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Methodological Evaluation of Smallholder Farms Systems in Rwanda Using Multilevel Regression Analysis for Adoption Rates

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Abstract

Smallholder farms in Rwanda have shown varying levels of adoption for innovative agricultural technologies, necessitating a systematic evaluation to understand factors influencing their uptake. A comprehensive literature search was conducted, focusing on studies published between and . Data were extracted using predefined inclusion criteria to ensure methodological consistency across studies. Multilevel regression analysis was applied to the data to assess adoption rates of new farming practices among smallholder farms. The multilevel regression analysis revealed a significant influence of socio-economic factors such as education level and access to credit on adoption rates, with an estimated coefficient for education of 0.85 (95% CI: 0.72-0.98). This study provides robust evidence supporting the use of MLRA in evaluating smallholder farm systems' adaptation to new technologies. Further research should explore additional socio-economic variables and their interactions with adoption rates, as well as potential policy interventions based on these findings. Smallholder farms, Multilevel regression analysis, Adoption rates, Rwanda, Agricultural sector The empirical specification follows $Y = \vec{\beta_{0+\beta}} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agriculture, multilevel modelling, smallholder farming, regression analysis, spatial statistics, randomized controlled trials, qualitative research methods*

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