



Nutritional Security and Dietary Diversity Framework in Rural African Communities of South Africa: An Agricultural Perspective

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Abstract

This study addresses a current research gap in Agriculture concerning Nutritional Security and Dietary Diversity in Rural African Communities in South Africa. 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. Nutritional Security and Dietary Diversity in Rural African Communities, South Africa, Africa, Agriculture, theoretical This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African, Geographic, Nutrition, Diversity, Food Security, Feeding Systems, Agricultural Economics*

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