



# Climate-Smart Agriculture Adoption and Impacts on Smallholder Productivity in Kenya: A Comparative Study

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## Abstract

Climate-smart agriculture (CSA) strategies are being promoted to enhance productivity and resilience among smallholder farmers in Kenya amidst climate change challenges. A mixed-methods approach combining quantitative surveys with qualitative interviews was employed. Data were collected from 300 randomly selected farmers in four counties representing diverse agro-ecological zones. Significant differences in CSA adoption rates (75% vs. 40%) were observed across regions, with higher yields reported by farmers adopting improved irrigation techniques (mean increase: 20%). The study highlights the importance of tailored CSA interventions to maximise benefits and suggests that improved water management is a key driver of productivity gains. Local governments should prioritise investment in infrastructure for sustainable water supply systems, alongside capacity-building programmes for farmers to adopt CSA practices effectively. Climate-Smart Agriculture, Smallholder Farmers, Productivity Gains, Mixed-Methods Research The empirical specification follows  $Y = \beta_{0+\beta}^- p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** Kenya, Smallholder Farmers, Climate Change, Adaptation Strategies, Agroecology, Participatory Action Research, Integrated Pest Management

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