African Retailing Studies

Methodological Evaluation of Smallholder Farms Systems in South Africa Using Time-Series Forecasting Models for Risk Reduction Analysis

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Abstract

Smallholder farms in South Africa face significant risks related to climate variability, market fluctuations, and economic instability. The study employs ARIMA (AutoRegressive Integrated Moving Average) model for predicting future agricultural yields based on historical data. Forecasts indicate a 15% variation in agricultural output over the next two years, highlighting potential risks to smallholder livelihoods. ARIMA models effectively predict yield variability but require further validation with larger datasets. Further research should focus on incorporating additional variables and improving model robustness through cross-validation techniques. Smallholder farms, South Africa, ARIMA model, time-series forecasting, risk reduction Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, ARIMA, econometrics, stochastic, forecasting, resilience, sustainability*

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