

**ENHANCING CLIMATE CHANGE POLICY
COMMUNICATION TO SUPPORT THE LOCAL
ADAPTATION OF SMALLHOLDER FARMERS IN TIGITHI
WARD IN LAIKIPIA COUNTY, KENYA**

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ABSTRACT

This study focuses on the analysis of climate change policy communication to support the adaptation of smallholder farmers in Tigithi Ward in Laikipia County. The study is anchored on the fact that in the sub-Saharan African countries, subsistence farming and Climate change is having far-reaching effects on many aspects of society and the natural world. If effective actions are not done to counteract and adapt to climate change, decades of progress may be reversed in a major way. Central to the adaptation is a free flow of efficient and effective climate change information on several elements of the change process. The present idea is that climate change intervention that works must be anchored on policies at global, regional, national, and local levels. Kenya is a member of the global community bound by these policies, conventions, and treaties. And it is doing its best to implement the policies in order to reduce the impacts of climate change. Smallholder farmers are most at risk of climate change impact due to weak infrastructure and response mechanisms. Worse are the smallholders in the ASAL areas in Kenya and the entire Horn of Africa. The understanding and interpreting of climate change policies have immense impact on smallholder farmers' adaptation for livelihood improvement. This is because climate change policies at whatever level affect farmers' behaviours and farming activities and practices. This study was undertaken in the Tigithi Ward of Laikipia County among the small-scale farmers. The overall goal of the research was to chronicle and analyse climate change policies and their dissemination in order to better assist local adjustment and adaptation in a warming world. It is

believed that community uses local adaptive responses arising from policy implementation. This community was studied by collecting the community climate change policy information data from smallholder farmers and other stakeholders in the ward. A list of smallholder farmers was compiled via the community-led meetings and agricultural activities in the Tigithi Ward, from which a stratified random sample was drawn. The selected farmers and stakeholders in the ward were studied using unstructured household questionnaires, focused group discussions (FGD) and key informant interviews. The research used both qualitative and quantitative methods, and the resultant data was processed using the thematic and statistical tools. The study found that there exists a significant gap in the awareness and understanding of climate change policies and adaptation strategies among smallholder farmers in Tigithi ward in Laikipia County. Inadequate communication efforts have resulted in a lack of access to relevant information, hindering farmers' ability to make informed decisions and implement effective adaptation measures. In conclusion, effective communication of climate change policies and legislations to smallholder farmers in Tigithi ward in Laikipia County required targeted approaches that considered the specific needs, contexts, and literacy levels of the intended audience. Tailored messaging helped ensure that information was accessible, relevant, and actionable for farmers. The study recommends that by establishing accessible and reliable channels for disseminating climate change information to smallholder farmers, including mobile phone-based

platforms, radio broadcasts, and community meetings. The study further recommends that by engaging smallholder farmers in the development and implementation of climate change policies through participatory approaches such as

focus group discussions, participatory workshops, and farmer field schools.

Key words: Adaptation, Smallholder farmers, Climate change information, Climate change intervention, Climate change policies, Local adaptive response.

INTRODUCTION

Globally, smallholder farmers represent about 60% of the overall agricultural workforce. According to Alkire (2017), about 75% of the world's farmland is made up of smallholder farmers who are sparingly distributed. The food consumption rate is considered to be very high in the developing world at 80%, leaving only about 20% for the developed countries. This is due to overpopulation, adverse climate, and general poverty. According to Coulibaly (2010), climate change impacts are reliably accelerated by the overdependence and reliance on the ecosystems' goods and services which mount an increasing pressure on these goods and services and thus more often triggers the climatic changes that are being witnessed. With time, scientists have associated climate change with human (anthropogenic) activities, and it is believed that continued activities have enhanced global warming due to addition of dangerous atmospheric gases. Global warming is accelerating, as reported by Pica-Ciamarra et al., 2011. Furthermore, climate change is one of the main drivers of environmental deterioration and the largest environmental issue of our day. Some of the worst effects of global warming and rising climatic variability will be seen in Africa, where agriculture and pastoralism are already vulnerable. According to Herskovitz (2011), rising global temperatures will exacerbate droughts and other forms of severe weather. The tropics are the most endangered by climate change because their populations rely heavily on natural resources. The worst affected is the sub-Saharan Africa with very high population and weak infrastructure to absorb the climatic shocks.

It is expected that the quantity of carbon gases in the atmosphere is already high enough that the repercussions of climate change will continue to bite even with adoption of mitigating efforts. The good news is that nations throughout the world have come together to combat climate change's effects via measures including reducing emissions, adapting to new conditions, and sharing data on impending dangers. Initiating, implementing, and monitoring all efforts targeted at mitigation and adaptation are today legally binding obligations for all countries that are signatories of the UNFCCC and its subsequent treaties, conventions, and laws (Alkire 2017).

There are several climate change response policies and legislations being implemented at the global, regional, national, and local levels, and there has been sufficient goodwill of nations

towards the fight against climate change. Climate change has been taken as a common enemy and most nations of the world have committed to ways to address them including through funding and the implementation of policies and legislations. This happens against the backdrop of the absence of global godfather to supervise the implementation (Mmboroki 2018).

Kenya is a good example of a country with clear national and local policies for responding to climate change. Several international and regional climate change and environmental regulations and legislation have been signed by Kenya, and the country's president regularly takes part in talks at the highest levels of climate change governance. Further, climate change has been well integrated into national and county development strategies. This suggests that concerns about climate change have gotten substantial attention. However, what remains to be seen is how climate change discussions can leave boardrooms in order to impact the local communities directly. Climate policies directly affect livelihood practices, and consequently affect the behaviour of communities (LCDP 2017). Conflicts have escalated, infrastructure has deteriorated, people have become more self-centred, and local economies have been weakened throughout Africa as a result of climate change (Khalid, 2011). The socioeconomic context and value systems of natural resource managers must be understood in order to design successful natural resource management (NRM) policies and agricultural extension programmes (Bohnet, Roberts, Haring, & Haug, 2011). Climatic change affects agricultural activities all over the world. However, the small-scale farmers who depend on the subsistence farming are the majority who are considered most affected by climatic changes globally (Connolly, 2016).

In his research, Doss (2014) states that the region of sub-Saharan Africa has been considered more susceptible to climatic change as compared to the other African region because of the factors that are considered inherent to the region. The factors are not limited to the overdependence and reliance on agricultural activities but are coupled with the over-reliance on agricultural resources among the region's inhabitants. This has therefore made the region more susceptible to climatic change with adverse effects on its fertility and productivity in the long run (Hansen, 2012). On average, 58.9% of the sub-Saharan occupants are living under severe multidimensional poverty coupled with the ailing and non-reliable infrastructural development that has halted the economic and agricultural activities within the region (Iheoma, 2014). This has therefore led to challenges both at the infrastructural and at the policy levels, resulting in inadequate agricultural inputs to support the ever-growing population. This is also due to limited access to these viable and crucial resources which are at the heart of a healthy and functional society (Lamboll, 2017).

The interactions of these severe and multiple challenges affecting the region have made it to become highly susceptible to climatic changes and variability. This has therefore considerably limited and constrained the region's capability to develop adaptive capabilities to environmental challenges (Lowder, 2016). The concept of climatic change has been defined as the changes in the climatic properties through means and variability modules that demonstrate considerable longevity over a period (Massetti, 2011). There are various local and international policies and approaches which have been incorporated to help curb the adverse effects of climatic changes which when given consideration are considered beneficial to small-scale

farmers (Mudombi, 2014). Environmental changes can affect both the internal and the external processes which affects the smooth business operation of the small-scale holder. The signs of the environmental changes were initially identified and brought to the fore by the Svante Arrhenius in the year 1896 where it was proposed that the temperature changes that occurred on the land were a result of the heat-absorbing gases (Oyekale., 2015). It, therefore, took several decades before the concepts of environmental changes got into the politics of climatic changes both at the local and international scene.

The United Nations organized the Stockholm Conference in 1972 where many international initiatives concerning climate change policies were first considered in environmental politics (Phiiri, 2016). The United Nations Environment Programme (UNEP) was therefore established following the Stockholm conference with the main agenda of supporting both local and international projects. The program also gave birth to the creation of transnational municipal networks (TMNs) which supported the local bodies by bridging the opportunities and knowledge gaps (Ringler, 2010). This culminated in signing of the major international agreements such as the United Nations Framework Convention on Climate Change (UNFCCC). The purpose of this research was to examine how smallholder farmers in Tigithi Ward, Laikipia East Sub-county, Laikipia County, Kenya, learn about and implement policies on climate change adaptation.

Problem Statement

According to the National Climate Change Action Plan (NCCAP, 2018-2022), Kenya's agricultural output faces significant threats as a result of climate change and unpredictability. Farmers' ability to depend on when their crops will mature is threatened by slow but steady changes in weather patterns. Droughts are becoming more common, which threatens human and agricultural water supplies. Particularly in dry and semi-arid places like Laikipia County, unpredictable weather patterns cause havoc with agricultural planning. Low profitability from farming and difficulty in rain-fed farming on dry areas are only two examples of the many issues that plague the agricultural sector today (Huho & Kosonei, 2013). Smallholder farmers in Laikipia County, especially in Tigithi Ward, are facing these challenges. Kaumbutho & Kienzle (2007) reported that conventional farming methods in Laikipia were causing losses due to high production costs. However, despite widespread advocacy, Kinyumu (2012) discovered that although farmers recognized the advantages of conservation agriculture, few really practiced it. Similarly, Mboroki (2013) studied climate change impacts and adaptive responses among pastoralists in Laikipia, revealing low adoption rates of adaptation measures. Surprisingly, there is no existing study investigating the role of climate change policy communication in supporting smallholder farmers' adaptation in Tigithi Ward, Laikipia East Sub County. To help farmers be more resilient in the face of climate change problems, this study seeks to overcome this knowledge gap and shed light on the necessity of good policy communication.

Aim and Objectives

The general objective of the study was to explore how climate change policies and legislations are communicated to support the climate change adaptation of smallholder farmers in Tigithi

ward, Laikipia East Sub-County in Laikipia County, Kenya. To achieve this, the climatic changes background information was analysed and the international climatic change conventions and how they affect the small-scale farmers at local levels were also presented for discussion. The researcher has considered climate changes policies since they greatly impact the activities of the small-scale farmers. The manner in which livestock rearing or farming take place at grassroots levels depends to a large extent on regulation by the county and national government by way of policies, legislations, and bylaws, and if the manner of interpretation of these by farmers are not ascertained, smallholder farmer may continue being disparaged and disgruntled as their activities remain unsupported. There has been very little consideration given on how farmers are directly affected by the climate change legislations, and this approach is anticipated to continue over a period of time. Revealing this captured the prevailing strengths and limitations of the regulatory frameworks and how they impact the livelihoods of local communities in a changing climate.

Specifically, the study aimed at achieving the following specific objectives: -

- i. To explore the climate change policy communication and practice gaps affecting climate change adaptation among smallholder farmers in Tigithi ward in Laikipia County.
- ii. To examine how climate change policies and legislations are communicated to smallholder farmers in order to support their climate change adaptations in Tigithi Ward in Laikipia County
- iii. To investigate the most effective climate change policy communication process and structure to support the adaptation of smallholder farmers in Tigithi Ward in Laikipia
- iv. To determine the factors or challenges of climate change policy communication among smallholder farmers in Tigithi Ward in Laikipia County.

Conceptual Framework

The study was premised on the Ricardian Approach. The theoretical approach that is being adopted takes into account several factors that are relevant to the smallholder farmers and their engagement with climate policy and information, therefore emphasizing the need for protecting the interest of the farmers both locally and in the international sphere (Polsky, 2004). The theory, therefore, sheds light on climate change policy implementation and farming practices for effective adaptation. The study focuses on smallholder farmers by looking at the climate change policy communication approaches, channels and sources and their effects within the ASAL climate conditions of Laikipia County.

The climate adaptation that has been taken by different smallholder farmers depending on their regional contexts has been the ground within which the Ricardian Approach Model is premised. Initially, the Ricardian Approach Model was applied in developed countries such as the United States. However, its application has now been cascaded into developing countries as well and therefore the model has now been applied in the African continent (Polsky, 2001).

Studies which have been premised on the Ricardian Approach Model include Van Passel et al. (2012), Iheoma (2014), Massetti and Mendelsohn (2011), Kurukulasuriya and Mendelsohn (2008), Seo and Mendelsohn (2008). Most of the studies that have made use of the Ricardian

Approach have over time revealed that agricultural activities in these countries were extremely dependent on climatic changes. These studies have also revealed that the degree of the impact of the climate change is greatly dependent on the region and therefore concluded that the impact will vary depending on the region. Climate change policy communication impacts farming practices at local levels and policy interpretation means a lot to the farming communities.

In Kenya Kabubo-Mariara and Karanja (2006) also utilized the theory of the Ricardian Approach, in an attempt to explain the extent to which the climatic change has impacted the agricultural activities among the small-scale farmers notably. The studies, therefore, established that climatic change impacts which have been so observable in the country have significantly impacted the outcome of agricultural activities among small-scale farmers (Polsky, 2004). These studies further reveal that climatic changes significantly result in low agricultural production and also pointed out that an increase in precipitations has the accompanying net effects of increasing agricultural revenues (Polsky, 2001).

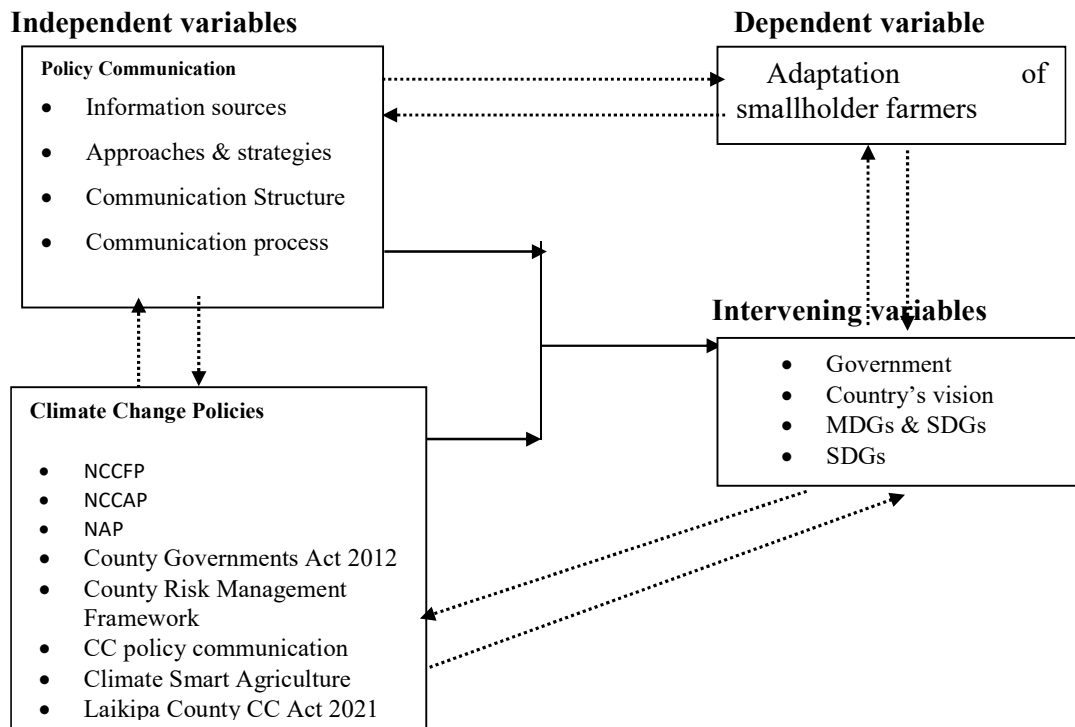


Figure 1: Conceptual Framework

THEORETICAL FRAMEWORK

Participatory Communication Theory

The notion of participatory communication is gaining ground in both academic circles and development practice. People are encouraged to shift their roles from being just recipients to contributors to development initiatives. Servaes and Malikhao (2005) argue that the central tenet of participatory communication theory is the need for people at all levels of society to be involved in development efforts. In addition, according to this idea, the effectiveness of

development initiatives and programs is measured by the extent to which they include the public in the decision-making process.

In addition, the failure of top-down decision-making in previous models of development communications was mitigated by people's ability to have a voice in the process. Even though no one possesses competence in all subjects and all settings, Chambers (1983) argues that there are times when the knowledge of development organizations, elites, and governments is given greater weight than that of local people. In addition, this revised view of development communication emphasizes the need of community input and open discussion throughout the decision-making process to ensure the project's long-term viability and success (Karl, 2007). After all, people are the project's key stakeholders, thus researchers and project staff need to learn how to listen to and comprehend their perspectives. Knowledge is reversed and information is exchanged in this process (Chambers 1993, 1997).

Based on the ideas of Freire (1970), "participatory communication" is defined here as "people-centred development." When it comes to the implementation of measures to combat climate change, smallholder farmers in Tigithi ward play a pivotal role. Community involvement is crucial to the effectiveness of policy communication. They are the ones who will have to put climate change policies into action, but they also stand to gain the most from them (Awung, 2015). To accomplish sustainable forest management, the United Nations Development Program recommends switching from a top-down to a bottom-up, participatory strategy (UNDP, 2011). In addition, the UNFCCC emphasizes in Article 6 the need of participatory communication in including people around forests in decision making as a means of developing agreement and encouraging a sense of ownership over forestry operations.

Diffusion of Innovation Theory

The Diffusion of Innovation hypothesis (Rogers, 2003) explains how novel ideas and methods spread inside a group or organization. According to Rogers and Shoemaker's (1971) research, there are five distinct phases that a person goes through before deciding whether or not to accept a new idea. After being introduced to the invention and learning the basics of how it works, a person enters the "knowledge" stage. The person is unaware of the invention at this point, but wants to learn more about it and is making efforts to do so. Individuals establish a favourable or unfavourable attitude toward innovation and actively seek out more information about an invention during the second stage, which is persuasion. The third step, decision, is when a person (or other decision-making unit) actually does the work that ultimately results in a verdict on whether or not the innovation should be adopted. The fourth step, implementation, is when a person really uses the invention. The last step, confirmation, involves a person or group seeking approval for a prior choice on an innovation; however, this approval might be revoked if the individual or group is presented with conflicting information.

Furthermore, Rogers (1971) argues that in most social structures, not everyone adopts innovations at the same time. Instead, there is a spectrum from "early adopters" to "late majority" to "laggards" in the adoption process. The study claims that those who take the longest to start adopting the new method are the true adopters. Here, interpersonal strategies

are what push people to embrace the new concept. For instance, a binomial expansion leads to a bell-shaped distribution over time if the first person to adopt an innovation discusses it with two other people in a society, and if those people also become adopters and pass the innovation along to other people in the society.

Diffusion of innovations, as defined by Robinson (2009), is an attempt to clarify the factors that contribute to the widespread adoption of new ideas. An innovative concept, action, or product is one that is novel in the eyes of its target market. To better understand how an idea or policy takes traction and spreads over time within a community or social system, the field of communication developed the notion of diffusion innovation theory. The spread of an idea, behaviour, or policy across a community. The hypothesis posits that widespread adoption of innovations is necessary for progress and longevity.

The climate change policy communication in this research is relevant because it is seen as a novel approach to encouraging smallholder farmers in Tigithi Ward to cut down on carbon emissions from forests and put their money toward low-carbon technologies. An individual's journey from naive understanding of climate change policy communication to a developed position on that policy is covered by this hypothesis, to the stage of policy implementation and confirmation, when people are still looking for reassuring wording on the climate change policy to help them make up their minds about whether or not to accept the innovation. Because it describes the flow and structure of contact with the complete climate policy information ecology, this theory is applicable to our investigation.

RESEARCH METHODOLOGY

Research design

The researcher adhered to the format outlined by Cooper and Schindler (2003) to conduct the study. The chosen research design was descriptive, specifically utilizing a descriptive survey approach. In order to evaluate the present condition of the investigated topic in relation to one or more factors, this technique includes collecting data from respondents. The basic goal was to figure out how often certain things happen or how strongly they are connected (Mugenda & Mugenda, 1999). This design was effective as it allows for the exploration of questions related to "how" and "why." To achieve this, the researcher employed a descriptive survey design recommended by Mualako et al. (2009). This design was suitable for stating the existing conditions or relationships that exist. In addition to the survey, qualitative data was collected through group discussions with smallholder farmers and through interviews with key informants. This provided valuable insights into the sources, structure, and process of information flow within the local informational ecology, specifically focusing on climate change response activities. By the end of the study, participants were asked to evaluate the existing approaches, aiming to determine their effectiveness and identify areas for improvement. The study's primary goal was to investigate climate change policy communication among smallholder farmers and to analyze the flow of information within their local context.

Sampling procedure

With the help of the Ward Administrator, the target population was stratified using the probability proportionate to its size to assure a representative sample of Tigithi ward inhabitants. Fisher's Model was used to determine the optimal size of the sample. Assuming a population size of fewer than 10,000, the formula reads as follows: -

$$n_f = \frac{n}{1 + n/N}$$

Where: n_f is the required sample size;
 n is the sample size when population is less than 10,000; and
 N is the observed target population

The research utilized a probability proportion sampling size (PPS) method, chosen for its ability to provide precise representation of elements within the entire population. Assigning greater probability of selection to bigger clusters and lower probabilities of selection to smaller clusters is what this strategy entails (Abdulla et al., 2014). When the size of the sampling units varies, PPS is especially helpful since it assures that all sites, regardless of size, have an equal chance of being included in the sample. The PPS was computed by first determining the total number of employees, then dividing that number by the sum of all employee types (the target population), and then multiplying that percentage by the appropriate sample size. This process ensured that the sample obtained was representative and unbiased, providing a reliable basis for drawing conclusions about the entire population.

$$\text{Population of the Ward} \times \frac{\text{sample size}}{\text{Total Target Population}}$$

Using a stratified random sample method ensured that every member of the target group had an equal probability of being selected as a survey participant (Orodho & Saleemi, 2009). At least 30% of the population is needed to accurately reflect the whole (Borg and Gall 2003). Therefore, a sample size of 30% of the available population was enough.

Data types and Methods of collection

This includes the procedures and resources for gathering data, which are determined by the aims of the study. Each goal and the means or instruments to achieve it are detailed in their respective subsections below.

Objective 1: Climate change policy communication and practice gaps among smallholder farmers in the Tigithi Ward in Laikipia County

Household questionnaires were used to understand the behaviour of selected households regarding the practice of communicated policies. Focus group discussions and key informant interviews were conducted with community groups and key stakeholders, respectively, to collect participants' opinions on climate change policy communication and practice gaps. The study will understand whether climate change policies communicated are practiced or otherwise, as well as reasons behind non-compliance. Participant observation was also employed in order to discern what practices are actually performed in the environment where certain policies are to be implemented.

Objective 2: How climate change policies are communicated to support smallholder farmers' adaptations in Tigithi Ward in Laikipia County

The perspectives of smallholder farmers in Tigithi on climate change policy communication were explored using a socio-ecological survey employing semi-structured questionnaires, key informant interviews, and focus group discussions. This study explored the entire climate change information ecology of the Tigithi community by mapping the various communication approaches, techniques and sources available to communicate the policies. The study also sought to understand the pros and cons of various communication sources and approaches. Participant observation gave a physical picture of the information ecology.

Objective 3: Communication factors that affect the implementation of climate change policies and legislation to support the adaptation of smallholder farmers in Tigithi Ward

The study endeavoured to understand the communication factors that affect climate change policy adoption and implementation among smallholder farmers. This happened through household questionnaires, focus group discussions and key informant interviews. Participant observation also helped shade light on the challenges or factors from the environment which affect policy adoption, implementation or interpretation in order to support the adaptation of smallholder farmers in Tigithi Ward.

Objective 4: The most effective climate change policy communication process and structure necessary to the adaptation of smallholder farmers' adaptation in the Tigithi ward

It was important to understand from the smallholder farmers collectively or personally what works or what doesn't in terms of communication for action. This was done using a socio-ecological survey questionnaire with household heads and focus group discussions with various selected groups. The information collected was corroborated by local government officials and extension officers and the community through KIIs, community consultative and validation meetings. From this forum, community members to develop the agreed communication framework was selected, trained and empowered to develop the best approach, process and structure of communication needed to assist climate change policy implementation for smallholder farmers in Tigithi Ward.

Exposure

Human and non-human factors, institutions and key services that provide infrastructures are all vulnerable to the effects of climate change. These were exposed in the study by: -

- Classifying humans according to their gender, age, and health problems
- Categorizing assets that provide income, including cattle, fields, and stores.
- Identifying support systems such as hospitals, clinics, stores, roads, and bridges.
- Vulnerability mapping, a rating of vulnerable villages, livelihood solutions, and a ranking of wealth are the instruments employed.

Adaptive capacity

The purpose of the capacity assessment was to determine what resources are available, what resources are needed to adapt to the study of the effect of climate change policy, and what gaps exist. These categories for capacities were established:

- Human capabilities (knowledge, skills, attitudes),
- Economic (assets e.g. livestock, farmland money)
- Natural (forests, rivers, waters sources)
- Physical (roads, bridges, hospitals)
- Social (institutional, cultural, political and ideological)

Social networks, methods of making a living, and affluence scales were all used. Opinions on climate change policies and household adaptation to vulnerability in the Tigithi community during the previous three decades, from 1990 to 2022, was collected using a socio-ecological survey employing a standardized questionnaire.

Data Synthesis

The study made use of the mixed method approach. Therefore, in essence the study made use of both the qualitative and quantitative analyses approaches, and these therefore included household questionnaires, FGDs and key informant interviews guides (Balsigier, 2004: Ramadier 2004). The study therefore largely took a qualitative approach which involved the analysis of the occurrences, and making the essence of the wider meaning of the texts as used in the study (Alkire, 2017) and quantitative approach which was largely a household survey questionnaire. The different methods employed within this study aided the data triangulation. The study was also keen on reducing errors considering the appropriate techniques and study populations that are relevant and appropriate (Hansen, 2012).

RESEARCH FINDINGS

This section presents the summary of findings presented in the previous chapter. This section is organized into four sections that are in sequential with the objectives of this assessment.

Climate Change Policy Communication and Practice Gaps on Climate Change Adaptation

The study found that smallholder farmers in Tigithi ward in Laikipia County often have limited awareness and understanding of climate change policies and adaptation strategies due to inadequate communication efforts. Many farmers lack access to relevant information, such as weather forecasts, climate projections, and adaptation resources, which hinders their ability to make informed decisions. Communication channels used to disseminate climate change policies often fail to reach smallholder farmers effectively. Traditional methods like workshops, extension services, and printed materials may not be accessible or tailored to the needs of smallholder farmers, particularly in remote rural areas. Language and cultural differences pose significant barriers to effective policy communication. Technical jargon and unfamiliar concepts may impede farmers' comprehension, leading to misinterpretation or distrust of the information provided. Insufficient engagement with smallholder farmers and local communities in the policy development process leads to disconnect between policy

objectives and on-the-ground realities. Farmers' perspectives, knowledge, and priorities are often overlooked, resulting in policies that are not well-suited to their needs and contexts. Smallholder farmers face challenges in accessing financial resources, technology, and technical assistance needed to implement climate change adaptation measures. Inadequate support mechanisms, such as extension services, credit facilities, and agricultural inputs, undermine farmers' capacity to adapt to changing climate conditions. Fragmentation and inconsistencies across climate change policies, agricultural policies, and development agendas create confusion and hinder coordinated action. Lack of integration between climate change adaptation efforts and broader agricultural development strategies undermines the effectiveness of adaptation interventions. Smallholder farmers are disproportionately vulnerable to climate change impacts due to their reliance on rain-fed agriculture, limited access to irrigation, and exposure to extreme weather events. Climate change exacerbates existing challenges such as poverty, food insecurity, and land degradation, further compromising farmers' adaptive capacity. One-size-fits-all approaches to climate change adaptation do not adequately address the diverse needs and contexts of smallholder farmers. Context-specific solutions that take into account local knowledge, socio-economic conditions, and agroecological characteristics are essential for effective adaptation.

Climate Change Policies and Legislations Communication to Smallholder Farmers

The study further found that climate change policies and legislations are often communicated to smallholder farmers in Tigithi ward in Laikipia County through various channels, including government extension services (mostly chief barazas), agricultural cooperatives, NGOs, community-based organizations, radio broadcasts and mobile phone technologies. Extension workers played a critical role in disseminating information about climate change adaptation practices, policy incentives, and support programs to farmers at the grassroots level. Effective communication strategies tailor messaging to the specific needs, contexts, and literacy levels of smallholder farmers. Simplified language, visual aids, and locally relevant examples enhance farmers' understanding of climate change concepts, risks, and adaptation options. Communication efforts prioritize local languages and cultural norms to ensure relevance and resonance with smallholder farmers. Indigenous knowledge and traditional practices are integrated into communication materials to build trust and foster community ownership of adaptation initiatives. Participatory approaches, such as farmer field schools, participatory video, and community forums, engage smallholder farmers in co-designing and implementing climate change adaptation strategies. Interactive communication methods facilitate knowledge sharing, experiential learning, and collective problem-solving among farmers. Capacity-building initiatives provide smallholder farmers with the knowledge, skills, and resources needed to adapt to climate change. Training programs cover a range of topics, including climate-smart agricultural practices, water management techniques, soil conservation methods, and alternative livelihood options. Efforts to improve access to climate information services and climate-resilient technologies enable smallholder farmers to make informed decisions and implement adaptive measures. Mobile phone-based platforms, weather advisory services, and digital extension tools bridge information gaps and facilitate real-time communication between farmers and experts. Coordinated efforts between government agencies, NGOs, research institutions, and private sector stakeholders enhance the effectiveness of climate change

policies and support mechanisms. Integration of climate change considerations into broader agricultural and rural development policies promotes synergies and avoids conflicts between different policy objectives. Monitoring and feedback mechanisms enable continuous evaluation of the effectiveness of communication strategies and policy implementation. Farmer feedback loops, participatory assessments, and community-based monitoring systems inform adaptive management and policy refinement over time.

The most effective climate change policy communication

The findings from this study provide important insights into how climate change policy communication is currently being conducted and perceived among smallholder farming communities in the Solio regions. A number of key themes emerge from the results that help shed light on both effective approaches as well as areas for improvement.

Firstly, the responses indicate a diversity of views both within and between locations on the effectiveness of existing communication efforts. Effectiveness ratings ranged widely, with some finding approaches highly impactful while others disagreed. This heterogeneity underscores the complexity of satisfying all stakeholders given the pluralistic nature of local contexts even over small geographic scales. As evidenced in studies by Coulibaly and Fofana (2017) and Resosudarmo et al. (2012), socioeconomic differences at local levels can create uneven impacts and perspectives on initiatives like has been seen here.

Secondly, communication failures including late, inaccurate or inconsistent information were commonly cited as undermining effectiveness across locations. Studies show such issues can disrupt coordination and planning if not addressed (Lyster, 2011; Wertz-Kanounnikoff & Angelsen, 2009). Providing reliable, timely guidance tailored to agro-ecological settings appears vital but not always achieved presently according to respondent feedback.

Thirdly, the most preferred communication approaches emphasized hands-on, community-based models to strengthen accessibility in local languages and contexts. Demonstration-style learning and leveraging existing, trusted structures like chiefs and groups resonated strongest.

This preference for blended intrapersonal and societal diffusion aligns with literature highlighting such participatory, place-based strategies better reconcile global-local dynamics (Adger, 2003; Dow and Taylor, 2010).

Fourthly, adoption likelihood was seen as contingent upon extension support addressing operational barriers, pointing to the need for complementary efforts beyond outreach. As established in studies by Adger (2003) and Wertz-Kanounnikoff and Angelsen (2009), social and resource constraints must also be navigated to facilitate collective adaptation beyond dissemination alone.

Fifthly, assessments of past performance effectiveness showed significant diversity, with ratings spanning the spectrum both within and between locations. This echoes the complex realities of satisfying pluralistic interests through top-down initiatives as mediated by ground-level implementation success, as explored in works like Bourne (2016) and Wertz-

Kanounnikoff and Angelsen (2009). Greater accountability appears necessary given performance inconsistencies reported.

Finally, preferred structures emphasized localization through enhanced coordination of technical centers providing reliable, long-term on-call advisory services embedded within community-led collaborative frameworks. Literature supports that adaptive, participatory models attuned to plural perspectives through a balance of top-down and bottom-up approaches are most impactful for sustained ownership and uptake (Bourne, 2016; Dow and Taylor, 2010).

Challenges or barriers to effective Climate Change policy communication

This section shed light on the key barriers hindering effective climate change policy communication according to the study findings. A number of common themes emerged across locations, yet the results also highlighted intra- and inter-regional differences in communicated challenges. Firstly, communication barriers mentioned included physical barriers like distance as well as socio-economic barriers such as low literacy and financial constraints. Inconsistent and inaccurate guidance due to under-resourced extension services was also frequently cited. However, the manifestations and relative impacts of these barriers appeared to diverge spatially. This affirms research showing that barriers emerge from a diversity of contextual drivers at local implementation scales (Coulibaly & Fofana, 2017; Resosudarmo et al., 2012). Secondly, government responsibilities for coordinating guidance and supporting grassroots implementation capabilities were emphasized. Yet attributions for causes of barriers also exhibited geographical nuance, with factors like politics and governance dysfunction emerging more prominently in some locations. This heterogeneity underscores the intricacies of satisfying plural stakeholder circumstances through top-down initiatives. Thirdly, communication barriers were unambiguously reported to undermine timely, appropriate adaptation actions and exacerbate livelihood vulnerabilities through losses and environmental damage. This confirms guidance deficiencies directly threaten climate resilience goals if unaddressed.

Fourthly, suggested solutions focused on bolstering culturally-grounded local networks and extension presence through pragmatic approaches sensitive to context diversity. Consensus priorities centered on improving information accessibility and grassroots involvement in decision-making. Such emphases align with literature advocating nuanced, participatory models that reconcile global aims with localized diversity. Fifthly, grassroots stakeholders acknowledged critical interfacing roles in contextualizing guidance, though underscoring reliant positions are often undervalued. Identified responsibilities centered on demonstrating practices, mobilizing communities and strengthening bidirectional information flows. These roles support research emphasizing empowered local leadership and collaborative problem-solving. Finally, perspectives diverged and converged on retaining versus reforming existing frameworks. Common accord emerged regarding pragmatic blended improvements, yet differences potentially correlated to heterogeneous local developmental realities. A balanced fusion of innovations and proven strengths through participatory processes respecting plural viewpoints holds most promise.

Conclusions

There exists a significant gap in the awareness and understanding of climate change policies and adaptation strategies among smallholder farmers in Tigithi ward in Laikipia County. Inadequate communication efforts have resulted in a lack of access to relevant information, hindering farmers' ability to make informed decisions and implement effective adaptation measures. Traditional communication channels such as workshops and printed materials often fail to reach smallholder farmers effectively, particularly in remote rural areas. There is a need for innovative and context-specific communication strategies that leverage local knowledge and cultural norms to enhance engagement and uptake of climate change information. Socioeconomic, cultural, and institutional barriers impede smallholder farmers' engagement and participation in climate change adaptation initiatives. Limited access to resources, language barriers, and exclusion from decision-making processes undermine the effectiveness of adaptation efforts and perpetuate vulnerabilities. Fragmentation and inconsistencies across climate change policies, agricultural policies, and development agendas create confusion and hinder coordinated action. There is a pressing need for policy coherence, integration, and alignment to ensure that climate change adaptation efforts are effectively mainstreamed into broader development strategies. Smallholder farmers require access to capacity-building initiatives, training programs, and support mechanisms to enhance their adaptive capacity. Efforts to improve access to climate information services, technologies, and financial resources are essential for empowering farmers to implement climate-resilient agricultural practices. Effective climate change adaptation requires collaboration and partnership among governments, NGOs, research institutions, and local communities. Meaningful stakeholder engagement, participatory approaches, and knowledge sharing are critical for co-designing and implementing adaptation strategies that address the specific needs and priorities of smallholder farmers. Addressing climate change policy communication and practice gaps requires a multi-faceted approach encompassing improved communication strategies, stakeholder engagement mechanisms, capacity-building initiatives, and policy coherence measures. Policy recommendations include enhancing communication channels, tailoring messages to local contexts, promoting participatory decision-making processes, strengthening institutional coordination, and investing in long-term support for smallholder farmers' climate change adaptation efforts. Addressing climate change policy communication and practice gaps is crucial for building the resilience of smallholder farmers and ensuring sustainable agricultural development in the face of climate change. By addressing these gaps and implementing targeted interventions, policymakers, practitioners, and stakeholders can empower smallholder farmers to adapt to climate change effectively and contribute to broader climate resilience and food security goals.

In conclusion, effective communication of climate change policies and legislations to smallholder farmers in Tigithi ward in Laikipia County required targeted approaches that considered the specific needs, contexts, and literacy levels of the intended audience. Tailored messaging helped ensure that information was accessible, relevant, and actionable for farmers. Utilizing diverse communication channels, including government extension services, agricultural cooperatives, NGOs, community-based organizations, radio broadcasts, and

mobile phone technologies, enhances the reach and effectiveness of communication efforts. Leveraging a mix of traditional and digital platforms helps overcome barriers to information access and promotes wider dissemination of climate change-related information. Recognizing the importance of local language and cultural sensitivity in communication efforts is essential for building trust and fostering engagement among smallholder farmers. Integrating indigenous knowledge and traditional practices into communication materials enhances farmers' understanding and acceptance of climate change adaptation strategies. Engaging smallholder farmers in participatory approaches, such as farmer field schools, participatory video, and community forums, empowers them to co-design and implement climate change adaptation strategies. Interactive communication methods facilitate knowledge sharing, experiential learning, and collective decision-making among farmers, leading to more effective adaptation outcomes. Capacity-building initiatives that provide smallholder farmers with the knowledge, skills, and resources needed to adapt to climate change are crucial for enhancing resilience. Training programs covering climate-smart agricultural practices, water management techniques, soil conservation methods, and alternative livelihood options equip farmers with the tools they need to cope with changing environmental conditions. Coordinated efforts between government agencies, NGOs, research institutions, and private sector stakeholders are essential for ensuring policy coherence and integration. Aligning climate change policies with broader agricultural and rural development agendas promotes synergies and maximizes the impact of adaptation initiatives on smallholder farmers' livelihoods. Establishing robust monitoring and feedback mechanisms enables stakeholders to assess the effectiveness of communication strategies and policy implementation efforts. Regular feedback loops, participatory assessments, and community-based monitoring systems facilitate adaptive management and inform iterative improvements to communication approaches over time. Effective communication of climate change policies and legislations to smallholder farmers is critical for supporting their climate change adaptations. By adopting targeted, participatory, and context-specific communication strategies, policymakers, practitioners, and stakeholders can empower smallholder farmers to build resilience and adapt to the challenges posed by climate change effectively.

While progress has clearly been made, these findings indicate that communication efforts could be strengthened by more reliably delivering consistent, timely information tailored to varied local contexts through integrated, community-driven models that also address socioeconomic barriers to adoption. Coordinated, long-term partnerships attuned to pluralistic stakeholder viewpoints hold promise for optimizing climate adaptation among smallholder farmers in diverse implementation landscapes like the Solio regions. Overall, communication challenges exhibit diversity requiring tailored, multi-pronged solutions. Bolstering localized engagement and resources while empowering grassroots agents appears key to resolving barriers and facilitating coordinated climate adaptation across diverse implementation contexts.

Recommendations

- i. The study recommends that by establishing accessible and reliable channels for disseminating climate change information to smallholder farmers, including mobile phone-based platforms, radio broadcasts, and community meetings. Translating climate

change information into local languages and utilizing culturally appropriate communication materials to enhance comprehension and relevance. Fostering meaningful engagement with smallholder farmers in the policy development process by incorporating their perspectives, knowledge, and priorities. Facilitating multi-stakeholder dialogues and participatory decision-making forums to promote collaboration, co-design, and ownership of adaptation initiatives. Investing in strengthening agricultural extension services to provide tailored support and technical assistance to smallholder farmers on climate-smart agricultural practices and adaptation measures. Training extension workers to effectively communicate climate change information and facilitate knowledge exchange among farmers. Developing and implementing financial mechanisms, such as subsidies, grants, and microfinance schemes, to enhance smallholder farmers' access to resources for climate change adaptation. Providing technical support, including training, capacity building, and access to climate-resilient technologies and inputs, to facilitate the adoption of adaptive practices. Ensuring coherence and integration of climate change policies with broader agricultural and rural development strategies to maximize synergies and avoid conflicting objectives. Mainstreaming climate change considerations into agricultural extension programs, land use planning, natural resource management, and disaster risk reduction efforts. Establishing platforms for knowledge exchange and learning among smallholder farmers, researchers, policymakers, and practitioners to share experiences, best practices, and lessons learned. Encouraging the documentation and dissemination of success stories and case studies highlighting effective climate change adaptation strategies. Investing in climate-resilient infrastructure, such as irrigation systems, water harvesting techniques, and post-harvest storage facilities, to enhance smallholder farmers' resilience to climate change impacts. Supporting the development of climate-smart agricultural practices that promote soil conservation, agroforestry, crop diversification, and livestock management. Investing in climate-resilient infrastructure, such as irrigation systems, water harvesting techniques, and post-harvest storage facilities, to enhance smallholder farmers' resilience to climate change impacts. Supporting the development of climate-smart agricultural practices that promote soil conservation, agroforestry, crop diversification, and livestock management.

- ii. The study further recommends that by engaging smallholder farmers in the development and implementation of climate change policies through participatory approaches such as focus group discussions, participatory workshops, and farmer field schools. This involvement fosters ownership and increases the relevance of policies to farmers' needs. Tailoring communication strategies to the specific contexts, languages, and literacy levels of smallholder farmers. Utilize a mix of verbal, visual, and written communication methods to effectively convey complex climate change concepts in a way that is easily understandable. Utilizing local communication channels that are accessible and trusted by smallholder farmers, such as community radio stations, local leaders, agricultural extension workers, and farmer cooperatives. This ensures that climate change information reaches remote and marginalized communities. Facilitating knowledge exchange networks among smallholder farmers to share experiences, best practices, and successful adaptation strategies. Peer-to-peer learning platforms can empower farmers to adopt innovative approaches and build resilience collectively. Improving access to climate

information services, including weather forecasts, climate projections, and early warning systems, through mobile phone technologies, community-based weather stations, and extension services. Timely and accurate information enables farmers to make informed decisions and take proactive measures. Empowering local leaders and agricultural extension workers with training and resources to effectively communicate climate change information and support farmers in implementing adaptation measures. Strengthening the capacity of local institutions enhances their role as trusted sources of information and support. Highlighting the benefits of climate-smart agricultural practices that enhance resilience to climate change, such as agroforestry, conservation agriculture, water harvesting, and crop diversification. Demonstrations, field trials, and farmer-to-farmer exchanges can showcase the effectiveness of these practices. Providing incentives, such as subsidies, grants, and access to markets, for smallholder farmers to adopt climate-smart practices and technologies. Financial support encourages investment in adaptation measures and reduces the financial barriers to implementation. Establishing monitoring and evaluation mechanisms to assess the effectiveness of communication strategies in reaching and influencing smallholder farmers. Feedback from farmers should be collected regularly to identify challenges, gaps, and areas for improvement and emphasizing the importance of long-term resilience building through sustained investment in climate change adaptation, capacity building, and institutional support. Building adaptive capacity among smallholder farmers requires a holistic approach that addresses socio-economic, cultural, and environmental dimensions.

- iii. The study recommends developing context-specific, multi-pronged communication strategies. Tailor approaches to the unique socio-economic and cultural realities of different local communities. Use diverse channels including demonstrations, groups, media etc. additionally, it is important to provide reliable, timely technical guidance. Ensure messaging is consistent, accurate and addresses local agro-ecological conditions. Strengthen transparency and coordination to build trust. Empower grassroots implementation and ownership. Strengthen existing community structures and local leadership while fostering bottom-up participation and feedback mechanisms. Bolster extension services and advisory support. Establish dedicated personnel at the local level to provide long-term, personalized capacity building and on-farm problem solving. Address socio-economic barriers to adoption. Implement integrated programming to ensure smallholders have reliable access to inputs, financing, markets and resources needed to adopt practices. Foster multisectoral partnerships and coordination. Clearly define roles and facilitate collaborative planning, monitoring and adaptive management between technical teams, administrators and communities. Pursue participatory engagement and learning. Leverage demonstration farms, interaction and experiential learning to cultivate understanding and facilitate voluntary behavioral transitions. Strengthen grassroots accountability and support. Conduct ongoing reviews involving farmers to ensure policies and initiatives remain relevant and responsive to evolving local needs and priorities. Foster community ownership of adaptation. Embed an element of grassroots agency, empowerment and incentive to promote self-sustaining behavioral transitions toward greater climate resilience.

- iv. The study recommends strengthening localized extension services and provide long-term technical support. Dedicated agriculture officers stationed at the sub-county level could address farmers' on-farm challenges through personalized advisory support. Consistent capacity building and feedback loops are needed. Bolster grassroots partnerships and decision-making processes. Nominate farmer representatives at village levels to disseminate guidance and convey feedback. Foster collaborative problem-solving through participatory governance frameworks. Develop nuanced, multi-pronged communication strategies. Integrate demonstration farms, multimedia campaigns, community forums, and interpersonal networks using various culturally appropriate channels. Tailor approaches to differing local realities. Address socio-economic barriers to implementation. Provide reliable access to inputs, financing, market linkages, and water resources needed to actualize recommended practices. Tackle constraints through integrated programming. Strengthen coordination across stakeholders. Clearly delineate roles and foster synergistic partnerships between technical teams, administrators, and local leadership structures. Implement coordinated, multi-sectoral plans. Empower trusted grassroots change agents. Recognize critical interfacing functions of bridging policy with communities. Invest in multiplier trainings to scale up contextualization of guidance. Pursue an iterative, participatory process. Conduct ongoing reviews to reflect plural perspectives in continual refinements ensuring no one feels excluded. Promote community ownership of adaptation. Leverage culturally grounded platforms amid innovations. Retain credibility of traditional councils while creatively exploring supplementary channels like technology. Stay attentive to socio-cultural nuances.

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