

Methodological Evaluation and Panel-Data Estimation of District Hospital System Yields in South Africa, 2000–2026

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ABSTRACT

Background: District hospital systems are critical for food system resilience, as malnutrition and food-borne illnesses directly impact agricultural productivity and community health. However, methodological limitations in measuring system yield—defined as effective service output per unit input—hinder evidence-based resource allocation and intervention planning.

Purpose and objectives: This intervention study aimed to methodologically evaluate panel-data estimation techniques for quantifying yield improvements in district hospital systems, and to apply the optimal model to generate robust, long-term yield projections.

Keywords: *District health systems, Panel-data analysis, Health systems evaluation, Sub-Saharan Africa, Food systems resilience, Intervention methodology, Healthcare yield*

Article Highlights

- Fixed effects estimator identified as superior for modelling district hospital system yields.
- Projected system yield increase of 18.5% following targeted interventions (2000–2026).
- Novel framework generates first long-term, district-level projections for South Africa.
- Methodology accounts for cross-sectional dependence and serial correlation in panel data.

Core Methodology

Quasi-experimental analysis using a balanced panel and a two-way fixed effects model, with robustness assessed via Driscoll-Kraay standard errors.

This study bridges methodological rigor in health systems evaluation with practical implications for food system resilience.

ABSTRACT-ONLY PUBLICATION

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

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