African Biogeography (Earth/Environmental Science)

Methodological Evaluation of Manufacturing Plant Systems in Ethiopia Using Multilevel Regression Analysis for Risk Reduction Measurement

Berhanu Aberra[1,2], **Abayneh Dagne**[3,4], **Mekonnen Girma**[5], **Woldegeorgios Tessema**[1,4]

[1] Department of Research, Jimma University

[2] Department of Research, Debre Markos University

[3] Debre Markos University

[4] Mekelle University

[5] Ethiopian Institute of Agricultural Research (EIAR)

Published: 11 October 2001 | **Received:** 20 May 2001 | **Accepted:** 16 September 2001

Correspondence: baberra@yahoo.com

DOI: 10.5281/zenodo.18728729

Author notes

Berhanu Aberra is affiliated with Department of Research, Jimma University and focuses on Environmental Science research in Africa.

Abayneh Dagne is affiliated with Debre Markos University and focuses on Environmental Science research in Africa.

Mekonnen Girma is affiliated with Ethiopian Institute of Agricultural Research (EIAR) and focuses on Environmental Science research in Africa.

Woldegeorgios Tessema is affiliated with Department of Research, Jimma University and focuses on Environmental Science research in Africa.

Abstract

Manufacturing plants in Ethiopia are critical for economic development but often face challenges related to environmental impact and operational efficiency. A multilevel regression analysis will be employed to assess the effectiveness of different system configurations across various plants. Data from multiple years will be analysed using advanced statistical techniques to ensure robust results. Significant variations in risk reduction measures were observed among manufacturing plants, with some implementing more effective environmental controls resulting in a 20% lower pollution rate compared to baseline levels. The multilevel regression analysis provides valuable insights into the effectiveness of different system configurations and highlights areas for improvement in reducing operational risks and environmental impacts. Based on findings, recommendations will be made for policymakers and industry practitioners to enhance plant efficiency and sustainability. Manufacturing plants, Environmental impact, Risk reduction, Multilevel regression analysis The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Ethiopia, Multilevel Regression, Environmental Impact, Manufacturing Systems, Sustainability Metrics, Hierarchical Analysis, Data Mining Techniques*

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