African Sensory Science in Food (Food Science)

Climate-Smart Agriculture Adoption and Its Impact on Smallholder Productivity in Kenya: A Systematic Literature Review

Mwihaki Ochieng[1]

[1] African Population and Health Research Center (APHRC)

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Correspondence: mochieng@yahoo.com

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Author notes

Mwihaki Ochieng is affiliated with African Population and Health Research Center (APHRC) and focuses on Agriculture research in Africa.

Abstract

Climate-smart agriculture (CSA) is a set of practices designed to enhance agricultural productivity while reducing environmental impacts and building resilience against climate change. In Kenya, smallholder farmers face significant challenges due to climate variability, leading to reduced crop yields and incomes. A comprehensive search strategy was employed using databases such as PubMed, Scopus, and Google Scholar. Inclusion criteria focused on studies published between and that reported quantitative data on the adoption of CSA practices by Kenyan smallholder farmers and their impact on productivity. A total of 45 relevant articles were identified and analysed. The findings suggest that the implementation of CSA practices, such as conservation agriculture and drought-resistant crop varieties, can lead to a 10-20% increase in maize yields among smallholders compared to conventional farming methods. The review highlights the potential of CSA to improve agricultural productivity for Kenyan smallholder farmers by enhancing resilience against climate variability. However, socio-economic factors and policy support are critical for effective implementation. Policy makers should invest in education programmes that promote CSA practices among smallholders. Additionally, financial incentives and infrastructure improvements can facilitate the adoption of these sustainable farming techniques. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agriculture, climate change adaptation, sustainable intensification, resilience building, smallholder farming systems*

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