



Comparative Methodological Assessment of Municipal Infrastructure Asset Systems in Ethiopia: A Randomized Field Trial Approach

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Abstract

This study examines municipal infrastructure asset systems in Ethiopia to assess their performance and potential for improvement. A mixed-method approach combining qualitative and quantitative data collection was employed. Randomized field trials were conducted to measure the impact of different management strategies on asset performance and public satisfaction. Randomized field trial results indicated a significant $Y = 0.5X + 10$ improvement in asset yield with strategic interventions, where Y represents improved asset performance, X represents investment in maintenance and technology upgrades. The randomized field trials demonstrated the effectiveness of targeted strategies in enhancing municipal infrastructure asset systems, contributing to more efficient public service delivery. Based on the findings, recommendations include prioritising investments in maintenance technologies and encouraging collaborative partnerships between government agencies and private sector entities for sustainable development.

Keywords: *Ethiopia, Geographic Information Systems (GIS), Monte Carlo simulation, fuzzy logic, performance metrics, stakeholder analysis, adaptive management*

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