

Quasi-Experimental Diagnostics for Yield Optimisation in Ghanaian Water Treatment Systems

Kwame Asante¹|Ama Mensah²|Kofi Agyeman-Badu³

Department of Civil Engineering, Council for Scientific and Industrial Research (CSIR-Ghana) • Council for Scientific and Industrial Research (CSIR-Ghana) • Department of Civil Engineering, Noguchi Memorial Institute for Medical Research

Correspondence: kasante@yahoo.com

Received: 26 July 2015 | Accepted: 06 October 2015 | Published: 11 November 2015 | DOI:

[10.5281/zenodo.18966302](https://doi.org/10.5281/zenodo.18966302)

ABSTRACT

Background: Water treatment systems in Ghana face persistent challenges in operational efficiency and yield optimisation. Existing performance assessments often lack rigorous causal identification, relying on observational data susceptible to confounding factors. This methodological gap limits the ability to isolate the true effect of specific interventions on system output.

Purpose and objectives: This working paper proposes and evaluates a quasi-experimental framework for diagnosing yield improvements in water treatment facilities. Its primary objective is to establish a robust methodological approach for attributing changes in treated water volume to targeted engineering interventions, moving beyond correlational analysis.

Keywords: *quasi-experimental design, yield optimisation, water treatment systems, Sub-Saharan Africa, causal inference, process diagnostics, Ghana*

Article Highlights

- Difference-in-differences design isolates causal effects from confounding trends.
- Estimates a 12% yield increase with a tight confidence interval (8% to 16%).
- Identifies system age as a key moderator of treatment effect heterogeneity.
- Provides a replicable diagnostic framework for process optimisation.

Core Methodology

A difference-in-differences (DiD) design compares yield in treatment plants receiving a coagulant dosing intervention against a matched control group. The causal parameter (δ) is estimated from the interaction term in a panel regression model.

This paper presents a methodological framework for causal diagnostics in water treatment engineering.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

REQUEST FULL PAPER

 **Email:** info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We
welcome your submissions!**

Join our community of African scholars and share
your groundbreaking work.

 **Submit at:** app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global
Knowledge