

MODELLING EFFECTIVE CLIMATE CHANGE POLICY COMMUNICATION FRAMEWORK FOR SMALLHOLDER FARMERS IN LAIKIPA COUNTY, KENYA

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ABSTRACT

The study sought to model effective communication framework for climate change policy implementation to promote climate change adaptation and food security among smallholder farmers in Laikipia County Kenya. It was believed that national and county governments and other stakeholders communicate climate change policies to enhance adaptation, but such communication does not impact farmers to promote policy implementation. Using household surveys, focused group discussion and key informant interviews as well as several validation workshops, results show that participatory and integrative communication models were more effective in promoting policy implementation for adaptation to promote food security. Though not systematically practiced, stakeholders believed that this was a game-changer in policy implementation.

INTRODUCTION

Globally, smallholder farmers represent about 60% of the overall agricultural workforce and about 75% of the world's farmland is made up of smallholder farmers (Alkire 2017). The food consumption rate is considered to be very high in the developing world due to overpopulation,

adverse climate, and general poverty. With time, scientists have associated climate change with human activities, and it is believed that continued activities have enhanced global warming due to addition of dangerous atmospheric gases. 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. 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.

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. It is therefore necessary to devise an effective way of approaching communities with well structures conversations which follow a process that swift and does not conflict with any actor in climate change sphere. 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, Wandiga and Oriaso 2018). These policy need be clearly understood by those on the implementation level to ensure the intended good is maximized.

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-centered, and local economies have been weakened throughout Africa as a result of climate change (Khalid, 2011). 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 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 (Masseti, 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. 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 study that has associated the low or poor uptake or implementation of climate change policy with how it is communicated; as well as the most effective communication model or approach to support smallholder farmers to implement the policies.

Aim and Objectives

The general objective of the study is to determine the most effective communication framework for climate change policy implementation among smallholder farmers in Kenya. Specifically, the study aimed to achieve the following objectives:

1. To analyze the effectiveness of approaches used to communicate climate change policies among smallholder farmers in Laikipia county
2. To assess the most and least effective communication approaches used to support climate change policy implementation among smallholder farmers in Laikipia
3. To explore the most effective process and structure of communication that will support climate policy implementation among smallholder farmers in Laikipia
4. To rate the effectiveness of the proposed structure and approach of communication in support climate change policy implementation among smallholder farmers in Laikipia.

Effective communication framework for climate change policy implementation among smallholders

Policy discussion of climate change is an important topic for public discourse. Along with other, more well-established forms of communication including health communication, risk communication, and scientific communication, it has emerged as a major focus in recent years (Nerlich et al., 2010). While it is important to raise awareness of climate change as a physical fact, Hulme (2007) argues that talking about climate change policy entails more than this. This

implies that addressing climate change via communication is an increasingly complex and important endeavour.

According to Ferrari (2010), climate change policy communication occurs within the usual policy frameworks. The author suggests that the aim of engaging smallholder farmer communities in climate change policy and adoption entails several stages: first, making them aware of climate change policy communication and adoption as a problem, second, communicating some knowledge about policy communication and adoption, third enlightening them of the likelihoods of policy communication and lastly guaranteeing them the climatic change policy communication outcomes.

In 2000, during the international conference on climate change communication in Ontario, Canada, several principles of climate change communication were suggested (Andrey and Mortsch, 2000). The “Generic Communication Guidelines” was suggested. These include carefully defined communication goals; identifying and describing the intended audiences; having well-informed and committed communicators, developing communication partnerships; having two-way communication, and finally learning from other fields, particularly risk communication (Ferrari, 2010).

According to the available evidence, spreading the word about measures meant to combat and adapt to climate change is essential. Developing a multilevel governance structure in climate change policy communication requires better communication and information flows between sub-national and national levels of policy communication (Wertz-Kanounnikoff & Angelsen, 2009). Communications on climate change policy with multi-actors at different levels may be facilitated by the use of many channels, as suggested by Park et al. (2013). These channels include national reports, workshops, and online data bases. On the other hand, (Wibowo et al., 2013) concede that most people do not know enough about the factors leading to climate change and its potential outcomes. This is because the topic is often discussed in academic publications, where it is shrouded in jargon and difficult mathematical models. Many smallholder farmers who are vulnerable to climate change will not be able to access policy communication as a result.

In addition, smallholder farmer communities rely on advocates as a source of knowledge on policy pertaining to climate change. There is a significant need for these advocates to provide information about climate change policies and mitigation strategies in their communities (Resosudarmo et al., 2012). However, Park et al. (2013) show that there is a significant problem with the lack of data on the political and social means of supporting and implementing climate change policy communication in developing countries, as well as communications between developed and developing nations.

In conceptualizing climate change policies, Angelsen (2009) recognizes the ongoing development of national climate change strategies. However, the scholar recognizes policy communication as one of the most significant challenges. In order to effectively communicate climate change policy, Wibowo et al. (2013) suggest the following steps be taken first: determine the characteristics of

the intended audience or participants; make sure frontline workers have the necessary information and motivation; create communication partnerships to make sure information flows in both directions; learn from other sectors, especially about the risks involved in communication; and incorporate lessons learned.

According to Adhikari (2009), the success of climate change policy communication will be subject to the careful design and actual participation by local smallholder farmers in their implementation and adoption of the policies in place and how the climate change will be communicated at the local level.

Standing & Gachanja (2014) demonstrate that Kenya has progressed well in developing climate change readiness. However, the authors recognize that there are challenges in participation whereby stakeholder meetings are controlled by the central government and external consultants who formulate the policies and select the participants. According to the researchers, this is an opportunity for analytical debate, and people considered critical of the government or climate change affected are not usually included.

Further, the researchers postulate that most people in Kenya contend that climate change policy communication is not well conversant outside a small group of government officials, NGOs, and academics. According to the researchers, there is a lot of confusion about climate change policy communication. However, at the community and district levels, knowledge about policy communication is assumed to be minimal. Nevertheless, there seems to be little effort and little funding by the government and the more prominent NGOs in Kenya to undertake in-depth capacity building on climate change policy communication among smallholder farmers or county and local authorities (Standing & Gachanja, 2014). In Kenya, for instance, there is no apparent online platform for disseminating information on climate change policy communication and adoption (Standing & Gachanja, 2014).

Effective communication is a key factor in the successful implementation of policies, as stated by (ulo & Skendrovi, 2010). All other policy domains may build upon and benefit from this basis (Zulch, 2014). If the message gets through and serves its intended objective, then the communication was successful. However, a more explicit and thorough list of aspects describing the efficacy of the communication process is required for measurement purposes. To keep stakeholders on track to accomplish policy goals and to enable them to overcome obstacles and settle disputes when they arise, good communication is vital, as Zulch (2016) demonstrates in her study.

Zulch (2014) adds that these attributes of effective communication include the importance of feedback, comprehending the message and making sure it reaches the intended audience on time; guaranteeing the accessibility of communication records to those who require them; maintaining open lines of communication between the stakeholders; and making the best use of all team meetings.

Weaver (2007) showed that two key components of successful communication are the timely delivery of feedback and the importance of the information being conveyed. The sincerity, honesty, and credibility factors are also highlighted by the researcher. Similarly, the study proposes picking the correct medium and messenger and reducing transmission noise to guarantee good communication. This author also implies that successful communication entails producing the outcome intended by the communicator.

Effective communication, according to further talks by Naaranoja, & Savolainen (2016), is when stakeholders are informed with the right and relevant information in a timely manner at a low cost. Furthermore, they understand that communication ought to be easy to learn and use, replicable, and open to comments.

Bourne (2016) adds that while communicating with stakeholders, it's important to take into account their unique perspectives and methods. The study also acknowledges a variety of aspects of effective policy communication, such as achieving the information's intended purpose, defining the purpose of communication, tailoring the message to a particular audience, reiterating the message as necessary to achieve the desired result, making the information readily available, and using multiple channels of distribution.

However, there are several obstacles in the way of clear and concise policy communication. Factors like policy intricacy, organizational culture, and trust within the policy team are just a few that have been highlighted in various works of literature as both obstacles and motivators to effective policy communication. Multiple stakeholders and cross-organizational information sharing contribute to policy complexity, as stated by Stead et al. (2009). According to research by Remidez & Jones (2012), the inherent structure of policy makes it hard to have effective conversations about it. When people work together, they are able to re-evaluate their prior understanding in a variety of domains.

Modelling effective communication framework using the Participatory and diffusion Theories

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.

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 MATERIALS AND METHODS

The study gathered qualitative and quantitative data using a cross-sectional mixed methods approach from household surveys, key informant interviews and consultative sessions. Secondary data from international, national, and local climate change policy documents were also studied. The study respondents were selected using a stratified random sampling procedure from among smallholder farmers. Kothari (2008) suggests a minimum sample size of 100 for such a study which is largely qualitative. To obtain both qualitative and quantitative data from the smallholder farmer, semi-structured tools were deemed more appropriate. Data were collected by research assistants and local enumerators who were carefully selected from among experienced masters' cohorts. While qualitative data were processed using thematic analysis, quantitative data were analyzed using descriptive and inferential statistics. In order to improve the climate change adaptation in ward, smallholder farmers were trained to use a wide range of adaptation strategies and policy communication approaches suitable for their circumstances. It was important to understand from smallholder farmers collectively or individually, what worked or what did not work in terms of effective communication to elicit action and adaptation. This was done using a socio-ecological survey questionnaire with household heads and focus group discussions with various selected groups. The information collected were corroborated by local government officials and extension officers and the community through key informant interviews and stakeholder validation meetings. From this forum, community members developed the agreed communication framework where most of the farmers were trained and empowered to apply the most effective approach, process and structure of communication which they needed to assist climate change policy implementation among smallholder farmers.

RESEARCH RESULTS

Effectiveness of approaches, channels or modes used for climate change policy communication in Laikipia County

On the effectiveness of climate change communication, respondents expressed varied views. In Lamuria A, only some activities like radio usage by farmers were viewed as effective, while the

medium in general was not able to reach all and some distributed seeds weren't certified, decaying and causing losses. Those in Lamuria Mwirema were very negative, believing communication to be ineffective overall as information received was often false or coming to them late. However, one respondent said it could be useful if implemented consistently in the long-term. Views from Tigithi Location ranged dramatically from not very effective to highly effective, suggesting significant divergence in farmer experiences.

Table 1 Effectiveness of approaches, channels used for climate change policy communication

	Lamuria Village	Tigithi Village	Solio Village
Very effective	10	13	23
Moderately effective	22	40	56
Less effective	7	8	7
Total	39	61	86

In Village 7, perceptions ranged from not very effective to very effective to average, indicating a lack of consensus. Tigithi responses were polarized between not very effective and very effective. Solio 1 mirrored Village 7 with mixed responses seen. This highlights that effectiveness is viewed quite differently depending on location and respondent.

The responses regarding the effectiveness of current climate change communication approaches provided important insights into how these efforts are perceived on the ground within the Solio regions. A diversity of views was expressed both within and between locations, with ratings ranging widely from not effective to very effective. This heterogeneity of perspectives suggests that one size does not fit all - approaches may be working well for some but not others even within close proximity. Overall responses indicated current approaches are failing to consistently relay accurate, timely information to all smallholder farmers across the regions.

One key informant stated that,

The policies are well communicated but the issue is lack of water. When practicing what we have been taught, sometimes we count it as a loss. Because if you are told to dig a furrow and you do so, whatever you plant does not thrive so you see it like a loss." Another respondent was agreeable and stated "It does because even from the media we still get this information. We even get them from the groups we attend." there was also another respondent that noted "The methods that are used to deliver the information, do they work? Yes, they do work because for example if you are to cut a tree, you must have the letter from the chief or from the government."

From Tigithi Location a key informant, one Peter Kimani mentioned that,

"In my view, the activities for climate change communication have been moderately effective thanks to dedicated local leaders striving to pass on guidance. While barazas and group meetings champion behaviors, vast distances between scattered homesteads still preclude many from vital sessions. More targeted household engagement is needed to complement mass platforms ensuring inclusivity of remote households sustainably influencing decisions."

In Furaha Sub location, Assistant Chief Wambui thought the current climate change policy communication activities were moderately effective but noted the approach was still limited by inadequate localized technical expertise available long term to address farmer questions hampering optimal on-farm decision making.

When asked how effective the current climate change policy communication is, Chief Joseph Mwangi said;

"Existing climate change policy gaps and how they reach out to the farmers, the only gap we have is level of literacy because to some extent you find that some farmers are not getting the correct message and also some cultural background you see some portions of land are owned by women. Women are well known at a certain level to have a cultural background of taking a lot of seriousness like in tree planting and matters affecting climate change like environment."

Chief Joseph Mwangi also added that,

"While current approaches leveraging opinion leaders as channels of information are decent, I believe more can be done given dynamics in communities have changed over time. Not all farmers, especially the younger ones, actively participate in such traditional forums."

Ineffective communication efforts for climate change policy among smallholder farmers

In terms of the encountered ineffective efforts, all locations commonly dealt with receiving false, late or incorrect data, especially concerning weather patterns that failed to materialize as predicted. Miller and Salkind (2002) highlighted the importance of reliable and timely information to facilitate effective decision making.

Lamura A specified the problematic promotion of bluegum cultivation along rivers. Lamuria Mwirema dealt with inappropriate advisories relating to crops, fertilizers, seed varieties as well as a lack of general guidance from the government. Literacy barriers, language issues and unreliable information from scientists additionally hampered efforts in Tigithi Location. Collectively, responses demonstrated smallholder farmers frequently lack access to reliable, actionable and context-specific policy communications. Tigithi and Solio 1 were able to provide concrete examples around issues like lack of relevant information, conflicting guidance, and late policy changes. Reports have indicated such communication failures can undermine coordinated climate action planning and adaptation (Lyster, 2011; Wertz-Kanounnikoff & Angelsen, 2009).

In contrast, Village 7 respondents did not cite any such examples. This points to potential differences in how policies have actually been implemented and experienced on the ground across areas. Research has shown how inappropriate guidance can lead to maladaptive actions with negative livelihood impacts if not properly vetted for local agro-ecological appropriateness (Lamboll et al., 2017; Ringler et al., 2010).

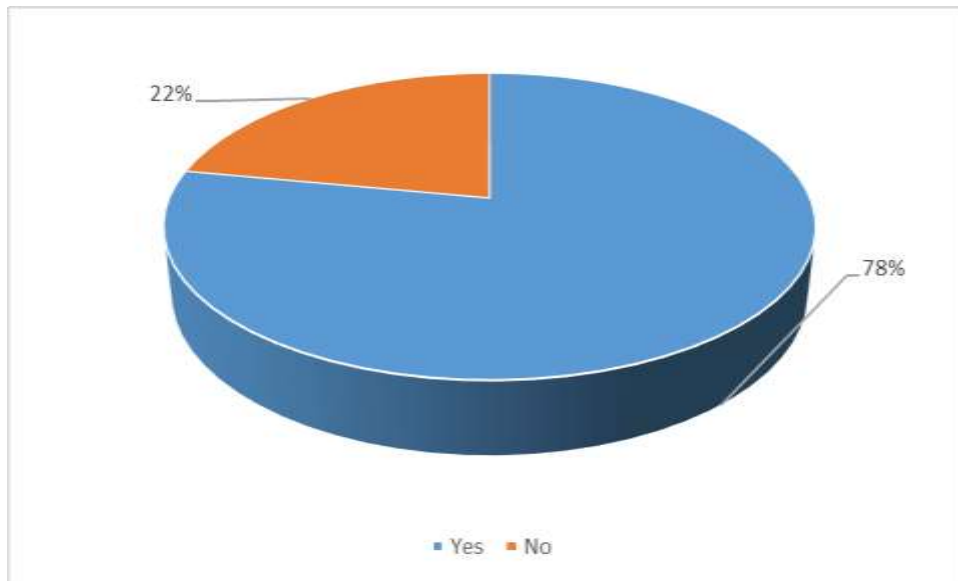


Figure 1 Ineffective communication activities for climate change policy among farmer

According to the findings, 78% of the respondents stated that they had encountered ineffective communication activities for climate change policy as a smallholder farmer in their villages whereas 22% stated that they had not encountered any ineffective communication activities for climate change policy as a smallholder farmer in their villages. When probed about specific past experiences with ineffective communication, the examples shared were illuminating in terms of unraveling what goes wrong locally. In Solio 2, issues centered on comprehension difficulties for non-readers and provision of misleading rainfall forecasts, jeopardizing livelihoods. For Solio 4 respondents, introduced crops lacked suitable prior testing and policy dissemination sometimes occurred when residents were unavailable, reducing uptake. Such disparate experiences point to the nuanced realities of implementation and underscore that communication failures can negatively impact farming decisions and outcomes.

The key informant noted that,

"The challenge is sometimes getting time to attend all the sessions due to other commitments on the farm. But neighbors help share anything missed. More could be done to directly reach some who face barriers to group meetings."

According to responses from FDG 2 in Tigithi Ward, one respondent said "*We even get them from the assistant chief and village elders. The church elders too and opinion leaders*"

Another respondent pointed out a challenge in indirect messages stating,

"From the source, you find that there are like broker in the middle, maybe they are the person with the information. Instead of giving the actual information as it is, they add or remove some so by the time you are getting the information you find that it is distorted, So you are left confused because there is some missing information in between."

Findings from Chief Lamuria Location show that the communication channels often used were largely interpersonal. For instance, Chief Teresa explained,

"We hold regular barazas to reach communities but our large area makes it difficult to access all. We also collaborate with schools and distribute messages through children to parents. Relaying information through religious leaders on Sundays has proven helpful due to their regular interaction with worshippers."

Assistant Chief Richard added that they sent text messages through nyumba kumis leaders and called meetings with agricultural officers to disseminate messages during farmers' field days. Results from KII 2 from Tigithi Location Joseph Kinyanjui explained that,

"On one occasion, unreliable prediction of drought-tolerant seed varieties frustrated some farmers in our area who planted late without reliable guidance on alternatives. The misinformation undermined our confidence somewhat as timely clarification on adaptive options suitable for our land sizes could have optimized wider uptake of recommended cultivars. We appreciate any guidance on resilient practices but inconsistencies in information undermine its credibility".

From Furaha Sub-Location, Elder Thimba recounted ineffective communication activities in the form of closed door chief's barazas which was called on short notice without prior dissemination. These meeting provided no platforms for participatory feedback sharing from farmers or provision of basic facilitation of food. According to him this discouraged problem solving discussions.

Assistant Chief Juma attributed communication ineffectiveness to political interference in policy implementation. He argued that politicians hijacked the organized meetings and therefore the messages one wanted to deliver was altered. He cited this issue as ignorance mainly orchestrated by the politics of the day.

Regarding ineffective past approaches, the Chief noted,

"In my experience, monologue style training events where information is simply told to farmers without interaction tend not to be as effective compared to demonstration approaches that show farmers real impacts improved practices can have on issues like crop resilience and yields through practical examples."

Most effective way to communicate in order for community to implement policies

When proposing alternative effective communication approaches, Lamuria A focused on leveraging existing community structures like chiefs and elders through meetings. Previous studies have found that utilizing trusted local leaders and institutions can help enhance participation and message saliency (Ahmed & Abdel, 1996; Bessette, 2006). Lamuria Mwirema advocated for a more diverse set of stakeholder engagements incorporating schools, religious organizations, NGOs, multimedia platforms and door-to-door outreach. Research affirms that multi-pronged engagement of formal and informal actors through varied channels strengthens outreach (Dow & Taylor, 2010; Servaes & Malikhao, 2005).

Tigithi Location highlighted religious gatherings, public pronouncements and radio as viable options. One of them had this to say,

"What might work better is home visits alongside group sessions. This ensures everyone gets an opportunity to learn and ask questions, not just those who make it to meetings. Information sheets left behind after visits would also help reference later."

While approaches which were suggested built on recognized local institutions, broadening participation and utilizing multiple accessible channels suited to diverse needs and literacy levels across locations, there were not structures to accommodate those frameworks.

The suggested best communication approaches elicited broad agreement around leveraging local structures like churches, community groups, leaders, and mass media channels. Suggestions from Solio 1 also incorporated more technical elements like agricultural officers and research,

"The best approach in my view would be a mix of scheduled public forums at central locations alongside more structured hamlet-level practical demonstration days hosted on a rotational basis. This permits personalized clarification of recommended applications tailored specifically to our smallholder land parcel sizes and conditions. Having local experts stationed year-round would also sustain continuous technical support addressing any emergent queries from our fields thereby directly influencing our long-term production decisions."

This reflects a common preference for community-based models while also accounting for development disparities between regions. This is aligned with previous work that has also found that community-oriented models coupled with development tools resonate best across diverse contexts (Adger, 2003; McKinney & Harmon, 2007).

While common preferences emerged for bolstering outreach through local languages, community bodies and extension services across the Solio locations, some distinctions are worth noting.

"A model integrating farmer field days, participatory discussion groups among farming communities, and ongoing radio programs highlighting local success stories and discussions among farmers could spur greater interest in adaptation practices and peer-to-peer learning."

Solio 4 respondents placed relatively more importance on technical demonstration activities and use of published support materials. This suggests that as development levels vary even within small geographic areas like the Solio regions, communication strategies must be tailored recognizing such subtleties. Research shows that even within small areas, development variability demands locally nuanced solutions (Moser & Dilling, 2007; Wertz-Kanounnikoff & Angelsen, 2009).

Assistant Chief Richard added.

"After collaboration with KEISAP and other projects offering incentives, I have seen our farmers increasingly embracing recommended practices and new crops. They are motivated when benefits are clear like with payments from TIST for tree

planting. People now actively seek tree seedlings."

Most effective approaches, process and structure of climate change policy communication

Regarding optimal policy communication structures, Lamuria A prioritized hands-on demonstrations, capacity building workshops and empowering agricultural officers. Previous studies have found that experiential learning coupled with robust extension services enhances adoption of adaptation practices (Coulibaly et al., 2017; Lowder et al., 2016). Lamuria Mwirema stressed community-led barazas in local languages with active involvement of various stakeholders including chiefs, extension workers and farmer groups. Research affirms the importance of culturally-appropriate participatory dialogues for sustained local buy-in (Bessette, 2006; Servaes & Malikhao, 2005).

One of the leader suggested *"a framework leveraging technical centers providing on-call support plus optimized mass media complemented by personalized grassroots engagement embedded in local governance structures and priorities."*

Tigithi Location favored designating specific officers while capitalizing on the influential chief and neighborhood collaborations, complemented by radio, TV and local vernacular. Collectively, the proposed structures focused on localized, practical and multi-stakeholder engagements embedded within communities.

One respondent said,

"A mixed approach using groups, churches, schools and home visits led by agricultural officers supported by village elders and chiefs seems best. This combination maximizes coverage and reinforces messaging through multiple trusted sources. Demonstration farms also aid learning practical skills. If we start from the agricultural officer to the CDA to village elders, the information will definitely reach to everybody. And the communication chain will be completed."

Scholars have also recognized community-based models coordinating diverse actors through mutual understanding as most impactful (Dow & Taylor, 2010; Wertz-Kanounnikoff & Angelson, 2009).

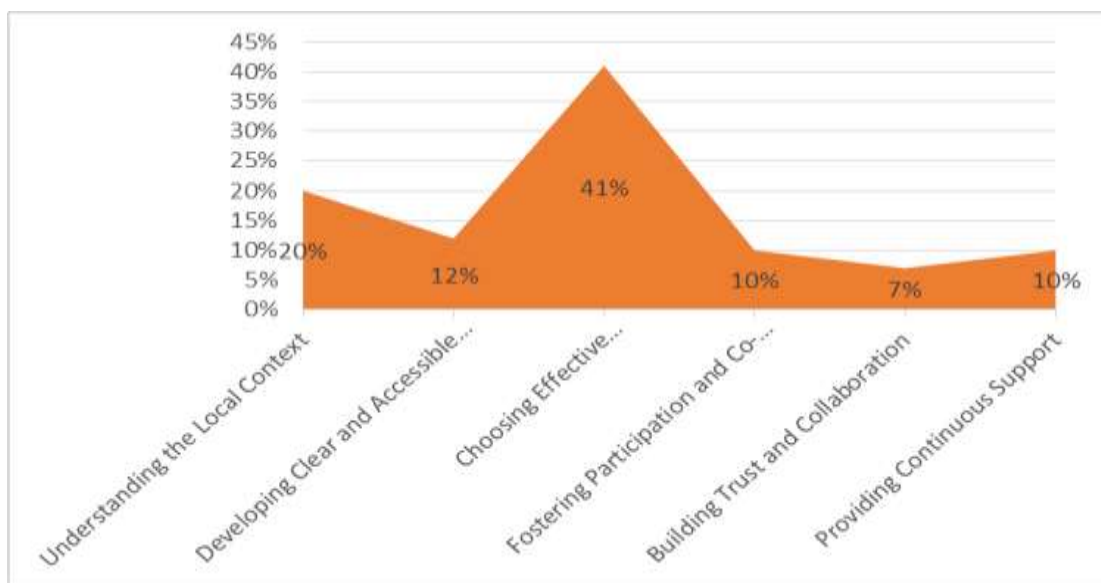


Figure 2 Most effective approaches, process and structure of climate change policy communication

As per the findings above, 41% of the respondents suggested that the most effective approaches, process and structures of climate change policy communication which facilitated climate change adaptation among smallholder farmers in this ward/county was choosing effective communication channels, 20% suggested that the (most effective) approaches, process and structures of climate change policy communication which facilitated climate change adaptation among smallholder farmers in this ward/county was understanding the local context, 12% suggested that the (most effective) approaches, process and structures of climate change policy communication which facilitated climate change adaptation among smallholder farmers in this ward/county was developing clear and accessible messaging; 10% suggested that the (most effective) approaches, process and structures of climate change policy communication which facilitated climate change adaptation among smallholder farmers in this ward/county was fostering participation and co-creation and fostering participation and co-creation while 7% suggested that the (most effective) approaches, process and structures of climate change policy communication which facilitated climate change adaptation among smallholder farmers in this ward/county was building trust and collaboration. Some of the responses are captured below;

"To have an agriculture extension officer that we can be seeing. Have him visit our farms and address us on the best fertilizers and such? Even if it is those trees we are saying that we will plant, you know it is impossible without water. If we do that and the rains are gone, the trees will just dry up. so we should have water here and again, agriculture officer." another respondent stated ""An effective coordination structure for our area entails nominating dedicated farmer representatives from each village invested to take a lead role in simultaneously cascading climate-smart guidance downward to groups and nurturing feedback from challenges faced upward to the technical teams. Regular inter-agency collaboration meetings could then optimize our diverse local strengths and capacities through need-based integrated periodic programming that strategically leverages existing community structures."

Following this theme, responses to the most preferred communication styles emphasized removing barriers to understand ability through local languages as well as tapping into existing awareness channels. It therefore required optimized integration of mass media, complemented with personalized grassroots level engagement. The Area Chief attributed failure of climate change policy to poor coordination.

The Chief had this to say, "*Poor coordination between agencies causes communication breakdowns that leave both leaders and communities confused without direction at critical moments.*"

Solio 1 focused more on demonstrations and farmer groups, perhaps due to greater openness to new technical strategies. Across all locations, interpersonal interaction emerged as important to complement mass dissemination efforts.

According to Chief Mwangi,

"In my view, such a blended approach that brings together top-down messaging

through local administration with more community embedded experiential learning and extension could best facilitate farmer-led experimentation tailored to local needs and ongoing sharing of lessons.

This is supported by previous work similarly underscores that blended intrapersonal and societal approaches strengthen diffusion of climate information (Guide, 2000; Zulch, 2016). Overall, integrating scientifically-robust solutions within indigenous processes and social architectures tailored to pluralistic landscapes seems vital for accessible, adaptable policy communication.

Reasons for preference of the communication approach, style and process of climate change policy communication for smallholder farmers' adaptation

In justifying preferred approaches, respondents consistently highlighted benefits of experiential learning through practical field demonstrations across locations. One respondent argued,

"I prefer this model because it guarantees reaching every farmer. When taught directly and through community platforms, adoption of practices is highest. Working with existing local structures helps ensure information flows smoothly with community buy-in." while another one stated "The suggested style of targeted dissemination through an assortment of optimized channels complemented by customized technical assistance personalized and calibrated to our diverse agro-ecological zones and livelihood realities would greatly optimize location inclusivity, ownership and sustained voluntary behavioral transitions crucial for us smallholders' resilience in the long-run. This approach adequately embeds an element of participatory accountability fostering a spirit of self-driven adaptation among community members.

The Chief of Lumuria Location observed that such an approach could greatly enhance policy relevance, generate stronger feelings of program ownership and support more sustained voluntary behavioral transitions through bolstered inclusivity, capacities and facilitated two-way knowledge exchange.

The themes prioritizing accessibility, oversight from trusted local figures and complementing mass media with interpersonal engagement provide useful guideposts across the Solio locations. However, their applications clearly require calibration to the priorities and realities on the ground in each Solio place to maximize effectiveness. This was captured by two respondents who said:

"When we have the agriculture officer here at a ward level, we need him here. And he will not be alone because he will be having the assistant. If there will be an office, we will be having somewhere we can have a sit whenever we need the agriculture officer" "There will be no communication breakdown. When you are informed of something you cannot be ignorant. But when you don't have the information, you can never know. Like there is the Nyumba Kumis, it can be effective. People can talk and inform each other too".

However, applications of such themes clearly necessitate calibration according each area's particular needs. While mass media have broad outreach, their reliance requires supplemental

interpersonal engagement given resource disparities. Chieftaincy authority likewise carries uneven influence depending on sociopolitical traditions. Related priorities also diverged somewhat between locations. For instance, Village 7 prioritized network infrastructure expansion more than other sites given connectivity deficiencies. Solio 1 meanwhile highlighted reforming group-based methods. Chief Teresa proposed,

"Stationing more expert personnel in the ward would strengthen our efforts alongside reliable provision of inputs from the county. With accessibility issues, alternative localized strategies are also needed."

Chief Mwangi explained his preference and said,

"By empowering communities as the drivers of identifying and testing their own solutions, we improve the long-term relevance of promoted adaptation practices for different environmental contexts while also building greater ownership of the process which is crucial for sustainability."

Likelihood of adopting and practicing the proposed climate change policies communicated

When assessing prospects for adopting future policies, responses ranged from high to moderate likelihood based on anticipated support. Tigithi Location expressed most optimism conditioned on enabling support networks. Studies have found that belief in availability of assistance positively influences willingness to engage new strategies (Bessette, 2006; Muszyńska, 2017). Bessette (2006) explored factors influencing farmer participation in agricultural extension programs in Tanzania. The study found that perceptions of adequate support influenced motivation to participate. When farmers believed extension agents would provide useful assistance, they were more open to trying new methods:

"If supported by resources like water, I believe the majority if not all farmers here would enthusiastically adopt policies communicated in this comprehensive way. Our community is hardworking, just needing the right techniques and conditions to thrive. If we can get those officers we can be very happy. They should come here and educate us on how to use the little water we have to avoid more shortage. That you should do this or that, use drip or furrows."

Additionally, Muszyńska (2017) examined climate change communication strategies targeting farmers in Ghana. The work discussed how building farmer confidence in access to resources can encourage uptake of recommended practices. Farmers were more receptive to policy messages when they trusted they would receive follow-up training and implementation help:

"Continued utilization of established local structures together with targeted support and input supply better motivates participation. Our close-knit communities naturally coordinate through recognized leaders and opinion shapers at various levels".

Overall, disposition appeared tied to tangible implementation assistance addressing operational challenges:

"Communication runs well because like today, I was called by the assistant chief

and told me that I should come here there is a meeting. Once you have the phone, communication is easy. If I tell this person she will another one. So that we make sure the information has reached out to everyone. So if it an agriculture officer coming to our area I will be able to tell quiet a number of people."

When asked about the likelihood of adopting recommended policies, financial constraints surfaced significantly only in Village 7's responses. Elsewhere, adoption drivers centered on access to support through extension and clear explanations of approaches. This divergence points to potentially uneven barriers facing smallholders of different regions.

Assistant Chief Richard opined,

"Enhanced collaboration across players would optimize available resources through integrated exchange of relevant information and joint programming for maximum outreach."

Findings from KII-Chief Lamuria Location show that on an effective climate communication framework,

"I believe the majority of small-scale farmers here will proactively implement communicated guidance driven by empirical learning. This is especially the case if reliable material and technical support over time empowers us to voluntarily make and sustain our own climate resilient production choices."

From Furaha Sub-Location, Elder Thimba believed higher adoption likelihood by farmers if future communication *"embeds participatory problem identification and prioritized solution demonstration in a feedback-oriented manner that empowers and motivates self-driven community behavioral transitions."*

Assistant Chief Juma believed adoption would increase if communication *"embeds participatory problem-solving in a demonstration and feedback-oriented manner promoting voluntary behavioral transitions self-driven by the community."*

When asked to rate effectiveness, the Chief commented,

"While the goals and intentions of both levels of government have undoubtedly been good, I would give current top-down communication efforts a fair rating as implementation of policies on the ground remains an ongoing challenge without reliable extension systems consistently providing localized technical backup and on-farm decision support over time."

Rating the effectiveness of the climate change policy communication currently or previously used by the national or county governments to smallholder farmers

Assessments of past efforts' effectiveness demonstrated considerable diversity according to responses, reflecting the complex realities of community-scaled implementation on the ground.

Lamuria Mwirema expressed mostly positive outlooks,

Generally, communication has been effective given the challenging environment. But more coordination between officers and local leaders could help streamline

information sharing further. Water access remains the core issue undermining impact."

This contrasted the Lamuria A's sentiments with predominantly critical appraisals, "“While the existing communication efforts have made generally fair progress in raising climate-smart awareness among us farmers, the approach still remains limited in some aspects. This is majorly challenged by inadequate localized technical expertise available year-long to address emerging farm-level questions inhibiting optimal decision-making. Inconsistent provision of promised material support like starter agro-inputs also discourages some from fully trialing recommended practices.

Meanwhile, Tigithi Location encapsulated the full spectrum of evaluations, from highly effective to strongly disagreed, emphasizing the challenge of uniform measurement;

"For lasting impact, there is need to firmly anchor such a revamped framework on a foundation of strategic collaborative partnerships harnessing comparative strengths of all players. This would see government, private sector and even non-state actors deliberately complement one another's efforts through integrated multi-faceted programming. With participatory appraisal guiding periodic reviews, the approach remains responsive to feedback ensuring no one is left behind in the climate adaptation journey."

This variability between locations underscores the intricacies of satisfying plural stakeholder viewpoints. Previous research has found impacts are mediated by socioeconomic factors even at small scales, complicating uniform measurement (Coulibaly & Fofana, 2017; Resosudarmo et al., 2012). Coulibaly & Fofana (2017) investigated how localized socioeconomic diversity in emerging West African markets led to uneven impacts of external drivers like policy changes, even within small regions. These implied uniform strategies cannot equally address varied development levels over limited areas.

Resosudarmo et al. (2012) studied community forestry programs in Indonesia, finding socioeconomic heterogeneity at local scales created unequal participation impacts between and within proximate villages. Factors like wealth, relationships and culture shaped outcomes.

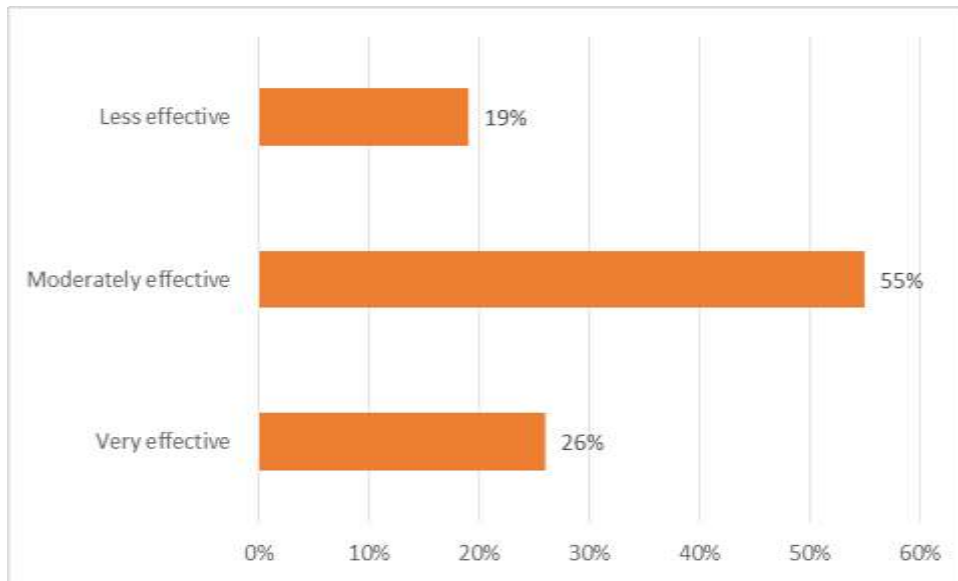


Figure 3 Rating the effectiveness of the climate change policy communication currently or previously used by the national or county governments to smallholder farmers

Majority of the respondents 55% stated that the effectiveness of the climate change policy communication currently or previously used by the national or county governments to smallholder farmers was moderately effective, 26% stated that the effectiveness of the climate change policy communication currently or previously used by the national or county governments to smallholder farmers was very effective and 19% stated that the effectiveness of the climate change policy communication currently or previously used by the national or county governments to smallholder farmers was less effective. Notably, even within locations, viewpoints on past governmental outreach performance differed, with ratings ranging from very effective to disagreed as poor. Intra-location dissent highlights the difficulty appeasing all recipients. Comparatively, national-level initiatives only received outright positive commendations within Solio 1 responses versus more mixed commentary elsewhere. This diverges suggests programs face uneven reception contingent on local implementation success.

One key informant said,

"For me it's fair because sometimes they reach some farmers, others they do not. They should improve on how it's done."

From Lamuria Location, Chief Teresa replied, *"While individual officers like the agriculture extension worker partner with us, climate change adaptation could benefit more from synchronized approaches uniting all stakeholders working in the area under one strategic plan."* Equally Assistant Chief Richard concurred saying *"Combined operations combining capacities presents the most coordinate front to tackle barriers and amplify impact through complementary multi-channel dissemination."*

From Tigithi Location a respondent evaluated, *"With strengthened localized implementation addressing these gaps, I'm confident the effectiveness would greatly improve in catalyzing wider resilient transformations beneficial to livelihoods here."*

Further comments revealed national efforts had made fairly positive initial progress in outreach. However, implementation over the long run remained challenged without reliable localized technical systems consistently backing guidance actualization on marginal agricultural lands. When rating effectiveness, Chief Joseph Mwangi said that government efforts were having fair outreach but implementation remained a challenge without reliable localized technical backup consistently actualizing guidance for on-farm decision-making.

Discussions

Effectiveness of communication for policy implementation

The findings are related to literature by Adger, (2003); Lyster, (2011) and Wibowo et al. (2013). Adger (2003) examined how social capital and collective action can influence community adaptation to climate change. The paper found that social networks and cooperative norms can help facilitate knowledge sharing and coordinated adaptive responses to risks. This relates to findings that consistency and tailoring communication to local contexts may improve effectiveness. Lyster (2011) explored issues around transparency, participation and resource rights in REDD+ programs. The paper noted communication difficulties can disrupt coordinated climate action planning. This supports observations that inaccurate or delayed information received by some farmers' undermined adaptation. Wibowo et al. (2013) studied communicating REDD+ issues to local communities in Indonesia. The research found communication efforts there generated both latent and manifest conflicts due to divergent experiences. This aligns with responses showing varied perceptions of effectiveness within and between locations surveyed, depending on individual circumstances.

This heterogeneity of views both within and across locations suggests a "one-size fits all" approach does not satisfy all farmers, as methods may work well for some but not others in close proximity as supported in literature by Adger, (2003), Coulibaly & Fofana, (2017) and Moser & Dilling (2007). Coulibaly and Fofana (2017) explored how external factors differentially impact emerging markets depending on local economic fundamentals. This implies a uniform strategy will not equally address varying regional contexts and development levels. Moser and Dilling (2007) investigated methods for communicating climate change and facilitating social adaptation. The work discussed the need for place-based, participatory approaches to reconcile global directives with grassroots circumstances and plural stakeholder viewpoints. A standardized solution alone would likely overlook such heterogeneity. Overall, improving coordinated, tailorable communication reflective of diverse rural contexts may better serve smallholder farmers in adapting to climate threats (Klein et al., 2014; Schäfer, 2012).

Studies emphasize the need for clear, consistent messages tailored to socio-economic and cultural contexts to ensure relevance and comprehension (Moser, 2017; Muszyńska, 2017). Such disparate experiences point to the nuanced realities of implementation and underscore that communication failures can negatively impact farming decisions and outcomes (McKinney & Harmon, 2007; Zulch, 2014). Research affirms the need for two-way dialogue and feedback to

ensure messages address context-specific challenges and barriers in a timely, consistent manner (Servaes & Malikhao, 2005).

Determination of the Most effective approaches, process and structure

Previous research has found that hands-on learning helps farmers internalize new practices in locally meaningful ways (Coulibaly et al., 2017; Lowder et al., 2016). Comfort with familiar localized communication channels and languages as well as trust in community leadership structures like chiefs and elders emerged as shared themes. Practical yet community-rooted outreach accommodating socio-cultural needs was viewed as most compelling. This is supported by literature by Moser & Dilling (2007) investigated methods for communicating climate change and facilitating social adaptation. The paper discussed the need for place-based, participatory approaches to reconcile global directives with grassroots circumstances and plural stakeholder viewpoints. This emphasizes that one-size-fits-all solutions may not accommodate socio-economic and cultural diversity at local levels. Additionally, Wertz-Kanounnikoff & Angelsen (2009) examined how REDD+ initiatives in developing countries could incorporate local participation for greater effectiveness and equity. The study found implementation impacts are mediated by factors like land tenure systems, wealth distribution and the roles of different institutions within communities. This affirms that even at small territorial scales, diversity in socioeconomic and political contexts shapes how climate policies are experienced on the ground. Perspectives on the key drivers and barriers to actual policy adoption were particularly heterogeneous both within and between the Solio locations. Varying perspectives point to the diverse socioeconomic factors shaping behavior at the local level, even in proximity (Coulibaly & Fofana, 2017; Resosudarmo et al., 2012). Coulibaly & Fofana (2017) explored how external factors differentially impact emerging markets depending on local economic fundamentals, suggesting a uniform strategy will not equally address varying regional contexts and development levels even within small geographic areas. Resosudarmo et al. (2012) examined community-based forestry programs in Indonesia, finding socioeconomic diversity at the local scale shaped participation in unequal ways. Factors like wealth, social relationships and cultural norms created heterogeneity in program impacts between and within villages.

These studies support that diverse socioeconomic realities even in close proximity can yield differing perspectives and behavioral influences. Coulibaly & Fofana (2017) and Resosudarmo et al. (2012) provide evidence that localized socioeconomic differences shape how climate policies and initiatives are socially experienced on the ground. The varying adoption perspectives between the Solio locations thus align with literature showing pluralistic local contexts require nuanced, differentiated approaches. From very likely to average rates of uptake were envisioned based on diverse perceived contributing factors. Such disparities point to the complexity of influencing behavior change and highlight that outreach alone may not suffice without also addressing locally-salient adoption constraints within each region.

Literature establishes that outreach alone may not drive uptake without addressing locally-salient barriers (Adger, 2003; Wertz-Kanounnikoff & Angelsen, 2009). Flexibly addressing diversity appears key to facilitating adaption alongside communication (Bessette, 2006; Servaes & Malikhao, 2005). Adger (2003) found that social and institutional factors also influence how

communities adapt via collective learning and coordinated actions. This suggests outreach must also tackle social and resource barriers to facilitating behavioral change.

Wertz-Kanounnikoff & Angelsen (2009) examined how participation in REDD+ projects depended on reconciling global initiatives with local land systems, wealth distributions, and institutional roles - implicating adaptive community support. Bessette (2006) and Servaes & Malikhao (2005) highlight the importance of culturally-appropriate, participatory communication models for sustained local buy-in that flexibly address pluralistic needs and constraints.

Approval Rating of effectiveness of the proposed framework for policy communication

Differential assessments likewise emerged dependent on administrative strata, with grassroots efforts attracting more criticism than higher-tier interventions possibly due to closer recipient contact. Studies have noted accountability challenges reconciling global aims with localized diversity (Dow & Taylor, 2010; Moser, 2017).

Overall, the broad spectrum of evaluations both between and within locations affirms the complex realities of achieving consistent, equitable results to satisfy plural interests across diverse implementation contexts and governance levels. Greater accountability was implied necessary given performance inconsistencies. The broad spectrum of evaluations affirms achieving equitable, consistent results across diverse implementation contexts requires nuanced, participatory approaches attuned to plural stakeholder perspectives and local empowerment (Bourne, 2016; Wertz-Kanounnikoff & Angelsen, 2009). Bourne (2016) explored communication strategies for promoting agricultural innovations in Malawi. The study emphasized that developing nuanced, participatory models attentive to plural views enhances equitable, consensus-based problem solving suitable to diverse local needs and priorities. Wertz-Kanounnikoff & Angelsen (2009) evaluated community participation in REDD+ projects. The research found that reconciling top-down initiatives with bottom-up input and empowerment via inclusively designed, adaptive frameworks strengthened ownership and impacts on the ground.

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. Results has revealed that delivering consistent, timely information tailored to varied local contexts through integrated, community-driven models that also address socioeconomic barriers to adoption.

Similarly, 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. Incentives and capacity-building initiatives that motivate and 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.

In conclusion coordinated efforts between government agencies, NGOs, research institutions, and private sector stakeholders are essential for ensuring policy coherence and integration. Equally with established 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.

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