African Digital Media Studies (Media/Social focus)

Forecasting Yield Improvement in Nigerian Smallholder Farms Systems using Time-Series Models: A Methodological Evaluation

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Abstract

The agricultural sector in Nigeria plays a crucial role in the country's economy, with smallholder farmers contributing significantly to food security and rural livelihoods. The research employs ARIMA (AutoRegressive Integrated Moving Average) model, a widely used time-series analysis method, to forecast future yields based on historical data from smallholder farms. The study also incorporates robust standard errors to account for the uncertainty inherent in forecasting models. The ARIMA model showed an average forecast error of ±5% over three years, indicating that while the model can predict yield trends with some precision, there remains a margin of error that needs further refinement. While the ARIMA model demonstrates potential for forecasting yield improvements in Nigerian smallholder farms, its accuracy could be enhanced through additional data and more sophisticated modelling techniques. Future research should consider incorporating climate change projections and market demand forecasts to improve the reliability of yield predictions. Additionally, a wider range of crops and regions should be included in the analysis for broader applicability. Agriculture, Nigeria, Smallholder Farms, Yield Forecasting, Time-Series Models Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, Agricultural, Econometrics, Time-Series, ARIMA, Nigeria, Farm, Systems*

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