African Swine Science (Agri/Animal Science)

Methodological Foundations of Quasi-Experimental Designs in Monitoring Networks for Risk Reduction in Rwanda's Agricultural Sector

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Published: 20 October 2000 | **Received:** 24 July 2000 | **Accepted:** 29 September 2000

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DOI: 10.5281/zenodo.18712305

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Abstract

This study addresses a current research gap in Agriculture concerning Methodological evaluation of regional monitoring networks systems in Rwanda: quasi-experimental design for measuring risk reduction in Rwanda. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of regional monitoring networks systems in Rwanda: quasi-experimental design for measuring risk reduction, Rwanda, Africa, Agriculture, theoretical This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The empirical specification follows $Y = \vec{\beta_{0+\beta}} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Rwanda, GIS, spatial analysis, econometrics, stochastic frontier analysis, randomized controlled trials, meta-analysis*

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