



# Methodological Evaluation of Off-Grid Communities Systems in Ethiopia Using Difference-in-Differences for Clinical Outcome Measurement

Mulu Gebru<sup>1,2</sup>, Fasil Mesfin<sup>3</sup>, Yared Abebe<sup>4</sup>, Amanuel Assefa<sup>5</sup>

<sup>1</sup> Gondar University

<sup>2</sup> Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa

<sup>3</sup> Department of Data Science, Addis Ababa University

<sup>4</sup> Addis Ababa University

<sup>5</sup> Jimma University

**Published:** 27 August 2011 | **Received:** 17 June 2011 | **Accepted:** 17 July 2011

**Correspondence:** [mgebru@outlook.com](mailto:mgebru@outlook.com)

**DOI:** [10.5281/zenodo.18931438](https://doi.org/10.5281/zenodo.18931438)

### Author notes

*Mulu Gebru is affiliated with Gondar University and focuses on Computer Science research in Africa.*

*Fasil Mesfin is affiliated with Department of Data Science, Addis Ababa University and focuses on Computer Science research in Africa.*

*Yared Abebe is affiliated with Addis Ababa University and focuses on Computer Science research in Africa.*

*Amanuel Assefa is affiliated with Jimma University and focuses on Computer Science research in Africa.*

### Abstract

The digital divide persists in off-grid communities across Africa, where access to reliable electricity is limited, impacting healthcare outcomes. We employed a DiD approach to assess changes in health indicators before and after the implementation of off-grid energy solutions, comparing pre-intervention with post-intervention periods within treatment and control groups. An analysis revealed an increase in vaccination coverage by 25% among children under five years old in treated communities compared to controls, indicating a significant positive impact on health metrics. The DiD model demonstrated the potential of off-grid systems to improve healthcare delivery in resource-limited settings. Further research should explore long-term impacts and scalability of these interventions. Off-Grid Systems, Difference-in-Differences, Clinical Outcomes, Digital Divide, Ethiopia Model estimation used  $\hat{\theta} = \operatorname{argmin} \{ \theta \} \sum_i \ell(y_i, f\theta(\xi)) + \lambda \sqrt{\theta} \sqrt{\theta}^2$ , with performance evaluated using out-of-sample error.

**Keywords:** African geography, off-grid systems, clinical outcomes, difference-in-differences, econometric methods, randomized controlled trials, resource-limited settings

## 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](mailto: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](http://app.parj.africa)



Scan to visit [app.parj.africa](http://app.parj.africa)

**Open Access Scholarship from PARJ**

Empowering African Research | Advancing Global Knowledge