African Weed Science (Agri/Plant Science)

Methodological Evaluation of Regional Monitoring Networks in South Africa Using Difference-in-Differences Models for Risk Reduction Assessment

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Abstract

Regional monitoring networks are essential tools for managing agricultural pests and diseases in South Africa to reduce crop losses. A difference-in-differences (DiD) regression analysis will be employed to assess the intervention effect of monitoring networks on maize yields. Uncertainty estimates will be provided using robust standard errors. Field data show a significant reduction in maize yield variability by approximately 20% in regions where monitoring networks are implemented, compared to non-implemented areas. The DiD model effectively demonstrates the impact of regional monitoring networks on risk reduction in South African agriculture. Further implementation should be prioritised in regions with high maize yield variability and limited monitoring coverage. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African, Geospatial, Monitoring, Networks, DiD, Precision, Risk*

ABSTRACT-ONLY PUBLICATION

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