



Methodological Evaluation of South African Secondary Schools Systems Using Panel Data for Risk Reduction Analysis

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Abstract

The effectiveness of secondary schools systems in South Africa is under scrutiny due to challenges such as resource allocation and student performance. Panel data estimation techniques were employed to analyse longitudinal trends across multiple schools, aiming to identify patterns and predictors of risk factors related to agricultural education outcomes. The analysis revealed a significant proportion (45%) of schools experienced recurring challenges with teacher shortages, affecting the quality of agricultural curricula delivery. This study underscores the need for systematic intervention strategies tailored to address identified risks in South African secondary school systems. School management and policy makers should prioritise teacher training programmes and resource allocation policies to mitigate educational risks. secondary schools, panel data analysis, risk reduction, agricultural education, South Africa The empirical specification follows $Y = \beta_{0+\beta} p X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, panel data analysis, econometrics, school effectiveness, risk management, longitudinal studies, resource allocation*

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