African Structural Engineering

Methodological Evaluation of Industrial Machinery Fleet Systems in Uganda: Randomized Field Trial for Yield Improvement

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Abstract

Industrial machinery fleets play a critical role in Uganda's economic development, yet their performance and efficiency are often underutilized. A randomized controlled trial (RCT) was conducted on selected industrial sectors, employing statistical modelling techniques and uncertainty analysis to assess the impact of fleet management interventions. The implementation of targeted fleet optimization strategies resulted in an average yield improvement of 15% across all tested industries, with a confidence interval for this finding at ±3%. This study provides evidence that strategic fleet management can significantly enhance industrial productivity in Uganda, offering a robust method for improving resource utilization. Based on the findings, it is recommended that Ugandan policymakers and industry leaders implement targeted fleet optimization strategies to maximise yield improvements. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Methodological Randomized Econometrics Cost-Benefit Operational Resource Optimization Geographic Field Ugandan Terms: Trials Analysis Efficiency Terms:*

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