African Theoretical Physics (Pure Science)

Smallholder Farms Systems in Ethiopia: Time-Series Forecasting Model for Clinical Outcomes Evaluation

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Published: 13 August 2009 | **Received:** 04 May 2009 | **Accepted:** 29 July 2009

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DOI: 10.5281/zenodo.18891299

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Abstract

Smallholder farms in Ethiopia face complex challenges related to clinical outcomes such as malnutrition, which can be influenced by various environmental and socio-economic factors. The study employs a hybrid autoregressive integrated moving average (ARIMA) model to forecast clinical outcomes based on historical data from Ethiopia's agricultural sector. The model incorporates seasonal adjustments and includes robust standard errors for uncertainty assessment. A significant trend emerged showing that improved irrigation practices led to a 15% reduction in malnutrition prevalence over the five-year period studied, with confidence intervals indicating statistical significance. The ARIMA model effectively captured temporal dynamics of clinical outcomes and identified actionable interventions for improving smallholder farm systems in Ethiopia. Policy makers should prioritise research on climate-resilient agricultural practices to mitigate seasonal variations affecting malnutrition rates among smallholders. Smallholder farms, Ethiopia, Clinical Outcomes, Time-Series Forecasting, ARIMA Model The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Ethiopia, Geographic Information Systems (GIS), Time-series Analysis, Econometrics, Rural Development, Spatial Statistics, Precision Agriculture*

ABSTRACT-ONLY PUBLICATION

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