



Methodological Evaluation of Industrial Machinery Fleets Systems in Tanzania: Randomized Field Trial for Yield Improvement

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Abstract

This study evaluates industrial machinery fleet systems in Tanzania to identify methods that can improve yield efficiency. A stratified random sampling approach was employed to select representative farms from various regions in Tanzania. A mixed-methods design incorporating both quantitative yield data collection and qualitative interviews with farmers was used to gather comprehensive insights into the effectiveness of different fleet management strategies. The analysis revealed that a specific machinery maintenance schedule, combined with targeted training programmes for farmers, resulted in an average 15% increase in crop yields compared to traditional farming practices. This finding suggests effective interventions could be significantly impactful. This study demonstrates the potential of randomized field trials and mixed-methods research designs in evaluating industrial machinery fleet systems and their yield improvement capabilities. Farmers should be provided with regular maintenance schedules for machinery, along with farmer training programmes to maximise the benefits of machinery utilization. Policy makers could also consider implementing similar interventions across different regions. The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + v_i \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, Geographic Sampling, Experimental Design, Yield Efficiency, Randomization, Interdisciplinary Research, Methodological Assessment*

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