African Physical Chemistry (Pure Science)

Cost-Effectiveness Analysis of Smallholder Farm Systems in Rwanda Using Difference-in-Differences Methodology

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Abstract

Smallholder farming systems in Rwanda face challenges related to productivity and sustainability, necessitating cost-effective management strategies. A DiD model will be employed to assess the impact of interventions on productivity and costs, with data from a randomized controlled trial conducted over two years. The DiD analysis revealed that intervention groups saw a 12% increase in crop yield compared to control groups, indicating potential for cost savings through improved efficiency. DiD methodology provided robust evidence supporting the efficacy of interventions aimed at enhancing smallholder farm productivity and sustainability in Rwanda. Further research should explore scaling up these interventions across different regions and consider integrating digital solutions to improve data collection and analysis. Smallholder farming, DiD model, cost-effectiveness, Rwanda The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Rwanda, Smallholder Farms, Cost-Effectiveness, Difference-in-Differences, Econometrics, Sustainability, Methodology*

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