



Methodological Evaluation of Process-Control Systems in Ghana: Randomized Field Trial for Efficiency Gains

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Abstract

Recent studies have highlighted the potential of process-control systems to enhance agricultural productivity in Ghana. However, there is a need for rigorous methodological validation and empirical evidence. A randomized controlled trial was conducted across three districts, with 20 randomly selected farms as treatment groups and 20 as control groups. Data were collected using precision agriculture sensors to monitor crop yield, resource use, and operational costs over a season. Significant increases in maize yields (15%) were observed in the treatment area compared to controls, with no statistically significant differences noted in other crops such as rice or cassava. The process-control systems demonstrated notable efficiency gains in maize production, though further research is needed for broader applicability and across different crop types. Future studies should explore the scalability of these findings to diverse agricultural contexts and evaluate additional economic and environmental impacts. Agricultural Efficiency, Process-Control Systems, Precision Agriculture, Randomized Field Trial, Ghana The maintenance outcome was modelled as  $Y = \beta_0 + \beta_1 X + u_i + \epsilon$ , with robustness checked using heteroskedasticity-consistent errors.

Keywords: Ghana

Geographic

Terms:

Methodological Randomization Evaluation

Terms:

*Experimental  
Process  
Field Trial*

*Control*

*Design  
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