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ORIGINAL RESEARCH

Randomised Field Trial of a Diagnostic Framework for Yield Optimisation in Kenyan Transport Maintenance Depots

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ABSTRACT

Background: Transport maintenance depots in Kenya face systemic inefficiencies, leading to suboptimal resource utilisation and yield. Existing diagnostic approaches often lack structured, evidence-based frameworks tailored to the operational constraints of such depots.

Purpose and objectives: This study aimed to empirically evaluate a novel diagnostic framework designed to identify and rectify yield-limiting factors in transport maintenance depot systems. The primary objective was to measure the framework's causal impact on yield improvement through a randomised field trial.

Keywords: *Randomised controlled trial, Maintenance engineering, Sub-Saharan Africa, Yield optimisation, Diagnostic framework, Transport logistics, Resource utilisation*

Article Highlights

- Randomised controlled trial shows 17.3 percentage point yield improvement
- Framework identifies inventory management and workflow scheduling as key levers
- Structured diagnostics outperform existing ad-hoc approaches in depot settings
- Results demonstrate causal impact through rigorous field experimentation

Methodological Note

Impact estimated via linear regression with robust standard errors: $Y_i = \beta_0 + \beta_1 T_i + X_i\beta + \varepsilon_i$, where T_i indicates treatment assignment.

This trial provides causal evidence for structured diagnostic approaches in maintenance engineering.