

CLIMATE CHANGE POLICY IMPLEMENTATION GAPS AMONG FARMING COMMUNITIES IN LAIKIPIA COUNTY IN KENYA

Anthony G. Maina¹, Silas O. Oriaso¹, George O. Outa² & Alfred O. Opere¹

1. University of Nairobi
2. Technical University of Kenya

Corresponding Author: antogito8@gmail.com

Submitted: 23rd June 2025; Accepted: 2nd October 2025; Published (online): 25th October 2025

ABSTRACT

This study examines gaps in climate change policy implementation among smallholder farmers in Laikipia County, Kenya. National and county governments have developed policies to promote climate change mitigation and adaptation, aiming to enhance food security and community resilience. However, implementation gaps persist among communities facing severe climate impacts, such as prolonged droughts and unpredictable rainfall, due to limited awareness and resource constraints (e.g., inadequate access to irrigation or drought-resistant seeds). Through semi-structured household questionnaires, focus group discussions, and key informant interviews conducted with smallholder farmers and stakeholders during community initiatives, local meetings, and agricultural workshops in Laikipia County, the study reveals that while policies on tree planting, water management, forest conservation and riparian protection are widely communicated, their adoption by smallholder farmers is limited, resulting to a significant gap in policy implementation.

Key words: Adaptation, Agriculture, Antony Gitonga, Climate Change, Communication, Farmers, Laikipia, Mitigation, Policy, Smallholder, Tigithi, University of Nairobi

INTRODUCTION

Smallholder farmers make up about 60% of the global agricultural workforce and control 75% of farmland (Alkire, 2017). Food consumption is highest in developing nations at 80%, due to overpopulation, climate issues, and poverty. Climate change worsens as ecosystems face mounting pressure from human dependence on natural resources (Coulibaly, 2017). Scientists link climate change to human activities, which increase global warming through greenhouse gas emissions (Pica-Ciamarra et al., 2011). Rising global temperatures will intensify droughts and extreme weather, with Africa being the worst affected (Abdi et al., 2011). Sub-Saharan Africa, with high population growth and weak infrastructure, is most vulnerable. Carbon emissions are already high enough to sustain climate change impacts despite mitigation efforts. Nations have united to tackle climate change through emissions reduction, adaptation, and data sharing. Signatories of the UNFCCC and related treaties have legal obligations to act (Alkire, 2017). Policies at global, regional,

Maina et al.

national, and local levels show commitment, but no central authority enforces implementation (M'mboroki, Wandiga & Oriaso, 2018).

Kenya has strong climate policies and regularly engages in global climate talks. Climate change is integrated into development strategies, but real impact depends on policy implementation at the community level. Climate change has worsened conflicts, weakened economies, and damaged infrastructure in Africa (Connolly, 2016). Effective resource management policies require an understanding of social and economic factors. Climatic changes affect global agriculture, but small-scale farmers suffer most (Connolly, 2016). Sub-Saharan Africa is highly vulnerable due to dependence on agriculture, weak infrastructure, and widespread poverty (Doss, 2014; Hansen, 2012). Over 58% of its population lives in severe poverty, with limited agricultural inputs and weak infrastructure (Iheoma, 2014; Lamboll, 2017). These constraints limit adaptive capacity to environmental challenges (Lowder, 2016).

Climate change refers to long-term shifts in climate properties (Massetti, 2011). Various policies support smallholder farmers in adapting to environmental challenges (Mudombi, 2014). Awareness of climate change dates back to 1896, when Arrhenius linked temperature changes to heat-absorbing gases (Oyekale, 2015). However, climate change only became a political issue few decades later. The 1972 Stockholm Conference led to the creation of the United Nations Environment Programme (UNEP), which supports global and local climate initiatives. Transnational municipal networks (TMNs) bridge knowledge gaps for local governments (Ringler, 2010). Major agreements like the UNFCCC guide climate responses at all levels, shaping policies for mitigation and adaptation.

In Kenya, agricultural output faces serious threats from climate change (NCCAP, 2018–2022), particularly as farmers struggle to predict crop maturity due to shifting weather patterns and frequent droughts that threaten water supplies. These issues are especially acute in arid and semi-arid lands (ASALs) like Laikipia County, where unpredictable weather disrupts farming activities, exacerbating low profitability and challenges in rain-fed agriculture (Huho & Kosonei, 2014). Smallholder farmers in Laikipia, particularly in Tigithi Ward, encounter these vulnerabilities firsthand. Conventional farming methods lead to significant losses from high production costs (Kaumbutho & Kienzle, 2007), and despite recognizing the benefits of conservation agriculture, few adopt it (Kinyumu, 2012). Pastoralists in the region also demonstrate low uptake of climate adaptation measures (M'mboroki, Wandiga & Oriaso, 2018). While Kenya's policies aim to address these issues, no prior study has specifically examined the gaps in climate change policy implementation at the community level. This study addresses that gap by analyzing climate change policy and practice disparities among smallholder farmers in Laikipia County, Kenya.

This study therefore aimed at analyzing the climate change policy implementation gaps among smallholder farmers in Laikipia County, Kenya. Specifically, it seeks to examine the climate change policies implemented by these farmers, analyze the sources from which they obtain these policies, determine the extent to which smallholders rely on these policies to guide their farming activities, and investigate the factors influencing their reliance or lack thereof on these policies to address the impacts of climate change.

LITERATURE REVIEW

Empirical studies on climate change policy implementation practices

Climate change policy communication is crucial for public awareness and action. Hulme (2007) argues that it goes beyond raising awareness and involves a complex engagement process. Ferrari (2010) outlines key stages: identifying climate change as a problem, communicating policy knowledge, explaining potential outcomes, and ensuring implementation. The 2000 Ontario conference on climate change communication proposed guidelines, including clear goals, identifying audiences, committed communicators, partnerships, and two-way dialogue (Andrey & Mortsch, 2000). Effective communication supports policy adoption through national reports, workshops, and online databases (Park et al., 2013). However, many people struggle to understand climate change due to complex language in academic reports (Wibowo et al., 2013).

Nerlich et al. (2010) argue that climate change policy debates are central to public discourse, gaining prominence alongside health, risk, and scientific communication. Effective climate policy communication involves a multi-stage process: raising awareness, disseminating knowledge, assessing implementation success, and clarifying expected outcomes. Parson and Dessler (2010) emphasize climate policy communication as both an environmental and developmental challenge, highlighting the lack of societal awareness on adaptation strategies and costs. To ensure sustainable development, climate policy communication must be integrated into all policies and financial decisions. Minor, cost-effective development improvements can mitigate vulnerabilities, while strategic adaptation planning is vital when climate change accelerates asset degradation (Agrawal & Perrin, 2008).

Adger (2003) assert that climate change threatens both past and present global development goals. Integrating adaptation into development planning is crucial, as policies like carbon sequestration support livelihoods, while emission-related fuel costs may disproportionately burden the poor. Anticipating responses to climate policies remains challenging, yet proactive adaptation is facilitated by accurate climate projections and accessible information. The National Climate Change Framework Policy (2016) underscores the need for informed adaptation and mitigation strategies. Effective climate knowledge management must integrate indigenous knowledge while balancing intellectual property rights and public safety concerns. Gender-sensitive approaches are essential, as climate impacts vary across demographics. In Kenya, limited climate information hinders policy-making, necessitating a national climate knowledge assessment.

Diverse stakeholders require participatory knowledge management, ensuring ownership and accessibility through multilingual, high- and low-tech dissemination methods. Establishing knowledge hubs at various governance levels would enhance distribution. While access to climate information is a constitutional right, legal and procedural restrictions exist. The government must proactively share climate data to ensure informed public participation and policy implementation (National Climate Change Framework Policy, 2016).

Smallholder farmers rely on advocates for climate policy information (Resosudarmo et al., 2012). Yet, there is limited data on how to support and implement climate change communication in

Maina et .al.

developing nations (Park et al., 2013). Angelsen (2009) recognizes policy communication as a major challenge in national climate strategies. Wibowo et al. (2013) suggest key steps: identifying audiences, training frontline workers, forming partnerships, learning from other sectors, and integrating lessons. Adhikari (2009) stresses that smallholder farmers must participate in policy implementation. In Kenya, Standing & Gachanja (2014) highlight that climate policy discussions are often dominated by the government and consultants, excluding critical voices. Awareness outside government, NGOs, and academia is low, with little effort to build capacity among farmers or local authorities. Kenya also lacks an online platform for climate policy communication (Standing & Gachanja, 2014).

Effective communication is essential for policy success (Ferrari, 2010). Zulch (2014) identifies key attributes: timely feedback, accessibility, clear messaging, and open stakeholder communication. Weaver (2007) stresses credibility and choosing the right medium. Butt, Naaranoja & Savolainen (2016) add that communication must be simple, cost-effective, and open to feedback. Bourne (2016) emphasizes tailoring messages to audiences and using multiple channels. Challenges include policy complexity, organizational culture, and stakeholder trust (Stead et al., 2009). Remidez & Jones (2012) argue that policy structure often hinders effective discussions. Collaboration can help reassess understanding across different fields.

Agarwal (2001) found that human interaction with forest ecosystems exacerbates climate change effects. In Kenya, formal regulations for forest governance began in 1897 to ensure a stable wood supply for constructing the Kenya-Uganda Railway. The railway administration managed forests within a mile of the railway, while local colonists oversaw the rest, in accordance with prevailing laws. The Forest Act, initially enacted during the colonial period (Cap. 385, Laws of Kenya), was amended in 1942, with further reviews conducted in 1968, 1982, and 1992.

Kenya's first formal forest policy was introduced in 1957 through White Paper No. 85 and later modified as Sessional Paper No. 1. The policy aimed to conserve forests for water catchment protection, regulate access to forest products, and prevent the destruction of gazetted forests while promoting sustainable forest management and a thriving forest industry. Over the past five years, Kenya has undertaken major policy reforms to curb deforestation and address historical governance failures. These reforms, developed over two decades through rigorous analysis and data collection, emphasize ecosystem-based, science-led forest management, sustainable use incentives, and participatory governance. They also introduce measures for forest clearance, livelihood enhancement, and benefit-sharing while promoting value-added forest products, commercial tree cultivation, a conservation fund, and the establishment of the Kenya Forest Service (KFS). The policies further recognize forests' role in biodiversity conservation, water resource management, and climate change mitigation.

Beyond the forest policy, other sectoral regulations impact deforestation trends. The Agriculture Act introduced the Agriculture (Farm Forestry) Rules in 2009 to maintain at least 10% farm forest cover on agricultural land, aligning with climate change mitigation goals. Similarly, Article 69(1)(b) of the 2010 Constitution mandates at least 10% national tree cover, consistent with broader land policy objectives such as equitable land access, tenure reforms, and sustainable land

use. The Constitution and national land policy are expected to significantly influence the management of trust land forests, historically under district councils.

Understanding Climate policy implementation using Participatory and Diffusion Theories

The concept of participatory communication is gaining traction in academia and development practice, emphasizing the shift from passive recipients to active contributors in development initiatives. Servaes and Malikhao (2005) argue that participatory communication theory requires inclusive decision-making at all societal levels. The failure of top-down models has highlighted the need for local input, as Chambers (1983) notes that institutional knowledge is often prioritized over community insights. This revised approach ensures long-term project viability through open discussions and local engagement (Chambers 1983). Based on Freire's (1970) idea of "people-centered development," participatory communication is crucial for climate change policy, particularly among smallholder farmers, who both implement and benefit from such policies (Awung, 2015). The UNDP (2011) advocates for a shift to a bottom-up strategy, and Article 6 of the UNFCCC underscores participatory decision-making in forest management.

Rogers' (2003) Diffusion of Innovation theory explains how ideas spread within societies. Rogers and Shoemaker (1971) outline five adoption stages: knowledge, persuasion, decision, implementation, and confirmation. Rogers (2003) further classifies adopters into early adopters, the late majority, and laggards, illustrating that adoption occurs gradually through interpersonal influence. Robinson (2009) describes diffusion as the process through which an innovation gains widespread acceptance, essential for sustainable change. Applied to climate change policy communication, this theory explains how smallholder farmers transition from initial awareness to policy implementation, influencing carbon reduction strategies and adoption of low-carbon technologies. Understanding the flow of climate policy information within a community is crucial to ensuring its effectiveness and long-term impact.

METHODOLOGY

This study employed a mixed-methods approach, combining qualitative and quantitative data collection through a cross-sectional design. Data were gathered from smallholder farmers, primarily household heads, and key informants via in-person interviews, consultative sessions, and surveys. Secondary data from international, national, and local climate change policies, including national and county development plans, were also reviewed. Given the limitations of content analysis in quantifying textual information (Connolly, 2016), household surveys were prioritized to explore community perspectives. Additionally, in-depth interviews, focus group discussions, and community meetings were conducted to assess the role of communication in implementing climate change policies for adaptation.

Stratified random sampling was used to select respondents, following Kothari's (2008) recommendation of a minimum sample size of 100 for qualitative studies. A semi-structured research tool was employed to collect both qualitative and quantitative data. Research assistants, including trained local enumerators and experienced graduate students, facilitated data collection.

Maina et .al.

Qualitative data underwent thematic analysis, while quantitative data were analyzed using descriptive statistics and presented in tables. Household questionnaires examined household responses to communicated policies. Focus group discussions and key informant interviews gathered stakeholder opinions on climate change policy communication and gaps in practice. The study also investigated policy compliance and reasons for non-compliance. Participant observation was used to assess actual practices in policy implementation environments.

Ethical Considerations

Written ethical approval was not sought for this study as based on the nature of study, participation was voluntary and no sensitive information was sought from the respondents. Additionally, the questionnaires used to collect the information were marked as anonymous and in cases where response was recorded or pictures taken, verbal informed consent was obtained. The authors declare that there is no conflict of interest as no gifts, honoraria or payment was issued to either respondents or any local authorities to influence the research process or findings. This research received no specific grant from the University of Nairobi or from any funding agency in the public, commercial, or not-for-profit sectors.

RESULTS AND DISCUSSION

Climate Change Policies and Regulations Implemented in the Community

The study examined climate change policies implemented in Laikipia County through documentary analysis, focus group discussions, key informant interviews, and household surveys.

As shown in **Table 1**, the study revealed that Laikipia County has enacted key policies to promote sustainable water use, land management, and climate-resilient agriculture in response to changing rainfall patterns and water shortages. These include regulations for flood-resistant infrastructure, energy-efficient designs, crop diversification, efficient irrigation, and sustainable soil management. Community-driven efforts, such as skill development and financial incentives, support adaptation, while renewable energy adoption and public education aim to reduce emissions and raise awareness. These Policies also encouraged sustainable land use, limited deforestation, and protected ecosystems to enhance climate resilience. Regulations mandated climate-resilient building standards, including flood-resistant structures and energy-efficient designs.

Villages like Lamuria, Solio, and Tigithi implement strategies such as tree planting, water harvesting, organic farming, and erosion control through Napier grass planting. For instance, Lamuria residents conserve indigenous trees and limit blue gum growth near rivers, while Solio farmers use drip irrigation and crop rotation. Tigithi prioritizes drought-resistant crops and river conservation. However, challenges like tree mortality due to drought and market access for drought-resistant crops persist, as noted by local chiefs.

Maina et .al.

Initiatives supported climate-resilient agriculture, such as crop diversification, efficient irrigation, and sustainable soil management. Infrastructure policies focused on resilient transport systems, flood defenses, and urban planning. Early warning systems for extreme weather events were being developed to enhance preparedness. Community-driven adaptation efforts were supported through skill development, awareness programs, and financial incentives. Other policies promoted renewable energy adoption to reduce reliance on fossil fuels and lower emissions. Public education initiatives aimed to raise awareness of climate change and adaptation strategies. Additionally, insurance programs were encouraged to mitigate risks and aid recovery from climate disasters. These measures were observed across all study sites, as shown in **Table 1**.

Table 1 Climate Change Policies and Regulations implemented

Occupation	Lamuria Village		Tigithi Village		Solio Village	
	Yes	No	Yes	No	Yes	No
Climate Change Act (2016) - establishing the National Climate Change Council to oversee and coordinate climate-related initiatives across national and county governments, the private sector, and civil society.	30	9	49	12	67	19
National Climate Change Action Plan (NCCAP) - The NCCAP outlines strategies for both mitigation and adaptation to climate change.	28	11	50	11	80	6
National Adaptation Plan (NAP) 2015–2030: aims to enhance climate resilience by integrating adaptation measures into national and county development planning.	22	17	53	8	73	13
Climate Change (Amendment) Act (2023): This amendment strengthens the existing Climate Change Act by incorporating emerging issues and aligning Kenya's climate policies with international commitments, ensuring a robust response to climate challenges.	31	8	56	5	57	29
Climate Change (Carbon Markets) Regulations (2024):- These regulations establish a framework for carbon trading in Kenya, promoting sustainable development through market-based mechanisms and encouraging investments in low-carbon projects.	28	11	55	6	61	25

Sources of Climate Change Policies Implemented by Smallholder Farmers

The data provided in **Figure 1** shows that communities in Tigithi Ward access climate change policies through diverse sources, including international reports (e.g., UNFCCC, IPCC, World Bank), government agencies, NGOs (e.g., Greenpeace, WWF), media (radio, TV, social media), and local channels like chief barazas and agricultural officers. Specifically, villagers from Lamuria Ward learn about policies through chief barazas, which provide guidance on living near rivers and planting fast-growing trees, while agricultural offices promote indigenous tree planting. NGOs encourage reducing bluegum trees and advise herders to sell livestock during droughts. Additional sources include TV and radio stations, social media, educational institutions, traditional farming practices, fellow farmers, and water resources authorities. Similarly, Solio villagers obtain climate change information through radio and TV programs, government and agricultural officers, NGOs, the Nairobi Water Fund, administration officers, schools, social media, forest officers, church leaders, personal observations, welfare groups, public meetings, special climate change committees, forest service providers, magazines, and newspapers. However, inconsistent attendance at meetings and water scarcity limit policy uptake.

This diversity of sources reflects a multi-channel approach to policy dissemination but also highlights significant challenges in ensuring effective communication. The reliance on local channels like chief barazas and agricultural officers aligns with participatory communication models, which emphasize inclusive, community-driven information sharing (Servaes & Malikhao, 2005). However, the effectiveness of these channels is undermined by barriers such as low literacy levels, language differences, and limited access to meetings, particularly for remote or marginalized farmers (Standing & Gachanja, 2014). For instance, while barazas are a primary dissemination tool in Lamuria, inconsistent attendance reduces their impact, as noted by key informants. Media platforms like radio and TV are accessible but often fail to provide tailored, actionable advice, and social media's reach is limited by digital divides in rural areas. NGOs and international reports, while authoritative, are often inaccessible to smallholder farmers due to technical language or lack of direct engagement (Wibowo et al., 2013).

Kenya's forest governance policies, such as the Forest Act (1942, amended 1968, 1982, 1992) and the 1957 Forest Policy, provide a framework for sustainable management and climate mitigation, emphasizing biodiversity conservation and water resource protection (Agarwal, 2001). The 2010 Constitution's mandate for 10% tree cover further support these efforts. However, dissemination to smallholder farmers is limited by weak extension services and inadequate training for frontline workers, as seen in Tigithi Ward's reliance on sporadic NGO interventions. The National Climate Change Framework Policy (2016) advocates for multilingual, accessible communication channels and knowledge hubs to bridge these gaps, yet implementation remains underdeveloped. The integration of traditional practices and community networks, as seen in Lamuria and Solio, offers potential for effective policy communication but requires stronger coordination and capacity-building to align with formal policies. These findings underscore the need for tailored, inclusive

Maina *et al.*

dissemination strategies that leverage local leadership and media to enhance policy adoption among smallholder farmers.

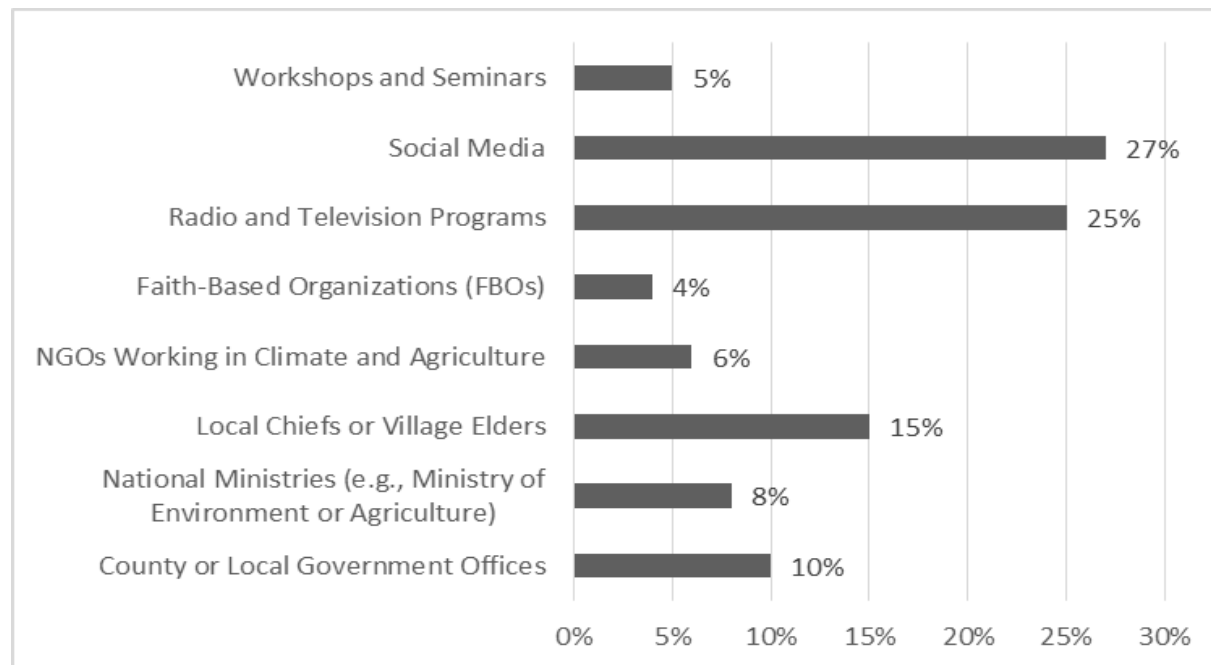


Figure 1: Sources of Climate Change Policies

Extent of Reliance on Climate Change Policies by Communities in Laikipia County

As shown in **Table 2**, most farmers in Solio (67/86), Tigithi (54/61), and Lamuria (29/39) rely on climate policies for adaptation, using resources like climate-smart agriculture and water management techniques. However, implementation is hindered by water scarcity, high costs of inputs (e.g., indigenous trees), and bureaucratic inefficiencies. Lamuria farmers use policies for income generation through tree planting, while Solio residents focus on erosion control and air quality improvement. Tigithi farmers adopt composting and irrigation but face drought-related challenges. Effective communication is vital for policy success, requiring clear messaging, timely feedback, and stakeholder engagement (Čulo & Skendrovi, 2010; Zulch, 2014). Policy complexity and organizational barriers often impede adoption (Stead et al., 2009). Kenya’s National Climate Change Framework Policy (2016) emphasizes public participation through civic education and media, but limited scale restricts outreach. Integrating climate education into curricula could enhance awareness, supporting long-term reliance on policies.

A key informant from Lamuria stressed that climate change adaptation is limited by water scarcity, suggesting borehole drilling as a solution. They highlighted the importance of government permits for tree cutting and information dissemination through media and community organizations. Another informant from Tigithi emphasized adherence to policies but noted the difficulty of

Maina et .al.

sustaining trees due to inadequate rainfall. In Mazingira, a key informant credited media for timely information that helps communities prepare for extreme weather events. The Chief of Lamuria confirmed growing interest in tree planting, shifting from traditional crops like maize to drought-resistant alternatives such as sorghum. Community participation in national tree-planting initiatives has increased, with organizations like Ol Pejeta Conservancy supporting conservation efforts. Additionally, improved cook stoves have reduced firewood consumption and limited charcoal burning. Overall, while climate policies play a vital role in adaptation, water access, funding, and practical implementation remain key challenges.

Table 2 Extent of reliance on policies on Climate Change in Laikipia County

	Lamuria Village	Tigithi Village	Solio Village
Yes	29	54	67
No	10	7	19
Total	39	61	86

Smallholder Farmers Who Rely on Climate Change Policies

Smallholder farmers in Tigithi Ward, Laikipia County, rely on climate change policies to varying degrees based on location, socioeconomic status, resource access, and government intervention efficacy; for instance, the data provided in **Table 2** shows that 89% of sampled farmers in Tigithi (54/61), 75% in Lamuria (29/39), and 78% in Solio (67/86) reported using policies for adaptation. These policies educate farmers on climate risks and adaptation, providing resources like better seeds, irrigation, weather forecasting, and sustainable farming training. In Laikipia West Sub-County, adoption rates of such measures vary widely: 97.5% of farmers use cultural practices (e.g., traditional planting calendars), 85% diversify crops, and 74.1% apply risk reduction techniques, while intensification practices reach 69.3% and terraces only 27%. Nationally, smallholder adoption of climate-smart agriculture (CSA) practices, often supported by these policies, remains low at around 42% for key measures like agroforestry and soil conservation (e.g., 182 adopters out of 428 in Kakamega County), influenced by factors such as education and extension access. These disparities underscore the need for targeted interventions to enhance policy efficacy among resource-constrained farmers.

Financial aid and extension services support climate-smart practices, but bureaucratic inefficiencies and one-size-fits-all policies limit effectiveness. In Lamuria, farmers use policies for water harvesting and crop rotation, though small land sizes constrain adoption. Solio farmers plant trees and build dams, but financial limitations persist. Tigithi farmers use certified seeds, yet drought often undermines efforts. Public participation, as emphasized by the National Climate Change Framework Policy (2016), strengthens adaptation through government-led education and media platforms. However, limited access to these channels restricts engagement, particularly for remote farmers. Multi-actor communication strategies, including workshops and online databases,

Maina et .al.

could bridge this gap, but their implementation remains underdeveloped (Standing & Gachanja, 2014).

Smallholder Farmers Who Don't Rely on Climate Change Policies

Respondents from Tigithi Ward in Laikipia County have deep environmental knowledge and adaptive strategies, though some ignore existing policies. Smallholder farmers diversify crops to reduce risk, adopt water management techniques like irrigation and rainwater harvesting, and integrate agroforestry for soil conservation and additional income. Soil conservation practices such as contour ploughing and mulching enhance resilience, while traditional knowledge informs decisions on planting, crop rotation, and pest control. Strong community networks support collective adaptation, and farmers adjust livestock management and seek off-farm income to strengthen financial stability against climate shocks.

Many farmers in Lamuria, Solio, and Tigithi do not rely on climate policies due to lack of awareness, financial constraints, and preference for traditional practices. In Tigithi Location, 11% of farmers (7/61) do not follow climate policies due to limited information and resources, such as inadequate access to extension services and costly inputs like drought-resistant seeds (Table 2). In Lamuria, some avoid fertilizers due to cost, while Solio farmers abandon tree planting due to drought. Tigithi farmers may cut trees without replanting or use outdated irrigation methods. These farmers diversify crops, use agroforestry, and rely on community networks for resilience, but poverty and distrust in government limit policy adoption. Policy communication remains a challenge, with central government control excluding critical voices and limited online platforms hindering access (Standing & Gachanja, 2014). Targeted strategies, such as training frontline workers and forming partnerships, are needed to improve engagement and address cultural and

Factors Affecting Reliance on Climate Change Policies by Smallholder Farmers

Factors hindering policy reliance include ineffective grassroots communication, resource constraints, and cultural resistance. Farmers lack access to technology and infrastructure for measures like crop diversification. Uncertainty and risk aversion deter adoption, as unpredictable weather and market volatility increase risks. Institutional barriers, such as unclear land tenure and policy fragmentation, further complicate efforts. Kenya's vulnerability to climate-related disasters like floods and droughts underscores the need for resilience-building (National Climate Change Framework Policy, 2016). Integrating climate considerations into environmental assessments and decentralizing governance could tailor solutions to local needs, but weak coordination undermines effectiveness.

Smallholder farmers in Tigithi Ward, Laikipia County, struggle to rely on climate change policies due to several factors. Policies often fail to reach the grassroots level effectively, limiting access to necessary resources and technical support. Many farmers lack financial means, technology, and infrastructure to adopt recommended adaptation measures like crop diversification and soil conservation.

Maina et .al.

Uncertainty and risk aversion also hinder adoption, as unpredictable weather, fluctuating markets, and potential crop failures make farmers hesitant to embrace new strategies without assured success. Limited access to information exacerbates the issue, as many farmers rely on traditional methods due to a lack of guidance from extension services. Institutional challenges, including bureaucratic hurdles, unclear land tenure, and conflicting policies, further obstruct adaptation efforts. Additionally, short-term survival needs such as food security and daily livelihoods—take precedence over long-term adaptation planning. Cultural and social influences also shape resistance, as farmers are reluctant to abandon traditional practices.

Market constraints, such as price volatility and limited access to profitable markets, discourage investment in climate-resilient farming. According to the chief of Lamuria village, climate policies could unlock economic opportunities through climate finance, carbon trading, and green jobs, but these benefits remain largely inaccessible to smallholder farmers. Farmers in Mazingira Location cite poor communication as a major barrier. Misinformation about El Niño led to misguided planting decisions, financial losses, and increased food insecurity. Language barriers further limit the effectiveness of climate advisories, as many elderly or uneducated farmers struggle to understand messages from institutions like KARLO. Meetings to disseminate crucial information are often held in distant locations or in languages that many farmers do not comprehend. To improve climate adaptation, policies must be communicated clearly, tailored to local realities, and supported by financial and technical assistance.

CONCLUSIONS

A significant gap exists in climate change policy awareness among **smallholder farmers in Tigithi Ward, Laikipia County**. Limited communication efforts prevent farmers from accessing relevant information, hindering their ability to implement adaptation strategies. Conventional communication channels, such as workshops and printed materials, fail to reach farmers in remote areas effectively. There is a need for **innovative, community-driven communication strategies** that leverage local knowledge and cultural contexts. Socioeconomic and institutional barriers, including limited resources, language barriers, and exclusion from decision-making processes, further hinder participation. Policy fragmentation creates confusion, necessitating improved **policy coherence and integration**. To enhance adaptive capacity, smallholder farmers require **capacity-building programs, training initiatives, and better access to climate information services, technologies, and financial resources**. Effective climate change adaptation efforts must be **collaborative**, involving governments, NGOs, research institutions, and local communities in participatory decision-making.

RECOMMENDATIONS

To enhance climate change policy implementation among smallholder farmers in Laikipia County, local authorities, such as county governments, should ensure policies are well-documented and easily accessible to farmers. Information must be communicated in languages that farmers understand, including local languages, to improve comprehension. Authorities and relevant institutions

Maina et .al.

should intentionally deploy diverse communication channels to disseminate climate policies effectively. While conventional channels like workshops and printed materials are valuable, they should be supplemented with media platforms, including television, radio, and social media, to broaden outreach. Furthermore, involving farmers and other community members in the formulation and implementation of climate policies is essential for relevance and ownership. Continuous support and capacity-building initiatives are needed to equip smallholder farmers with the skills and resources to adopt these policies. Finally, climate change adaptation efforts should be collaborative, fully engaging farmers, public, and private sector stakeholders to ensure inclusive and effective outcomes.

ACKNOWLEDGEMENT

I am deeply grateful to my supervisors; Prof. Silas Odongo Oriaso, Prof. George Odera Outa and Prof. Alfred Owuor Opere for their dedicated time and invaluable insights throughout this research process. Their expertise and feedback have enhanced this research paper's quality and credibility. I am also grateful to the Department of Agriculture and Climate change at the Laikipia County Government for providing important background information and linkage with the farmers. Finally, I extend my sincere appreciation to the Institute of Climate Change and Adaptation (ICCA) at the University of Nairobi for providing relevant resources and supportive research environment.

DISCLOSURE

As this study is part of my PhD thesis, which covers one of the four objectives in the study, it is possible that part of the information is available online as part of the study covering other objectives has already been published.

REFERENCES

- Agrawal, A., and Perrin, N. 2008 Climate Adaptation, Local Institutions, and Rural Livelihoods. IFRI Working Paper # W08I-6. Accessed at <http://www.umich.edu/~ifri/>
- Alkire, H. (2017). Multidimensional Poverty in Sub-Saharan Africa. *Poverty Reduction in the Course of African Development*, 102. <http://dx.doi.org/10.1093/acprof:oso/9780198797692.003.0005>
- Abdi and cord aid (2011): Technicalbrief; community managed disaster risk reduction (CMDRR); cord aids strategy for building resilience communities in dry lands areas of east and the horn of Africa. <https://www.disasterriskreduction.net/east-central%20Africa/reglap%2020-08-2015,%204.45pm>
- Adhikari, B. (2009). Reduced emissions from deforestation and degradation: Some issues and considerations. *Journal of Forest and Livelihood*, 8(1), 14–24.

Maina et al.

https://www.forestaction.org/app/webroot/vendor/tinymce/editor/plugins/filemanager/files/images/stories/pdfs/journal_of_forest_and_livelihood/vol_8_1/2_adhikari.pdf

- Agarwal, B. (2001). Participatory exclusions, community forestry, and gender: An analysis for South Asia and a conceptual framework. *World development*, 29(10), 1623-1648. [https://doi.org/10.1016/s0305-750x\(01\)00066-3](https://doi.org/10.1016/s0305-750x(01)00066-3)
- Andrey, J. and Mortsch, L. (2000) 'Communicating about Climate Change: Challenges and Opportunities' climate change Communication Proceedings of an International Conference June 22-24, 2000 Kitchener – Waterloo, Ontario CANADA Available at: <http://dsp-psd.pwgsc.gc.ca/Collection/En56-157-2000E.pdf>
- Angelsen, A. (2009). Realizing REDD+: National strategy and policy options. Cifor. <http://dx.doi.org/10.17528/cifor/002871>
- Awung, N. S. (2015). Assessing community involvement in the design, implementation, and monitoring of REDD+ projects: A case study of Mount Cameroon National Park-Cameroon. https://theses.whiterose.ac.uk/id/oai_id/oai:etheses.whiterose.ac.uk:11152
- Adger, (2003): Social capital, collective action, and adaptation to climate change; *Economic and geography* 79(4):387–404 <https://www.jstor.org/stable/30032945> 04 -02-2017-8.30
- Bourne, L. (2016). Targeted communication: The key to effective stakeholder engagement. *Procedia-Social and Behavioral Sciences*, 226, 431–438. <http://dx.doi.org/10.1016/j.sbspro.2016.06.208>
- Butt, A., Naaranoja, M., and Savolainen, J. (2016). "Project change stakeholder communication." *International Journal of Project Management*, <https://doi.org/10.1016/j.ijproman.2016.08.010>, (ASCE) 34(8), 1579–1595.
- Chambers, R. (1983) *Rural Development: Putting the Last First* (Volume 198). Longman, London. Available at [Rural Development: Putting the Last First](#)
- Connolly, S. (2016). Climate change, food security, and livelihoods in sub-Saharan Africa. *Regional Environmental Change*, 16(2), 385-399. <http://dx.doi.org/10.1007/s10113-015-0761-x>
- Coulibaly, C. &. (2017). International financial spillovers to emerging market economies: How important are economic fundamentals?. *Journal of International Money and Finance*, 76, 133-152. <https://doi.org/10.1016/j.jimonfin.2017.05.001>
- Čulo, K., & Skendrović, V. (2010). Communication management is critical for project success. *Informatologia*, 43(3), 228–235. <https://hrcak.srce.hr/file/89183>
- Parson, Edward & Dessler, Andrew. (2010). *The Science and Politics of Global Climate Change: A Guide to the Debate*. DOI: [10.2307/4128717](https://doi.org/10.2307/4128717)

Maina et .al.

- Doss, C. (2014). If women hold up half the sky, how much of the world's food do they produce?. In *Gender in agriculture* (pp. 69-88). Springer, Dordrecht. http://dx.doi.org/10.1007/978-94-017-8616-4_4
- Ferrari, C. A. (2010). Communicating Climate Change, REDD, and Political Ecology: A global land question and prospects for agroecology. 4–7. <https://consensus.app/papers/communicating-climate-change-redd-and-political-ecology-a-ferrari/a809a4303527522ebf7ff863862400ab/>
- Freire, P. (1970). *Pedagogy of the Oppressed*. New York: Continuum Books. Available at [Paulo Freire, Myra Bergman Ramos, Donald Macedo - Pedagogy of the Oppressed, 30th Anniversary Edition \(2000, Bloomsbury Academic\).pdf](http://www.paulofreire.org/Myra%20Bergman%20Ramos,%20Donald%20Macedo%20-%20Pedagogy%20of%20the%20Oppressed,%2030th%20Anniversary%20Edition%20(2000,%20Bloomsbury%20Academic).pdf)
- GOK (2018). National Climate Change Action Plan 2018-2022. Published by the Ministry of Environment and Mineral Resources, Nairobi, Kenya. https://rise.esmap.org/data/files/library/kenya/clean%20cooking/kenya_nccap_2018-2022.pdf
- Hansen. (2012). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization science*, 13(3), 232-248. <http://dx.doi.org/10.1287/orsc.13.3.232.2771>
- Huho, Julius & Kosonei, Rose. (2014). Understanding Extreme Climatic Events for Economic Development in Kenya. *IOSR Journal of Environmental Science, Toxicology And Food Technology*. 8. 2319-2399. <https://doi.org/10.9790/2402-08211424>
- Hulme, Mike. (2007). Understanding climate change: The power and the limit of science. *Weather*. 62. 243-244. DOI: [10.1002/wea.108](https://doi.org/10.1002/wea.108)
- Iheoma, C. (2014). Impact of Climate Change on Agricultural Production and Sustainability in Nigeria. *Asian Journal of Agricultural Extension, Economics & Sociology* 4(1): 29-41, 2015. <http://dx.doi.org/10.9734/ajaees/2015/11518>
- Kaumbutho, P., Kienzle, J. 2007. Conservation Agriculture as Practised in Kenya: Two Case Studies. <https://vtechworks.lib.vt.edu/bitstreams/bc1b0533-2ef5-4cdc-9f70-7afdb52702e3/download>
- Kinyumu, D.M., 2012. Is Conservation Agriculture a Solution to Dry Land Rain-fed Farming? Experiences and Perceptions of Smallholder Farmers in Laikipia District, Kenya. *Journal of Developments in Sustainable Agriculture*.7, 134-147. <https://doi.org/10.11178/jdsa.7.134>
- Kothari, C. R. (2008). *Research Methodology: Methods and Techniques*. New Age International.
- Lamboll, R. S. (2017). Climate change and agricultural systems. In *Agricultural Systems* (pp. 441-490). Academic Press. <http://dx.doi.org/10.1016/b978-0-12-802070-8.00013-x>

Maina et .al.

- Lowder, S. K. (2016). The number, size, and distribution of farms, smallholder farms, and family farms worldwide. *World Development*, 87, 16-29.
<https://doi.org/10.1016/j.worlddev.2015.10.041>
- Massetti, E. M. (2011). The impact of climate change on US agriculture: a repeated cross-sectional Ricardian analysis, in: Dinar, A., Mendelsohn, R. (Eds.), *Handbook on Climate Change and Agriculture*. Edward Elgar, Cheltenham, UK, Northampton, MA, USA.
<http://dx.doi.org/10.1080/19390450802495882>
- M'mboroki, K. G., Wandiga, S., & Oriaso, S. O. (2018). Climate Change Impacts Detection in Dry Forested Ecosystem as Indicated by Vegetation Cover Change in Laikipia, of Kenya. *Environmental Monitoring and Assessment*, 190, 1-19.
<https://doi.org/10.1007/s10661-018-6630-6>
- Mudombi, S. (2014). Access to weather forecasting and early warning information by communal farmers in Seke and Murewa districts, Zimbabwe. *Journal of Human Ecology*, 48(3), 357-366. <http://dx.doi.org/10.1080/09709274.2014.11906805>
- Nerlich, Brigitte & Koteyko, Nelya & Brown, Brian. (2010). Theory and language of climate change communication. DOI: [10.1002/wcc.2](https://doi.org/10.1002/wcc.2)
- Oyekale. (2015). Assessment of Malawian mothers' malaria knowledge, healthcare preferences and timeliness of seeking fever treatments for children under five. *International journal of environmental research and public health*, 12(1), 521-540.
<https://doi.org/10.3390/ijerph120100521>
- Park, M. S., Choi, E. S., & Young, Y.-C. (2013). REDD+ as an international cooperation strategy under the global climate change regime. *Forest Science and Technology*, 9(4), 213–224.
<http://dx.doi.org/10.1596/16221>
- Pica-Ciamarra, U.; Baker, D.; Morgan, N. and Zezza, A. (2011) 'Measuring the Contribution of Livestock to Household Livelihoods: A livestock module for multi topic household surveys'. Poster presented at the 4th City Group Conference on Statistics on Rural Development and Agricultural Household Income, Rio de Janeiro, 9-11 November.
<https://hdl.handle.net/10568/16995>
- Republic of Kenya. (2016) Sessional Paper No. 3 of 2016 on National Climate Change Framework Policy. Ministry of Environment and Natural Resources State Department of Environment.
<https://repository.kippra.or.ke/bitstream/handle/123456789/493/MENR-Sessional-Paper-No.-5-of-2016-on-National-Climate-Change-Framework-Policy.pdf?sequence=1&isAllowed=y>
- Ringler, C. Z. (2010). Climate change impacts on food security in sub-Saharan Africa. Insights from Comprehensive Climate Change Scenarios.

Maina et .al.

- https://www.researchgate.net/publication/237137914_climate_change_impacts_on_food_security_in_sub-saharan_africa_insights_from_comprehensive_climate_change_scenarios
- Remidez, H., & Jones, N. B. (2012). Developing a model for social media in project management communications. *International Journal of Business and Social Science*, 3(3). https://ijbssnet.com/journals/vol_3_no_3_february_2012/3.pdf
- Resosudarmo, I. A. P., Duchelle, A. E., Ekaputri, A. D., & Sunderlin, W. D. (2012). Local hopes and worries about REDD+ projects. *Analyzing REDD+*, 193. <https://cgspace.cgiar.org/items/9d70c9d8-dab0-4fe9-82f8-556104d13d05>
- Robinson, L. (2009). A Summary of Diffusion of Innovations. *Changeology*. Available at [Summary Diffusion Theory.pdf](#)
- Rogers, E. (2003). *Diffusion of innovations*, 5th edition Tampa, FL: Free Press.[Google Scholar], 2(12), 14–45. <http://dx.doi.org/10.1016/j.jmig.2007.07.001>
- Rogers, E. M., & Shoemaker, F. F. (1971). *Communication of Innovations; A Cross-Cultural Approach*. https://books.google.com/books/about/communication_of_innovations.html?id=6lk9aaaai
- Servaes, J., & Malikhao, P. (2005). Participatory communication: The new paradigm. *Media & Global Change. Rethinking Communication for Development*, 91–103. <https://biblioteca.clacso.edu.ar/clacso/coediciones/20100824064944/09chapter5.pdf>
- Standing, A., & Gachanja, M. (2014). The political economy of REDD+ in Kenya: Identifying and responding to corruption challenges. *U4 Issue*. <https://scispace.com/papers/the-political-economy-of-redd-in-kenya-identifying-and-1achwpv2o6>
- Stead, K., Kumar, S., Schultz, T. J., Tiver, S., Pirone, C. J., Adams, R. J., & Wareham, C. A. (2009). Teams communicating through STEPPS. *Medical Journal of Australia*, 190(S11), S128–S132. <http://dx.doi.org/10.5694/j.1326-5377.2009.tb02619.x>
- UNFCCC, U. (1992). *United Nations Framework Convention on Climate Change. Convention on climate change*. UNFCCC. *Forest Science*. <https://unfccc.int/resource/docs/convkp/conveng.pdf>
- Weaver, P. (2007). Getting the “soft stuff” right—effective communication is the key to successful project outcomes. *PMI Global Congress (North America)*. https://www.mosaicprojects.com.au/pdf_papers/p055_getting_the_soft_stuff_right.pdf
- Wibowo, L. R., Race, D., & Curtis, A. (2013). Communicating REDD+ issues at the local level: Creating latent and manifest conflict. *Indonesian Journal of Forestry Research*, 10(2), 67–78.

Maina *et al.*

<https://xjournals.com/collections/articles/article?qt=lxhipcizeol/rf0pz4m3xjdi1fidztxdercgbkqpf/b6o8yti4mwbdz+bfbi5wb>

Zulch, B. (2014). Communication: The foundation of project management. *Procedia Technology*, 16, 1000–1009. <https://doi.org/10.1016/j.protcy.2014.10.054>