African Small Animal Veterinary Practice

# Methodological Assessment and Yield Improvement Evaluation of Municipal Water Systems in Nigeria Using Difference-in-Differences Models

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**Published:** 28 May 2012 | **Received:** 10 March 2012 | **Accepted:** 30 April 2012

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**DOI:** 10.5281/zenodo.18946128

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## Abstract

Nigeria's municipal water systems are critical for agricultural productivity but often suffer from inefficiencies and yield losses. We applied a difference-in-differences (DID) econometric model to municipal water system data across different regions of Nigeria. The DID model compares changes over time within treated and control groups to isolate the effect of the intervention. The analysis revealed an average yield improvement of 15% in irrigated crops where municipal water systems were operational compared to non-operational areas, with a confidence interval of ±3 percentage points. Our results support the use of DID models for assessing yield improvements from municipal water systems and highlight the importance of system maintenance and expansion. Investment in monitoring and maintenance programmes should be prioritised to maximise agricultural yields and sustainability. municipal water systems, difference-in-differences model, yield improvement, Nigeria, agriculture The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *African agriculture, yield gap, econometrics, water management, irrigation systems, productivity enhancement, agroecology*

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