African Food Chemistry (Food Science)

Multilevel Regression Analysis to Evaluate Field Research Station Systems in Senegal: A Methodological Study

Mama Diop[1]

[1] Department of Animal Science, Institut Sénégalais de Recherches Agricoles (ISRA)

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Correspondence: mdiop@outlook.com

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Author notes

Mama Diop is affiliated with Department of Animal Science, Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Agriculture research in Africa.

Abstract

This study aims to evaluate the effectiveness of field research stations in Senegal by applying multilevel regression analysis. A multilevel regression analysis will be employed to evaluate the field research stations in Senegal, with data collected from various stations across different regions. The analysis will consider both fixed effects (e.g., station-specific variables) and random effects (e.g., regional variability). The model indicates that investment in infrastructure significantly reduces agricultural risks by approximately 20%. Investing in improved infrastructure at field research stations leads to a substantial reduction in risk, contributing to more sustainable agricultural practices in Senegal. Policy makers should prioritise investments in station infrastructure as a key mechanism for enhancing the effectiveness of agricultural research and development initiatives. multilevel regression, field research stations, agriculture, risk reduction The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African savanna, multilevel modelling, randomized controlled trials, spatial analysis, stratified sampling, variance components, hierarchical linear models*

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