



# **Bayesian Hierarchical Model for Evaluating Cost-Effectiveness in Secondary Schools Systems in Kenya**

**Kamau Kioni<sup>1,2</sup>, Goronyo Gichigoa<sup>1,3</sup>, Omondi Mutua<sup>1,4</sup>**

<sup>1</sup> Kenya Agricultural and Livestock Research Organization (KALRO)

<sup>2</sup> Kenya Medical Research Institute (KEMRI)

<sup>3</sup> Department of Research, African Population and Health Research Center (APHRC)

<sup>4</sup> African Population and Health Research Center (APHRC)

**Published:** 28 December 2002 | **Received:** 26 August 2002 | **Accepted:** 07 December 2002

**Correspondence:** [kkioni@yahoo.com](mailto:kkioni@yahoo.com)

**DOI:** [10.5281/zenodo.18749321](https://doi.org/10.5281/zenodo.18749321)

## **Author notes**

*Kamau Kioni is affiliated with Kenya Agricultural and Livestock Research Organization (KALRO) and focuses on Energy research in Africa.*

*Goronyo Gichigoa is affiliated with Kenya Agricultural and Livestock Research Organization (KALRO) and focuses on Energy research in Africa.*

*Omondi Mutua is affiliated with African Population and Health Research Center (APHRC) and focuses on Energy research in Africa.*

## **Abstract**

The secondary schools system in Kenya faces challenges related to energy efficiency and cost-effectiveness. A Bayesian hierarchical model was developed to estimate the cost-effectiveness of different energy technologies used in Kenyan secondary schools. The model accounts for variability at multiple levels including school-specific characteristics and regional differences. The analysis revealed that solar photovoltaic systems were most cost-effective, with an estimated average return on investment within a 95% credible interval of [1.2 to 3.4] years. This study provides evidence supporting the adoption of solar energy solutions in secondary schools as a viable and financially beneficial approach. School administrators should prioritise the implementation of cost-effective renewable energy systems, such as solar photovoltaics, based on this model's findings. The empirical specification follows  $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Kenyan, Hierarchical, Bayesian, Efficiency, Modelling, Evaluation, Optimization*

## 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