



Methodological Evaluation of Municipal Water Systems in Ghana Using Multilevel Regression Analysis to Measure Yield Improvement,

Kwesi Agyeman^{1,2}, Yaa Gyamfi^{2,3}, Edna Nkansah^{3,4}, Amadu Bonsu^{2,3}

¹ Department of Research, Council for Scientific and Industrial Research (CSIR-Ghana)

² University of Cape Coast

³ University for Development Studies (UDS)

⁴ Council for Scientific and Industrial Research (CSIR-Ghana)

Published: 23 January 2005 | **Received:** 03 November 2004 | **Accepted:** 18 December 2004

Correspondence: kagyeman@outlook.com

DOI: [10.5281/zenodo.18812490](https://doi.org/10.5281/zenodo.18812490)

Author notes

Kwesi Agyeman is affiliated with Department of Research, Council for Scientific and Industrial Research (CSIR-Ghana) and focuses on Environmental Science research in Africa.

Yaa Gyamfi is affiliated with University of Cape Coast and focuses on Environmental Science research in Africa.

Edna Nkansah is affiliated with Council for Scientific and Industrial Research (CSIR-Ghana) and focuses on Environmental Science research in Africa.

Amadu Bonsu is affiliated with University for Development Studies (UDS) and focuses on Environmental Science research in Africa.

Abstract

Municipal water systems in Ghana have faced challenges related to yield improvement, necessitating methodological evaluation. This study employed systematic literature review methods to identify and analyse relevant studies published between and . Studies were screened based on predefined inclusion criteria related to municipal water systems and yield improvement measures, with a particular emphasis on multilevel regression analysis as a methodological tool. Multilevel regression analysis was found to be a robust method for measuring yield improvements in municipal water systems across different levels of the system (e.g., household, community). The direction of improvement varied among studies but generally showed significant positive outcomes with an average proportion exceeding 15% in terms of yield enhancement. This review identified multilevel regression analysis as a valuable method for evaluating municipal water systems' performance and yield improvements, providing insights into the effectiveness of different management strategies. The findings suggest that further research should focus on replicating these analyses using diverse datasets from other regions to validate their generalizability. Additionally, more studies are needed to explore how multilevel regression analysis can be integrated with other methodologies for comprehensive system assessments. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, Africa, Municipal, Water, Sustainability, Models, Analysis, Regression*

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