

# A Quasi-Experimental Evaluation of Municipal Infrastructure Asset Management Systems for Yield Improvement in Ghana

Kofi Mensah Ankrach<sup>1</sup>, Kwame Asante<sup>1,2</sup>, Ama Serwaa Boateng<sup>3</sup>

Water Research Institute (WRI) | Ashesi University | Department of Mechanical Engineering, Ashesi University

Correspondence: [kankrah@outlook.com](mailto:kankrah@outlook.com)

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## ABSTRACT

Municipal infrastructure asset management systems (MIAMS) are critical for sustainable urban development, yet their efficacy in improving fiscal yields for infrastructure renewal in developing contexts is poorly quantified. Existing evaluations often lack rigorous causal designs. This study aimed to evaluate the causal impact of formalised MIAMS on revenue yield improvement for infrastructure assets in a municipal context. The primary objective was to estimate the yield differential attributable to systematic asset management adoption. A quasi-experimental difference-in-differences design was employed, comparing yield trajectories in treatment municipalities implementing structured MIAMS against matched control municipalities. The core statistical model was  $Y_{it} = \beta_0 + \beta_1 (\text{text}\{Treat\}_i \times \text{text}\{Post\}_t) + \gamma_i + \delta_t + \varepsilon_{it}$ , where  $Y_{it}$  is the annual yield per capita. Robust standard errors were clustered at the municipal level. Implementation of a formal MIAMS led to a statistically significant increase in average annual infrastructure revenue yield of 18.7 percentage points (95% CI: 12.4, 25.0). The treatment effect was robust to multiple model specifications and sensitivity analyses. The formal adoption of structured municipal infrastructure asset management systems has a substantial positive causal effect on revenue generation capacity, confirming their value as a fiscal governance tool. Municipal authorities should prioritise investment in and institutionalisation of structured asset management systems. National policy should support capacity building and provide standardised frameworks for MIAMS implementation. asset management, municipal infrastructure, quasi-experimental, revenue yield, difference-in-differences, Ghana This paper provides the first quasi-experimental evidence quantifying the causal impact of formal asset management systems on municipal infrastructure revenue yields in a sub-Saharan African context.

**Keywords:** *Municipal infrastructure, Asset management, Quasi-experimental design, Sub-Saharan Africa, Fiscal sustainability, Yield improvement, Developing economies*

### Article Highlights

- A quasi-experimental design quantifies the causal impact of formal asset management systems.
- Structured MIAMS implementation increased municipal infrastructure revenue yield by 18.7%.
- The study provides robust evidence from a sub-Saharan African context.
- Findings support institutional investment in asset management as a fiscal governance tool.

### Core Finding

The formal adoption of structured municipal infrastructure asset management systems has a substantial positive causal effect on revenue generation capacity.

*This study provides the first quasi-experimental evidence on this topic from sub-Saharan Africa.*

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