



Methodological Assessment and Forecasting Models of Field Research Stations in Rwanda: A Scoping Review

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Abstract

Field research stations in Rwanda have played a crucial role in agricultural development by providing data on crop yields and other variables. However, the methodologies used for data collection and analysis vary significantly across these stations. A systematic search strategy was employed to locate relevant studies published between and . Inclusion criteria included peer-reviewed articles, reports from agricultural research institutions, and grey literature focusing on yield forecasting models in Rwanda's field research stations. Studies were assessed for methodological rigor using predefined criteria. The analysis revealed that while most studies used linear regression models to forecast yields, there was significant variation in the inclusion of explanatory variables such as climate data and soil quality metrics. A notable finding was the use of ARIMA (Autoregressive Integrated Moving Average) models by some stations, which showed promise for improving forecasting accuracy. The scoping review highlights the need for standardisation in methodology across Rwanda's field research stations to enhance yield forecasting precision and reliability. Standardised guidelines should be developed to ensure consistency in data collection and analysis methodologies. Furthermore, incorporating more advanced models like machine learning algorithms could improve forecast accuracy. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agriculture, Geographic Information Systems (GIS), Methodology, Remote sensing, Statistical analysis, Time-series analysis, Yield forecasting*

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