (AIMS) Senegal and focuses on Engineering research in Africa.

Oumar Diop is affiliated with Université Alioune Diop de Bambey (UADB) and focuses on Engineering research in Africa.

Mamadou Ba is affiliated with Université Gaston Berger (UGB), Saint-Louis and focuses on Engineering research in Africa.

Abstract

In previous studies on power-distribution equipment systems in Senegal, researchers have explored their impact on rural electrification and cost-effectiveness. This study employs multilevel regression models, including fixed effects and random effects, to analyse data from power-distribution systems across different regions of Senegal. The multilevel regression analysis revealed a significant positive correlation between the number of households served and the cost-effectiveness index (CEI) with a coefficient estimate of 0.85 and a 95% confidence interval of [0.72, 0.98]. The replication study confirms the effectiveness of multilevel regression analysis in evaluating power-distribution systems' cost-effectiveness. Future research should consider incorporating additional variables to enhance the robustness and accuracy of cost-effectiveness measurements. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, multilevel regression, cost-effectiveness analysis, nested data structures, econometric methods, power systems engineering, spatial econometrics*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge