African Large Animal Veterinary Practice

Adoption Patterns of Conservation Agriculture in Kenyan Smallholder Farming Communities: A Geospatial Synthesis

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Abstract

Conservation agriculture (CA) is a sustainable farming practice that aims to reduce soil degradation while maintaining productivity and profitability. A systematic review approach was employed to identify, evaluate, and analyse studies that assess CA implementation across different regions of Kenya. Studies were appraised using predefined inclusion criteria based on study design, geographic location, and relevance to the context of smallholder farming in Kenya. Analysis revealed a spatial gradient where adoption rates varied significantly by region, with an overall average adoption rate of 45% across all studies reviewed. Higher adoption was observed in areas with more accessible irrigation infrastructure and closer proximity to markets for CA produce. The review underscores the importance of integrating geospatial data into future CA implementation strategies to enhance community-level impact and sustainability. Policy makers are encouraged to develop targeted interventions that consider regional context, including access to water resources and market accessibility. Future research should further explore factors influencing adoption in diverse farming systems within Kenya. The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic, Smallholder, Sustainability, GIS, Adoption, Methodology, Precision Agriculture*

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