



Methodological Assessment of Regional Monitoring Networks in Yield Improvement within Senegal's Agricultural Systems,

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Diella Ndiaye

*Department of Crop Sciences, Cheikh Anta Diop University (UCAD), Dakar
African Institute for Mathematical Sciences (AIMS) Senegal*

Mame Sarr

*Université Gaston Berger (UGB), Saint-Louis
Cheikh Anta Diop University (UCAD), Dakar*

Ama Diop

*Université Gaston Berger (UGB), Saint-Louis
African Institute for Mathematical Sciences (AIMS) Senegal*

Correspondence: dndiaye@outlook.com

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Abstract

This study examines regional monitoring networks in yield improvement within Senegal's agricultural systems, focusing on methodologies for assessing these systems. A multilevel regression analysis was employed to assess the impact of various variables on yield improvement, including climate conditions, soil quality, and agricultural practices. Data from multiple regions were analysed using advanced statistical techniques to ensure accuracy and reliability. The analysis revealed that climate variability significantly influenced crop yields in Senegal, with a notable decrease in yields during years with extreme rainfall events (e.g., -10% reduction in yield for every 5 cm increase in annual rainfall). The regression models demonstrated high explanatory power, accounting for approximately 70% of the variance in observed crop yields across regions. Further research should focus on developing adaptive management strategies to mitigate the effects of climate variability on agricultural productivity. The findings suggest a need for enhanced early warning systems and improved irrigation infrastructure to support farmers during challenging climatic conditions. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic, monitoring networks, regression analysis, agricultural systems, yield assessment, multilevel models, data collection*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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