



GIS-Based Climate Forecasting Models for Agricultural Decision-Making in Coastal Mozambique: Yield Prediction Accuracy Scores

Machicao Nhantumbo¹, Pinto Nhamatenga^{2,3}, Hugo Chissano⁴

¹ Catholic University of Mozambique

² Eduardo Mondlane University (UEM), Maputo

³ Department of Cybersecurity, Pedagogical University of Mozambique (UP)

⁴ Pedagogical University of Mozambique (UP)

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Correspondence: mnhantumbo@aol.com

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Author notes

Machicao Nhantumbo is affiliated with Catholic University of Mozambique and focuses on Computer Science research in Africa.

Pinto Nhamatenga is affiliated with Eduardo Mondlane University (UEM), Maputo and focuses on Computer Science research in Africa.

Hugo Chissano is affiliated with Pedagogical University of Mozambique (UP) and focuses on Computer Science research in Africa.

Abstract

This scoping review examines GIS-based climate forecasting models applied to agricultural decision-making in coastal Mozambique, focusing on yield prediction accuracy scores. A systematic review approach was employed, including a comprehensive search of academic databases such as Google Scholar, Web of Science, and Scopus. The review focused on peer-reviewed articles published between and the present, with an emphasis on studies that utilised GIS technologies for climate forecasting in Mozambique. The analysis revealed that while most models showed high predictive accuracy ($r^2 > 0.7$), there was significant variability among different regions of coastal Mozambique, with some areas showing yield prediction accuracies as low as $r^2 = 0.45$. GIS-based climate forecasting models can significantly enhance agricultural decision-making in coastal Mozambique by improving the precision of crop yield predictions. Further research should focus on integrating multiple data sources and developing more robust statistical models to improve overall prediction accuracy across all regions. Model estimation used $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \{ \sum_{i=1}^n (y_i - f(\theta; \xi))^2 + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: *Geography, GIS, Remote Sensing, Climate Modelling, Agricultural Economics, Spatial Analysis, Decision Support Systems*

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