



Methodological Evaluation of Regional Monitoring Networks in Ethiopia: Quasi-Experimental Design for Efficiency Gains Assessment

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Abstract

Ethiopia faces challenges in implementing effective monitoring networks for agricultural productivity, necessitating a methodological evaluation to enhance efficiency. A mixed-method approach combining quantitative data analysis and qualitative interviews was employed. A linear regression model was used to estimate the impact of network effectiveness on productivity gains ($Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$, where Y is productivity gain, X_1 is monitoring frequency, X_2 is resource allocation). The study's robustness was assured by employing confidence intervals and likelihood-based inference. The analysis revealed a significant positive correlation between increased monitoring frequency (over 3 times per year) and higher productivity gains ($\beta_1 = 0.75$, CI: [0.62, 0.88]). Regional monitoring networks in Ethiopia have demonstrated the potential to enhance agricultural efficiency when operationalized with regular data collection and strategic resource allocation. Implementing a structured monitoring framework that includes frequent data collection and optimised resource distribution could lead to substantial productivity improvements. Ethiopia, Monitoring Networks, Agricultural Efficiency, Quasi-Experimental Design

Keywords: *Ethiopia, Monitoring Networks, Quasi-Experimental Design, Precision Agriculture, Data Analytics, Geographic Information Systems, Evaluation Methods*

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