



Methodological Evaluation of Regional Monitoring Networks in Nigeria: A Randomized Field Trial for Risk Reduction

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Abstract

Regional monitoring networks are crucial for agricultural risk reduction in Nigeria, where climate variability poses significant challenges to food security and productivity. A randomized field trial was conducted across three regions in Nigeria. Soil moisture sensors were deployed at multiple sites, with data collected over two growing seasons. Statistical models were used to analyse soil moisture levels and their impact on crop yields. Soil moisture levels showed significant variation between the three monitored regions, affecting crop yields by up to 30% in areas with insufficient moisture. The randomized field trial demonstrated that regional monitoring networks can effectively identify areas at risk of agricultural risks and guide targeted interventions to mitigate these risks. Further research should focus on extending the network to include more regions, ensuring data quality through calibration exercises, and integrating climate forecasts into the monitoring systems. The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African, GIS, precision agriculture, methodology, climate change, monitoring systems, randomized trials*

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