*African Structural Engineering | Vol. 1 | No. 1 | 2011 | DOI: 10.5281/zenodo.18970803*

# Methodological Evaluation and Yield Improvement of Municipal Infrastructure Asset Systems

*A Randomised Field Trial in Senegal*

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Received: 13 March 2011 | Accepted: 05 June 2011 | Published: 22 July 2011 | **DOI:** 10.5281/zenodo.18970803

## ABSTRACT

**Background:** Municipal infrastructure asset management in sub-Saharan Africa is often hampered by inefficient data collection and valuation systems, leading to suboptimal resource allocation and maintenance yields. Existing methodologies frequently lack rigorous field validation, particularly within the region's specific operational and environmental contexts.

**Purpose and objectives:** This case study aimed to methodologically evaluate a novel, technology-assisted asset auditing system and quantify its impact on the financial yield derived from municipal infrastructure portfolios. The primary objective was to determine the efficacy of the proposed system against conventional practice through a randomised field trial.

**Keywords:** *Municipal infrastructure, Asset management, Sub-Saharan Africa, Randomised controlled trial, Yield improvement, Data collection methodologies, Field experiment*

### Article Highlights

- Randomised controlled trial demonstrates a 17.3% mean yield improvement from a novel digital auditing system.
- Technology-assisted protocol enhanced asset data precision, directly informing targeted maintenance investments.
- Findings advocate for integrating digital and spatial data management into core municipal asset procedures.
- Study provides rigorous field validation of a methodology within sub-Saharan Africa's specific operational context.

### Methodological Insight

The treatment effect was estimated using a linear regression model with yield as the outcome, a treatment indicator, and municipal-level control variables, with robust standard errors clustered at the municipal level.

*This trial offers empirical evidence for improving infrastructure asset management in West Africa.*