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Methodological Evaluation of Smallholder Farm Systems in Uganda Using Time-Series Forecasting Models

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Abstract

Smallholder farming in Uganda faces challenges related to resource management and environmental sustainability. A mixed-methods approach combining survey data with machine learning algorithms for forecasting adoption trends over a five-year period. The model forecasts an increase in the adoption rate by 15% within the next year, with significant variability due to seasonal and economic factors. Time-series forecasting models effectively predict sustainable agricultural practices' uptake among smallholder farmers in Uganda. Implement targeted interventions based on forecasted trends to enhance sustainability and resilience of farming systems. Smallholder farms, time-series forecasting, adoption rates, sustainable agriculture, machine learning The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, Smallholder, Sustainability, Forecasting, Evaluation, Analytics, GIS*