



Methodological Assessment of Multilevel Regression Analysis in Measuring Adoption Rates Among Smallholder Farm Systems in Rwanda

Mwesigwa Muhire¹, Ignace Bizimungu^{2,3}, Kizito Mukabana⁴

¹ Rwanda Environment Management Authority (REMA)

² Department of Interdisciplinary Studies, Rwanda Environment Management Authority (REMA)

³ African Leadership University (ALU), Kigali

⁴ Department of Research, Rwanda Environment Management Authority (REMA)

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Correspondence: mmuhire@hotmail.com

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Author notes

Mwesigwa Muhire is affiliated with Rwanda Environment Management Authority (REMA) and focuses on Energy research in Africa.

Ignace Bizimungu is affiliated with Department of Interdisciplinary Studies, Rwanda Environment Management Authority (REMA) and focuses on Energy research in Africa.

Kizito Mukabana is affiliated with Department of Research, Rwanda Environment Management Authority (REMA) and focuses on Energy research in Africa.

Abstract

Smallholder farm systems in Rwanda are pivotal for agricultural productivity and rural livelihoods. A multilevel logistic regression model was employed to analyse data from smallholder farms, considering both individual farmer characteristics and contextual factors at the village level. The multilevel model revealed that education levels of farmers had a significant positive impact on adoption rates (OR = 1.30, $p < 0.05$), indicating that higher educational attainment was associated with greater likelihood of adopting new agricultural technologies. Multilevel regression analysis provided robust insights into the determinants of adoption rates among smallholder farmers in Rwanda. Future research should explore additional contextual factors and adopt more sophisticated multilevel models to enhance explanatory power.

Keywords: *Rwanda, Smallholder Farms, Multilevel Analysis, Logistic Regression, Hierarchical Modelling, Quantitative Methods, Methodological Evaluation*

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