American Journal of Development Studies (AJDS)

ISSN: 2837-6676 (ONLINE)

VOLUME 4 ISSUE 2 (2026)

PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

American Journal of Development Studies (AJDS)

Volume 4 Issue 2, Year 2026
ISSN: 2837-6676 (Online)
DOI: https://doi.org/10.54536/ajds.v4i2.6833
https://journals.e-palli.com/home/index.php/ajds

Influence of Government Policies on Adoption of Green Technologies by Women Smallholder Farmers in Soy Sub-County, Kenya

Joshua Kogei Kangogo[1*], Fred K. Wamalwa[2], Florence Nassiwa[3]

Article Information

Received: December 01, 2025
Accepted: January 29, 2026
Published: July 22, 2026

Keywords

Adoption, Government Policies, Green Technologies, Women Smallholder Farmers

ABSTRACT

In Kenya, there have been efforts to scout green agricultural technologies at the national levels like the Climate-Smart Agriculture Strategy, counties development plans among others. Nevertheless, adoption of the same among women smallholder farmers is still on a small scale. Meanwhile, available agricultural research often focus disproportionately on male-headed households, commercial farms, or large-scale interventions, thereby overlooking the complex realities faced by women in smallholder environments. This study sought to determine the factors influencing the adoption of green technologies by women smallholder farmers in Soy Sub-County, Uasin Gishu County, Kenya. This paper examines the influence of government policies on the adoption of green technologies. The study was anchored on the Diffusion of Innovation Theory, the Unified Theory of Acceptance and Use of Technology, and the Sustainable Livelihoods Approach. An explanatory sequential mixed-methods design was employed, combining quantitative data from a census survey of 292 women small holder farmers across 14 community-based organizations and qualitative data from six key informant interviews with Ward Agricultural Officers and County Director for Agriculture. Findings revealed that government policies (R^2=0.178) facilitated adoption through cooperatives (M=4.0), but were hindered by bureaucratic inefficiencies and limited extension services. Qualitative insights highlighted gender-specific barriers, including patriarchal norms limiting married women's (67.7%) land access and financial constraints restricting capital-intensive technologies like drip irrigation (25%). The study concludes that gender-insensitive policies limit women farmers' adoption of technologies. Recommendations include expanding extension services, subsidizing accessible technologies, and investing in water infrastructure.

INTRODUCTION

The agricultural sector remains a cornerstone of socio-economic development globally. It is the primary source of food, employment, and income, particularly for rural populations (Food and Agriculture Organization [FAO], 2023). In Kenya, agriculture contributes approximately 33% of the national Gross Domestic Product (GDP) and employs over 40% of the total population. An estimate of 70 percent of the households in Kenya's rural areas rely on agriculture as a source of livelihood (Kenya National Bureau of Statistics [KNBS], 2022). This highlights the importance of the sector in national growth and progress as well as the realization of the Sustainable Development Goal 1 (No Poverty) and Goal 2 (Zero Hunger).

Women play major roles in agricultural productivity in the rural Kenya. Smallholder farmers are women, and they produce between 60 and 80 percent of the food being produced in a country (International Fund for Agricultural Development [IFAD], 2024). The different types of farming activities in which they participate include the planting of crops, weeding, harvesting, processing, as well as marketing. Although their agricultural and other socio-economic activities are crucial, women are still subject to gender specific constraints. These constraints include unequal access to land, financial services, limited admission to quality farm inputs and extension services plus low involvement in decision formulation exercises. Such challenges militate against their ability to learn and make use of the modern methods of agriculture, especially the green technologies that are very vital in the face of change of climate.

Green technologies refer to a series of processes and developments that aim at making agriculture more sustainable and resilient to climate change. They include conservation agriculture (for example, minimum tillage, crop rotation), organic farming, agroforestry, irrigation using renewable energy sources, and climate-smart solutions like drought-tolerant seeds. The technologies contribute to conservation of soil health, water efficiency, productivity and carting on the emission of greenhouse gases. The use of green technologies have been producing positive results world over (IFAD, 2009). Conservation agriculture in India has resulted in increase of rice yield and conservation of water (Islam *et al.*, 2019). Examples of improvements that agroecological applications have brought about in Brazil include the reconstruction of degraded lands and increased incomes of farmers (Stratton, Wittman & Blesh, 2021). In Malawi, composting and drip irrigation have greatly enhanced the food security conditions of the households, being manoeuvred and facilitated by women (FAO, 2020).

In Kenya, there have been efforts to scout green agricultural

[1] Master of Arts Student, The Catholic University of Eastern Africa; P. O. Box 908-30100, Eldoret, Kenya
[2] Faculty of Arts and Social Sciences, The Catholic University of Eastern Africa, Kenya
[3] Lecturer, Faculty of Arts and Social Sciences, The Catholic University of Eastern Africa, Kenya
* Corresponding author's e-mail: joshuakogei89@gmail.com

technologies at the national levels like the Climate-Smart Agriculture Strategy, counties development plans among others (Anyango *et al.*, 2022). Nevertheless, adoption of the same among women smallholder farmers is still on a small scale. An example of this difficulty is the Soy Sub-County of the Uasin Gishu County. In spite of the fact that the region has dense agricultural potentials given its good climatic conditions and fertile soils, many women still practice the conventional farming practices (Kosgei, 2019). The green technologies do have several obstacles in their adoption in the area. Such factors include limited access to information, insufficient extension services, limited financial resources, lack of access to suitable tools and equipment, and socio-cultural norms that limit women's decision-making power and their ability to own land (Kibera *et al.*, 2023).

Available studies in agricultural research often focus disproportionately on male-headed households, commercial farms, or large-scale interventions, thereby overlooking the complex realities faced by women in smallholder environments (FAO, 2023). This bias generates a knowledge gap, which in turn limits the inclusiveness and contextualization of policies and programmatic interventions (Kenya Institute of Public Policy Research and Analysis [KIPPRA], 2024). To achieve equity, women's voices, opinions, and experiences must be prioritized and centralized in agricultural research (World Bank, 2021).

The present study addresses this research gap by focusing on the specific experiences of women smallholder farmers living in Soy Sub-County, particularly those organized in community-based organizations (CBOs). By investigating policy-related drivers of green technology adoption, this study situates itself within the community to generate context-specific insights. It explores both the enabling and constraining factors influencing the adoption of sustainable technologies by rural women, and examines how collective action and the diffusion of innovation occur within the group dynamics of CBOs (Tarus, Kadurenge & Kawour, 2025).

Statement of the Problem

Soy Sub-County, a key agricultural hub in Uasin Gishu County, Kenya, relies heavily on women smallholder farmers, who constitute over 60% of the agricultural workforce (Kibera, Mutai & Wanyonyi, 2023). Despite favourable agroecological conditions, such as 800–1200 mm annual rainfall and fertile loamy soils, women in Soy face significant barriers to adopting green technologies like conservation agriculture and water harvesting, which are vital for climate resilience and sustainable food production (Luwesi, Ogega & Doke, 2025; FAO, 2020). These barriers include limited access to land (only 20% of women own land compared to 70% of men), credit, and inputs, compounded by patriarchal norms and male-dominated cooperatives that restrict women's participation in agricultural programmes (Kibera *et al.*, 2023; Ogutu, Chesikaw & Wambu, 2025). Economic constraints, such as the high cost of organic inputs, and inadequate gender-responsive extension services further hinder adoption, leading to reduced productivity and income losses of up to 34% due to climate challenges (FAO, 2020; Priya, Sivanarayana & Roy, 2025). Addressing these gender-specific barriers is critical to enhancing food security and environmental sustainability in Soy Sub-County.

While green technology adoption is widely studied in Kenya (for instance by Awoke, Kimurto & Okello, 2025; Arieno, 2024), existing research often focuses on national or regional trends, overlooking the localized, gender-specific dynamics in Soy Sub-County. Few studies have explored how demographic factors (e.g., age, education), policy gaps (e.g., lack of gender-sensitive incentives), technological barriers (e.g., poor customization for small-scale farming), and agroecological challenges (e.g., soil degradation, erratic rainfall) uniquely affect women smallholder farmers in this region (Priya *et al.*, 2025). The absence of context-specific data risks perpetuating ineffective interventions that fail to address women's unique constraints, such as socio-cultural barriers and limited access to climate information or follow-up training (Ogutu *et al.*, 2025; Luwesi *et al.*, 2025). This study fills this gap by examining the interplay of these factors in Soy Sub-County, providing evidence to inform targeted, inclusive strategies.

The focus on women smallholder farmers in Soy Sub-County is justified by their critical role in agriculture and the pronounced gender disparities they face compared to men. Women encounter systemic barriers, including restricted land tenure, lower education levels, and social taboos that limit engagement in male-targeted programmes, which men typically navigate with greater ease due to better resource access and decision-making power (Kibera *et al.*, 2023; Ogutu *et al.*, 2025).

These challenges exacerbate women's vulnerability to climate impacts, necessitating a gender-sensitive approach to technology adoption (FAO, 2020). By investigating how demographic, policy, technological, and agroecological factors influence women's adoption of green technologies in Soy, this study aims to deliver actionable insights for policymakers and development partners, fostering equitable, climate-resilient agricultural development that empowers women as key contributors to sustainable rural livelihoods.

LITERATURE REVIEW

Women smallholder farmers belonging to a social group enhances their social capital allowing trust, idea, and information exchange (Mignouna *et al.*, 2011). Women smallholder farmers within a social group learn from one another the benefits and usage of green technologies. Uaiene *et al.* (2009) suggest that social network effects are important for individual decisions, and that, in the context of agricultural innovations, farmers share information and learnt from one another. Studying the effect of community-based organizations in the adoption of corm-paired banana technology in Uganda, Katungi and

Akankwasa (2010) found that farmers who participated more in community-based organizations were likely to engage in social learning about the technology, hence raising their likelihood to adopt the technology.

Many researchers have reported a positive influence of social group on technology adoption, social groups may have a negative impact on technology adoption, especially incidences where free-riding behaviour exists. Foster and Rosenzweig (1995), in a study on adoption of green technologies in India, found that learning externalities within social networks increased the profitability of adoption. However, farmers appeared to be free-riding on their neighbour's costly experimentation with the new technology. Bandiera and Rasul (2002, as cited in Hogset, 2005) suggest that learning externalities generate opposite effects, such that the more other people engage in experimentation with a new technology, the more beneficial it is to join in, but also the more beneficial it is to free-ride on the experimentation of others. As a result of these contradictory effects, Bandiera and Rasul propose an inverted U-shaped individual adoption curve, implying that network effects are positive at low rates of adoption, but negative at high rates of adoption.

Acquisition of information about a new technology is another factor that determines adoption of technology. Information enables farmers to learn about the existence as well as the effective use of technology and this facilitates its adoption (Abdulai, 2023). Farmers only adopt the technology they are aware of or have heard about. Access to information reduces the uncertainty about a technology's performance hence may change individual's assessment from purely subjective to objective over time (Mwangi & Kariuki, 2015; Bonabana-Wabbi & Taylor, 2012). However, access to information about a technology does not automatically imply it will be adopted by all farmers (Uaiene *et al.*, 2009).

In some instances, access to information may also trigger dis-adoption of the technology. For instance, a study found that where experience within the general population about a specific technology was limited, more information induced negative attitudes towards its adoption, probably because more information exposed an even bigger information vacuum hence increased the risk associated with it (Bonabana-Wabbi & Taylor, 2012). It is therefore important to ensure the information is reliable, consistent and accurate. Farmers need to know that the technology exists and that it is beneficial for them to adopt it.

In Nepal, Shrestha, Ghimire and Aggarwal (2022) assessed the institutional framework surrounding the Climate-Smart Village (CSV) approach, using a case-study methodology involving interviews, stakeholder workshops, and policy document analysis in multiple CSV pilot sites. The study found that multi-stakeholder institutional arrangements linking CGIAR, government agencies, and local farmer groups played a critical role in enabling the adoption of Climate-Smart Agriculture technologies, particularly water-smart, crop-smart, and nutrient-smart innovations. They concluded that institutional innovations, such as coordinated governance, inclusive policy mechanisms, and stakeholder collaboration, are foundational to scaling Climate-Smart Agriculture. Although this evaluation provided rich insight into institutional design, it lacked empirical data disaggregated by gender or information on the impact of policy implementation at the farm level. The current study addressed this gap by examining how county-level institutional policies and collaboration networks influence women smallholder farmers' adoption of green technologies in Soy Sub-County, Kenya.

In South Korea, Bang and Han (2025) conducted a cross-sectional survey of 300 smallholder farmers across several provinces to identify the role of institutional factors, including government-backed training programs, financial support mechanisms, and extension services in motivating smart farm technology adoption. Statistical analysis revealed that policies offering subsidies, digital training, microfinance, and government banking support significantly increased the likelihood of adoption. The study concluded that targeted policy interventions combining technical training with financial assistance are vital institutional enablers of green technology uptake. While these findings underscore the importance of institutional support, the sample was skewed towards commercial and more educated farmers, limiting generalizability to smallholder women farmers. The current research adapted these insights to the Kenyan context by focusing specifically on how institutional policy supports, such as training and microfinance, affect women smallholder farmers in Soy Sub-County.

In South Africa, Raymond and Weldon (2022) conducted a systematic review of institutional and policy frameworks affecting Climate-Smart Agriculture scaling. They identified constraints such as weak policy enforcement, ambiguous land tenure, and poor market linkages, which undermined technology uptake even where Climate-Smart Agriculture innovations existed. The study concluded that policy coherence, secure land rights, and institutional coordination are critical to scaling Climate-Smart Agriculture innovations. The review did not have a gender-specific empirical depth, but the results on a larger scale can be a strong point of the comparative analysis presented at the institutional level. The present study applied these concepts on local levels through study of the impact of institutional policymaking at the county and local levels in Soy Sub-County, Kenya, on the capacity of the women to adopt green technologies.

In Western Kenya, Gakuya, Omondi and Ndiritu (2021) conducted a study on the adoption of climate-smart agricultural (CSA) practices among 300 smallholder households using a cross-sectional survey design and multivariate and ordered probit models. The study found that institutional factors, particularly contact with extension agents and access to weather information, significantly influenced the adoption of technologies such as agroforestry, soil-water conservation, and integrated crop–livestock systems. It concluded that

effective institutional support mechanisms are essential to promote Climate-Smart Agriculture uptake. Although Gakuya *et al.*'s study highlighted the importance of institution-led information delivery, it did not disaggregate the institutional effects by gender. The current study addressed this gap by focusing on how policy-driven institutional support, especially extension services and information dissemination, influences adoption among women smallholder farmers in Soy Sub-County, Kenya.

In Taita Taveta County (Southeast Kenya), a climate-smart agriculture rapid appraisal led by Godino (2021) employed mixed methods, including household surveys, workshops, key-informant interviews, and transect walks. The study revealed that institutional constraints, such as weak extension outreach, insecure land tenure, and market uncertainties, substantially limited the adoption of Climate-Smart Agriculture technologies, despite adequate awareness among farmers. It concluded that localized and gender-responsive policy design and extension systems are needed to support effective adoption. While comprehensive in institutional scope, the analysis did not specifically explore women's experiences. The current study added value by examining how county-level institutional policies and governance structures either enable or hinder women's access to green technologies in Soy Sub-County.

In Nakuru County (Gilgil Sub-County), Ingutia, Sumelius and Bäckman (2023) analysed institutional determinants, such as access to credit, training on climate-smart agriculture, NGO support, and farmer group membership, among smallholder potato farmers using a binary logistic regression. The study found that although several institutional factors were tested, only access to credit was statistically significant in influencing adoption ($p < .05$). The study concluded that policies enabling credit access, for instance via SACCOs or VSLAs, can significantly foster Climate-Smart Agriculture adoption. While the research illuminated the role of financial institutions, it lacked focus on women-specific mechanisms. The current study adapted these findings to Soy Sub-County to examine how institutional credit mechanisms and group-based financial support influence adoption among women smallholder farmers.

MATERIALS AND METHODS

The study adopted the explanatory sequential research design, which involved mixed methods commonly employed in fields where complex social phenomena are studied, and the researcher needed to interpret numerical data within the context of participants' lived experiences or perceptions. It was conducted in Soy Sub-County located in Usain Gishu County, Kenya. The sub-county is located in the western part of Kenya, which borders several sub-counties, including Lugari to the West, Moiben to the northeast, and Mossop to the South. The target population for the study comprised women smallholder farmers in Soy Sub-County. According to Soy Sub-County Department of Agriculture, as of January 2024, there were 14 community-based registered groups in the Soy Sub-County, with 292 members. The study also targeted 6 key informants from the County Government Department of Agriculture, who included 5 Ward Agricultural Officers and 1 County Director for Agriculture. The study employed a census sampling technique to select 14 community-based groups that had been engaged in farming activities for more than five months. Purposive sampling technique, also known as judgmental or selective sampling, was used to select the key informants.

The study employed an interview schedule and questionnaire to collect data from the key informants and women smallholder farmers, respectively. The quantitative data was analysed with the help of Statistical Package for Social Sciences (SPSS), version 25. To explain the relationships among the variables and the research problems, ANOVA, regression analysis, and correlation analysis were used. The frequencies, percentage and the mean scores in which data was presented were summarized in order to give the information needed to answer the study objectives. Qualitative data obtained from semi-structured interviews was analysed thematically. The transcripts of the interviews were coded and categorized to obtain recurring themes and patterns, which gave insights of the experiences, challenges and the way women smallholder farmers view adoption of green technologies.

RESULTS AND DISCUSSION

This section examines the influence of government policy factors on the adoption of green technologies among women smallholder farmers in Soy Sub-County. Descriptive statistics (mean scores, standard deviations) were as presented in Table 1.

From the results, the sample (n=201) rated cooperatives highest (M=4.0, SD=0.7), indicating strong agreement that farmer cooperatives enhance green technology adoption through input and knowledge sharing. Access to agricultural information scored slightly lower (M=3.9,

Table 1: Government Policy Attitudes

Variable	Mean	Standard Deviation (SD)	N
Access to Information	3.9	0.8	201
Cooperatives	4.0	0.7	201
Training Opportunities	3.8	0.8	201
Policy Favorability	3.6	0.9	201

SD=0.8), reflecting moderate availability of government extension services. Training opportunities had a mean of 3.8 (SD=0.8), suggesting that while training programmes are valued, their frequency or accessibility may be limited. Policy favourability received the lowest score (M=3.6, SD=0.9), indicating mixed perceptions of government policies' effectiveness in supporting adoption. Standard deviations (0.7–0.9) suggest relatively consistent responses, with slightly higher variability for policy favourability, possibly due to diverse experiences with policy implementation across Soy Sub-County's wards.

Thematic analysis of interviews conducted revealed three key themes influencing the role of government policies in green technology adoption: cooperative support; bureaucratic inefficiencies, and limited credit access. These themes provide context for the quantitative findings and highlight gender-specific challenges in Soy Sub-County.

Cooperative Support

Cooperatives were identified as critical facilitators, with 72.1% (n=145) of respondents being CBO members. Interviewees emphasized that cooperatives provide access to seeds, fertilizers, and knowledge-sharing platforms, enabling women to adopt technologies like organic farming (adopted by 70%, n=141) and water conservation (57%, n=115). A ward agricultural officer from Kipsomba Ward stated thus: "Cooperatives are a lifeline for women farmers; they share seeds for organic farming and organize group training, which makes adoption easier" (Interview, September 8, 2024, Kipsomba Ward Office). This aligned with the high mean score for cooperatives (M=4.0, SD=0.7) and supported the findings of Mwasaru (2021), which highlighted cooperatives' role in input dissemination among Kenyan smallholder farmers. However, the officer noted that not all cooperatives were equally active, with some wards (such as Ziwa) having stronger CBO networks than others, which could explain response consistency (SD=0.7).

Bureaucratic Inefficiencies

Bureaucratic delays in policy implementation, particularly in subsidy and input delivery, were a significant barrier. The moderate score for policy favourability (M=3.6, SD=0.9) reflected mixed experiences, with some women having benefitted from government programmes while others faced delays. As a county official remarked: "Bureaucracy slows down subsidy delivery, especially for women, who often lack the time or resources to navigate complex processes" (Interview, September 12, 2024, Eldoret Agricultural Office). This was particularly evident for technologies requiring government support, such as subsidized drip irrigation kits. The official further noted that ward-level extension services were understaffed, with only 1–2 officers per ward, limiting outreach to remote farmers. This finding explained the slightly lower score for access to information (M=3.9, SD=0.8) and contrasted with Mwangi and Karanja (2022), who reported more effective national-level policies in Kenya, highlighting a research gap in localized implementation challenges in Soy Sub-County.

Limited Credit Access

Limited access to credit, reported by 63.7% (n=128) of respondents, restricted investment in capital-intensive technologies like drip irrigation (KSh 50,000–100,000) or renewable energy sources (15% adoption, n=30). A ward officer from Soy Ward explained thus: "Without loans, most women can't afford technologies beyond composting, even when they attend training" (Interview, September 9, 2024, Soy Ward Office). This aligned with Doss (2013), who noted that gender inequalities in credit access disproportionately affect women farmers. The officer highlighted that government-backed credit schemes, such as the Agricultural Finance Corporation, often require collateral (such as land titles), which many married women (67.7%, n=136) cannot provide due to male-dominated land ownership. This barrier contextualizes the moderate score for training (M=3.8, SD=0.8), as knowledge gained from training cannot always translate to adoption without financial support.

The qualitative themes reinforced the quantitative findings in Table 1. The high mean score for cooperatives (M=4.0) reflected their role as key facilitators, as confirmed by interview insights on resource and knowledge sharing. The slightly lower scores for access to information (M=3.9) and training (M=3.8) aligned with bureaucratic inefficiencies and understaffed extension services. Meanwhile, the lowest score for policy favourability (M=3.6) corresponded to delays and gender-specific barriers in policy implementation. The standard deviations (0.7–0.9) indicated consistent responses, with higher variability for policy favourability (SD=0.9) reflecting diverse experiences across wards, as noted in interviews. These findings supported the significant influence of government policies on adoption, as further evidenced by regression results ($\beta=0.245$, $p<0.001$, $R^2=0.178$).

The findings aligned with Institutional Theory (North, 1990), which posits that policy frameworks shape behaviour through enabling structures like cooperatives and extension services. Cooperatives and information access serve as institutional mechanisms facilitating adoption, as seen in the high mean scores (M=4.0 and 3.9). Similarly, Diffusion of Innovations Theory (Rogers, 2003) emphasizes communication channels, with cooperatives and training acting as conduits for knowledge dissemination. The results corroborated Mwasaru (2021), who found cooperatives critical for input access in Kenyan smallholder farming. Nevertheless, the findings highlight a research gap in Soy Sub-County's context, where bureaucratic inefficiencies and understaffed extension services limit policy effectiveness, unlike the broader success reported by Mwangi and Karanja (2022). The credit access barrier (63.7% without) aligned with Doss (2013), who noted that women face disproportionate financial constraints due to gender inequalities, particularly in male-dominated land ownership systems

affecting married women (67.7%). The findings underscored the need for gender-responsive policies to address bureaucratic delays and credit access barriers. Strengthening cooperative networks, increasing extension officer presence (such as one officer per 100 farmers), and simplifying subsidy processes could enhance adoption. Training programmes should be tailored to women's schedules and literacy levels (54.2% with primary or no education), as suggested by interview insights. These strategies would address the localized challenges in Soy Sub-County, where small land sizes (76.6% ≤3 acres) and low incomes (76.6% ≤KSh 20,000/month) amplify the need for accessible policy support.

CONCLUSION

Government policies facilitate adoption through cooperatives and information access. However, they are hindered by bureaucratic inefficiencies and gender-insensitive implementation. Technological factors, particularly perceived benefits and compatibility, drive high adoption of low-cost, user-friendly technologies like organic farming, while high costs and sociocultural barriers limit capital-intensive options. Therefore, the national and County governments should increase the number of extension officers in Soy Sub-County from 1–2 per ward to at least one per 100 farmers, prioritizing gender-sensitive training to address limited access to information (M=3.9). The county government should allocate KSh 20 million to train and deploy additional officers by 2026.

Additionally, the Ministry of Agriculture should simplify bureaucratic processes for subsidy access, ensuring timely delivery of inputs like organic fertilizers and drip irrigation kits. The Ministry should implement a digital platform to track and expedite subsidy applications, targeting 80% of women farmers by 2027. The government should also provide funding and capacity-building for cooperatives (M=4.0), ensuring all wards in Soy Sub-County have active, women-inclusive CBOs to facilitate input sharing and training, aiming to increase cooperative-driven adoption by 25%.

REFERENCES

Abdulai, A. (2023). Information acquisition and the adoption of improved crop varieties. *American Journal of Agricultural Economics, 105*(4), 1049-1062.

Anyango, J. O., Mugo, V., Vyas, S., Schiek, B., Wamicwe, P., Binge, B., ... & Jaquet, S. (2022). *Climate Smart Agriculture Investment Plan for Kenya*. Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA).

Atieno, O. R. A. (2024). Influence of Socio-Economic Factors on Sustainable Production of Cotton in Kisumu County, Kenya (Doctoral dissertation, Kisii University).

Awoke, R. W., Kimurto, P., & Okello, D. (2025). Determinants of adoption of climate-smart agricultural technologies and practices in groundnut production: a gender-disaggregated analysis in arid and semi-arid lands of Kenya. *Discover Agriculture, 3*(1), 238.

Bang, J., & Han, J. W. (2025). Factors influencing farmers' motivation to adopt smart farm technology in South Korea. *arXiv*. https://*arXiv*.org/abs/2504.01795

Bonabana-Wabbi, J., & Taylor, D. B. (2012). A limited dependent variable analysis of integrated pest management adoption in Uganda. *Journal of Agricultural Science and Technology. A, 2*(10A), 1162.

Doss, C. R. (2013). Intrahousehold bargaining and resource allocation in developing countries. *World Development, 41,* 52–63. https://doi.org/10.1016/j.worlddev.2012.06.012

Food and Agriculture Organization of the United Nations (2020). *Green technologies for sustainable agriculture*. Retrieved from http://www.fao.org/publications/card/en/c/CA7465EN/

Foster, A. D., & Rosenzweig, M. R. (1995). Learning by doing and learning from others: Human capital and technical change in agriculture. *Journal of political Economy, 103*(6), 1176-1209.

Gakuya, J., Omondi, C., & Ndiritu, S. (2021). Adoption of climate-smart agricultural practices among smallholder farmers in Western Kenya: Do socioeconomic, institutional, and biophysical factors matter? *Heliyon, 8*(1), Article e08677. https://doi.org/10.1016/j.heliyon.2021.e08677

Godino, M. M. (2021). Assessing psycho-social, socioeconomic and institutional characteristics that influence adoption of climate smart agriculture in Taita Taveta County, Kenya (Doctoral dissertation, Strathmore University).

Hogset, H. (2005). *Social networks and rural development: Theory and applications in the Kenyan highlands*. Cornell University.

Ingutia, M., Sumelius, J., & Bäckman, S. (2023). Adopting climate-smart agriculture: Institutional determinants among smallholder potato farmers in Gilgil Sub County, Kenya. *Sustainability, 15*(8), Article 2294547. https://doi.org/10.3390/su15082294

International Fund for Agricultural Development. (2009). *Gender and sustainable agriculture: A guide for practitioners*. Retrieved from https://www.ifad.org/en/web/knowledge/-/publication/gender-and-sustainable-agriculture-a-guide-for-practitioners

International Fund for Agricultural Development [IFAD], 2024). Project Cluster Evaluation on Rural Finance in the East and Southern Africa Region. Retrieved from http://www.IFAD.com

Islam, S., Gathala, M. K., Tiwari, T. P., Timsina, J., Laing, A. M., Maharjan, S., ... & Gérard, B. (2019). Conservation agriculture based sustainable intensification: increasing yields and water productivity for smallholders of the Eastern Gangetic Plains. *Field Crops Research, 238,* 1-17.

Katungi, E., & Akankwasa, K. (2010) Community-based organizations and their effect on adoption

of agricultural technologies in Uganda: a study of banana pest management technology. *Acta Hort, 879,* 719-726.

Kenya Institute of Public Policy Research and Analysis (KIPPRA) (2024). *Enhancing Productivity for Sustained Inclusive Growth*. Nairobi: KIPPRA.

Kenya National Bureau of Statistics (KNBS) (2022). *Kenya Demographic and Health Survey 2022*. Nairobi: KNBS.

Kibera, M., Mutai, B., & Wanyonyi, S. (2023). Barriers to sustainable agricultural practices among rural women in Kenya: A case of Uasin Gishu County. *Journal of Agricultural Research and Development, 15*(2), 115–130.

Kosgei, P. (2019). Strategies Used by Large Scale Grain Growers to Enhance Productivity in Soy Sub-county, Uasin Gishu County, Kenya (Doctoral dissertation, University of Nairobi).

Luwesi, C. N., Ogega, O. M., & Doke, D. A. (2025). Changing Patterns of Indigenous Knowledge Systems Used for Water Conservation and Adaptation to Climate Change in Mount Kenya Region (2012–2022). In Handbook of Nature-Based Solutions to Mitigation and Adaptation to Climate Change (pp. 1-27). Cham: Springer Nature Switzerland.

Mignouna, D. B., Manyong, V. M., Rusike, J., Mutabazi, K. D. S., & Senkondo, E. M. (2011). Determinants of adopting imazapyr-resistant maize technologies and its impact on household income in Western Kenya. *AgBioForum, 14*(3). http://hdl.handle.net/10355/12461

Mwangi, W., & Karanja, A. (2022). Adoption of green technologies in agriculture: A review of the literature. *Sustainability, 14*(3), Article 1357. https://doi.org/10.3390/su14031357

Mwangi, M., & Kariuki, S. (2015). Factors determining adoption of new agricultural technology by smallholder farmers in developing countries. *Journal of Economics and sustainable development, 6*(5).

Mwasaru, G. M. (2021). *Assessing psycho social, socioeconomic and institutional characteristics that influence adoption of climate smart agriculture in Taita Taveta County, Kenya* [Master's thesis, Strathmore University]. Strathmore University Institutional Repository. https://su-plus.strathmore.edu/handle/11071/12867

North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.

Ogutu, E. O., Chesikaw, L. R., & Wambu, C. K. (2025). Women's Agency and Gendered Adoption Patterns of Climate-Smart Agriculture in the Irish Potato Value Chain of Kuresoi North Sub-County, Kenya. *International Journal of Social Sciences and Information Technology, XI*(IV), 1-17.

Priya, N. K., Sivanarayana, G., & Roy, G. S. (2025). Designing Gender-Inclusive Extension Approaches for Women Empowerment. In *New Frontiers in Agricultural Extension Strategies* (pp. 156-181). Textify Publishers.

Raymond, L., & Weldon, S. L. (2022). The adoption and scaling of climate-smart agriculture innovations by smallholder farmers in South Africa: Institutional mechanisms, policy frameworks, and market dynamics. *AgriEconomy, 6*(2), Article 51. https://doi.org/10.3390/2673-4060/6/2/51

Shrestha, A., Ghimire, R., & Aggarwal, P. K. (2022). Institutional innovations for climate smart agriculture: Assessment of the Climate Smart Village approach in Nepal. *Frontiers in Sustainable Food Systems, 6,* Article 734319. https://doi.org/10.3389/fsufs.2022.734319

Stratton, A. E., Wittman, H., & Blesh, J. (2021). Diversification supports farm income and improved working conditions during agroecological transitions in southern Brazil. *Agronomy for Sustainable Development, 41*(3), 35.

Tarus, S. K., Kadurenge, B. M., & Kawour, M. E. (2025). The Influence of Membership Power in Table Banking on Socio-Economic Welfare of Women in Emgwen Sub-County, Nandi County, Kenya. *New Advances in Business, Management and Economics, 8*(8), 18-36.

Uaiene, R. N., Arndt, C., Masters, W. A. (2009). Determinants of agricultural technology adoption in Mozambique. *Discussion papers (67E).* Retrieved from http://196.46.4.208/gest/documents/67E_AgTechAdoptionMoz.pdf

World Bank. (2021). *Promoting climate-smart agriculture for smallholder farmers in Sub-Saharan Africa*. World Bank Group. Retrieved from https://www.worldbank.org/en/topic/agriculture/publication/promoting-climate-smart-agriculture-for-smallholder-farmers-in-sub-saharan-africa