



Methodological Evaluation of Process-Control Systems in Tanzanian Agricultural Settings: A Randomized Field Trial

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Abstract

The adoption of process-control systems (PCS) in agricultural settings has been studied extensively; however, there remains a need for rigorous methodological evaluation to enhance their effectiveness and applicability across diverse environments. A controlled experiment was conducted in three randomly selected villages in Tanzania. Farmers were randomly assigned to either an experimental group (receiving PCS) or a control group (no PCS). Data collection included pre- and post-intervention surveys and field observations over six months. In the experimental group, 75% of farmers adopted PCS within three months compared to only 20% in the control group. Key themes identified include improved crop yields and reduced labour costs among adopters. The study provides preliminary evidence supporting the potential of PCS for enhancing agricultural productivity in Tanzania, particularly when tailored to local conditions. Future research should explore long-term impacts and sustainability of PCS implementation in Tanzanian agriculture. Policy recommendations include targeted support for farmers adopting PCS. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u + \varepsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: African agricultural, randomized trial, process-control systems, methodological evaluation, econometrics, GIS applications, spatial analysis

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