Time-Series Forecasting Model for Evaluating Cost-Effectiveness of Field Research Stations in Rwanda

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Abstract

Field research stations in Rwanda have been established to support various scientific studies. However, there is a need for an evaluation method that can determine their cost-effectiveness over time. A time-series forecasting model was developed using historical data from existing field research stations. The model accounts for various factors affecting station costs such as personnel expenses, equipment maintenance, and logistical operations. The forecast indicates that the cost of maintaining a single field research station in Rwanda is projected to increase by approximately 10% annually due to inflation and operational inefficiencies. The time-series forecasting model provides insights into potential future costs and helps stakeholders make informed decisions about resource allocation for these stations. Stakeholders should consider implementing cost-saving measures, such as optimising personnel schedules or upgrading equipment, to mitigate projected increases in station costs. Field Research Stations, Time-Series Forecasting, Cost-Effectiveness, Rwanda 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: *Geographic, Sub-Saharan, Time-series, Evaluation, Forecasting, Methodology, Cost-benefit*

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