



Methodological Evaluation of Transport Maintenance Depot Systems in Kenya Using Multilevel Regression Analysis for Yield Improvement Assessment

Nelly Gitonga Njoroge¹, Oscar Kibet Muriithi^{1,2}

¹ African Population and Health Research Center (APHRC)

² Moi University

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Correspondence: njoroge@aol.com

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Author notes

Nelly Gitonga Njoroge is affiliated with African Population and Health Research Center (APHRC) and focuses on Engineering research in Africa.

Oscar Kibet Muriithi is affiliated with Moi University and focuses on Engineering research in Africa.

Abstract

Transport maintenance depots (TMDs) in Kenya are critical for ensuring road safety and vehicle efficiency. However, their operational effectiveness varies significantly across different regions. A multilevel regression model was applied to analyse data from multiple depots nested within different geographical zones. The model accounts for both fixed and random effects, including regional variations in vehicle maintenance needs. The multilevel analysis revealed significant differences in TMD performance metrics across regions, with a notable improvement of 15% in service delivery efficiency observed in the optimised depots compared to baseline settings. This study provides robust evidence for the effectiveness of regional-specific optimization strategies in enhancing TMD performance and underscores the importance of context-specific interventions. Based on our findings, it is recommended that future research should focus on replicating these models across other regions to validate their generalizability and impact. The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Kenyan, Multilevel, Regression, Analysis, Maintenance, Depot, Evaluation

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