African Applied Remote Sensing
(Technology/Methodology)

Methodological Evaluation of Off-Grid Communities Systems in Senegal: Panel Data Estimation for Risk Reduction Measurement

Issa Sow[1], **Samba Ndiaye**[2], **Toumani Sall**[3,4], **Mame Diop**[5,6]

[1] Department of Data Science, Cheikh Anta Diop University (UCAD), Dakar

[2] Department of Cybersecurity, Institut Pasteur de Dakar

[3] Institut Sénégalais de Recherches Agricoles (ISRA)

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

[5] Institut Pasteur de Dakar

[6] Department of Cybersecurity, Université Gaston Berger (UGB), Saint-Louis

Published: 12 June 2010 | **Received:** 02 March 2010 | **Accepted:** 08 May 2010

Correspondence: isow@gmail.com

DOI: 10.5281/zenodo.18908880

Author notes

Issa Sow is affiliated with Department of Data Science, Cheikh Anta Diop University (UCAD), Dakar and focuses on Computer Science research in Africa.

Samba Ndiaye is affiliated with Department of Cybersecurity, Institut Pasteur de Dakar and focuses on Computer Science research in Africa.

Toumani Sall is affiliated with Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Computer Science research in Africa.

Mame Diop is affiliated with Institut Pasteur de Dakar and focuses on Computer Science research in Africa.

Abstract

This study addresses a current research gap in Computer Science concerning Methodological evaluation of off-grid communities systems in Senegal: panel-data estimation for measuring risk reduction in Senegal. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of off-grid communities systems in Senegal: panel-data estimation for measuring risk reduction, Senegal, Africa, Computer Science, methodology paper This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, GIS, econometrics, stochastic, panel, regression, spatial analysis*

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