
**COMMUNICATING CLIMATE CHANGE ADAPTATION: A
STUDY OF MESSAGES TARGETING SMALLHOLDER
FARMERS IN MACHAKOS COUNTY, KENYA**

***¹Stella Mwihaki Kihara & ²Sr. Justin Nabushawo**

¹Student, Moi University

²Lecturer, Moi University

***Email address of the Corresponding Author: stellamwihakik@gmail.com**

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ABSTRACT

Problem Statement: Despite the widespread dissemination of information on agricultural innovations to combat climate change, the adoption rate among smallholder farmers remains significantly low. This study sought to understand the barriers to effective communication and the design of messages that could potentially enhance farmer engagement and adaptation behaviors.

Purpose of the Study: The purpose of this study was to explore the effectiveness of communication strategies in promoting the adoption of climate change adaptation technologies among smallholder farmers in rural Kenya.

Research Methodology: The study adopted a relativist constructivist paradigm and utilized qualitative research methods, including a case study approach. Data collection involved purposive sampling to select the Katumani area in Machakos for detailed study. Methods included observations at farmer meetings, focus group discussions with farming households, one-on-one interviews with agricultural experts, and analysis of documents such as seasonal weather advisory fliers. An inductive thematic approach was employed for data analysis.

Findings: The research identified a critical gap in the assumptions held by designers of climate messages. The prevailing belief that simply providing information about new technologies is sufficient for adoption was challenged. Instead, findings suggested the need for employing social behavior change communication strategies, particularly those informed by social learning theory, to effectively engage farmers and encourage the adoption of new practices.

Conclusion: The study concluded that the current methods of communicating climate adaptation technologies to smallholder farmers are inadequate.

Keywords: *Climate Change, Adaptation, Messages Targeting, Smallholder Farmers, Machakos County*

INTRODUCTION

Globally, communication has been recognized as one of the main tools to drive the adaptation of farming options in the face of climate variabilities. This is because communication, and more so, social behavior changes communication approaches, ensure that message appeals build the determination to change from the old way of doing things (Mashizha, 2019). However, the effectiveness of communication in disseminating information on climate change adaptation technologies to rural farmers in Kenya remains a challenge. Despite the increasing availability of information on new agricultural innovations to help farmers adapt to climate change, the rate of change among farmers remains disappointingly low. One possible explanation for this is that the design and communication of climate change technology messages are not effectively reaching and resonating with smallholder farmers.

In the past, efforts to communicate climate change were focused on disseminating information rather than improving the understanding of adaptation challenges, raising awareness of adaptation pathways, encouraging dialogue, or influencing behavior change. Indeed, in developing countries, the issue of climate change communication presents itself as a unique challenge, whereby communicators are confronted not only by the complex convergence of scientific, practitioner, and traditional knowledge systems (Naess, 2013, cited by McGahey & Lumosi, 2018), but also sensitivities surrounding power dynamics which render such communication a linear process. Messages, therefore, come from the center to the periphery – with no options for feedback or dialogue. That is why Harvey et. al., (2012) contend that some climate communications processes can serve to unintentionally legitimize or prioritize certain forms of knowledge and in doing so reinforce structural power relationships. Being a linear process, the messages and the transmission modes are centered not on the recipients but the agents of change. This challenge is particularly prevalent in semi-arid developing world regions, which have been identified as zones of historic marginalization, with acute human vulnerability to climate change (Wilby et al. 2009; Tucker et al. 2015).

This raises questions about how effective current communications efforts in the global south, and specifically its semi-arid regions, are at influencing changes in perception and social change around climate change adaptation. However, there has been a shift in climate change

communication over the past decade because many studies have shown that effective communication must move beyond simply providing information to include raising awareness and starting active public engagement if change is to take place (Moser 2010; Nerlich, et al. 2010; Russill & Nyssa 2009).

LITERATURE REVIEW AND THEORY

In his study on factors that lead to the successful implementation of projects in Africa, Gregory found out among other things that community participatory communication approaches have been key to both individual and social behavior change interventions across sectors in various African contexts. Further, he noted that consistently poor outcomes and failures in top-down, unidirectional SBCC approaches fail to sufficiently include local actors. Yet, he noted, community participatory approaches have proved effective in achieving outcomes in emergency settings, even in fragile contexts. Climate change adaptation is a fragile and emergency context that can use this approach to bring change. His study therefore concluded that effective SBCC begins and ends at the community level. Even when national SBCC campaigns occur, the messages that are projected at national levels must resonate at the local level, he says. This requires investments in formative research to learn from the target audiences what values and social norms to appeal to. Further, community leaders must be engaged and feel that they are full partners in the effort to improve the lives of community members.

To further emphasize this point, Bharwani, Davis and Vulturius (2016) claim that while climate communication approaches expend significant resources promoting attitudinal change, research suggests that encouraging attitudinal change alone is unlikely to be effective. They claim that there is a link between an individual's attitudes and subsequent behavior which is influenced by factors such as social norms. Hence, they claim that such communication approaches that advocate individual, voluntary action and ignore social norms and other social influences are an impediment to behavior change. Most climate communication efforts today target individuals, aiming to change their personal attitudes, intentions, and behavior, yet these individuals are part of a social group with values and norms that may run counter to these messages and reduce their impact. Psychological research shows that individuals will always seek information that confirms their existing views and those of the social group they wish to belong to (Kahan et al., 2011). Based on

the social learning theory, message designers must therefore understand their end users' needs and tailor messages appropriately. They must design relevant and actionable messages. As per the social learning theory, to do this, they need to co-produce and co-explore with users and apply peer-learning approaches. The result of such a process would be to build trust.

Although its use in climate change adaptation is new, the theory has received increasing attention as an approach to tackling the complex problem of human-induced climate change (Collins & Ison 2009, Pahl-Wostl et al. 2008, cited by Ensor & Harvey, 2015). Many existing theories on knowledge production lack a clear connection with learning processes (Morey & Thuraisingham 2000, cited by Ensor, 2012). But this theory was chosen for this study because it is a theory that gives a clear connection between knowledge production and the learning processes, hence acting as a good reference point when addressing the potential for social learning to address complex, interconnected social and environmental challenges, such as climate change adaptation. No wonder, therefore, that social learning is receiving increasing attention in research and practice (Ensor & Harvey, 2015). The literature reviewed on the role of SBCC and specifically, the social learning theory to facilitate in designing and communicating climate adaptation messages paved the way for this study.

RESEARCH METHODOLOGY

This qualitative study used purposive sampling to select small-scale farmers (1-3 acres) in the semi-arid region of Katumani, Machakos County, Kenya, an area facing climate change challenges where agricultural research institutions and partners promote climate-adaptive technologies. Focus groups and in-depth interviews were conducted with farmer groups associated with the Kenya Agricultural & Livestock Research Organization (KARLO) and other local organizations. The groups were selected based on their active engagement with agricultural innovation dissemination efforts, including on-farm demonstrations. During the focus groups, a seasonal weather advisory flier summarizing recommended farming activities based on climate forecasts was discussed to understand how the packaging, design, and delivery of such adaptation messages inform farmers' attitudes and adoption of climate-resilient technologies. The researcher also observed technology transfer meetings between agricultural experts and farmers.

RESULTS

There are three major critical factors that characterize and influence the way the climate change adaptation messages are designed and communicated to small holder farmers. These are: the top-down nature of message designing; the technical language and poor packaging of the advisory that is hindering understanding of messages; and female farmers are left out of messaging since message dissemination tools are not farmer centered. All participants, including farmers, message designers, and extension actors, agree that the messaging process is top-down. Messages are typically created and disseminated in a hierarchical order, beginning at the regional level, progressing to the national level, and ending at the county level. At the national level, the Kenya Meteorological Department issues a forecast that is then tailored to different locations. Therefore, according to message designers, climate adaptation messages are developed by technical professionals and scientists, starting at the top and cascading down to the farming community. One of the message designers said, *“the conversation starts from the regional level, that is the Great Horn of Africa. In this season already the technical people are in Kampala doing the regional forecast - we call it the Great Horn of Africa”* (MO).

The message designers pointed out that during a workshop known as a Participatory Scenario Planning (PSP), the national weather advisory board is discussed by crop scientists, extensionists and livestock officers. In addition, farmers are invited to that meeting, where a local advisory board is prepared. Although the message designers believe that they involve the farmers during the PSP, the farmers do not perceive themselves as people who contribute to the climate change messages. It emerged that the message designers invite elitist farmers or male leaders to the PSP and not the real farmers who work on the land, especially the female farmers.

“...the various technical people from different sectors like livestock, agriculture and fisheries sit and decide the fate of farming based on the weather forecast. They recommend the technologies for the season, e.g., right varieties of plants and other farming options to adopt that season. So, from the forecast they can see what impacts the rainfall will have (MO).”

The study also revealed that farmers and the agricultural officers see this whole process as ‘belonging’ to some experts in Nairobi. For example, asked what carries the day if there is a

dissonance between traditional knowledge and the scientific knowledge, the message developer says the scientific forecast carries the day. A farmer in FDG 5 also concurs, *“the pace of using the new technologies is slow because most of the discussions and functions related to farming and climate change take place in hotels, far away from where farming is taking place. These experts do not even come back to farmers to explain what they discussed”* (FGD4:2).

Despite women being the primary workforce in agricultural activities, they often face challenges due to low literacy levels. Consequently, there is a significant breakdown in communication, particularly affecting elderly and women in general, who struggle with understanding technical language and English. In a focus group discussion, an elderly woman expressed her reliance on others, such as group members or grandchildren, to interpret the content of flyers for her. In response to this issue, one female participant suggested that scientists often fail to communicate in a simple manner, advocating for the use of diagrams and pictures to enhance comprehension. Additionally, a young man from another focus group emphasized the importance of using clear photos to illustrate new crop varieties, proposing a more user-friendly approach to flyer design. As far as the message designing is concerned, therefore, it emerged that farmers did not take ownership of the messages and felt they belonged to the meteorological people since it came from them. Some of the languages mentioned include: i) fonts were too small, especially for elderly who cannot read small fonts ii) the lack of visual illustration made it a tedious exercise reading it, iii) the language was too technical, and they did not understand some of the proposed technologies, like food crops due to the difficult language. Tailoring the information to their needs is therefore important if adaptation is to take place. It emerged that farmers ultimately do not trust the messages and the messengers due to the above factors, yet for adaptation to take place, there must be trust.

Regarding the communication tools utilized to convey information about new adaptation options, respondents identified three primary modes: weather advisory flyers, radio advisories, and demonstrations or farmer-to-farmer meetings attended by extensionists. The respondents explained that the main dissemination tools, namely the weather advisory and radio advisory were not farmer centered, yet these messaging tools are specifically designed to help farmers in their farms day to day farming activities. Weather advisory leaflets are displayed on notice boards within agricultural

offices, intended for farmers to read during their visits. However, discussion with during the focus group sessions revealed that most farmers had never seen these leaflets before. This revelation revealed a stark reality: agricultural office visits are still rare, with only a small percentage—ranging from 100 to 200 individuals per season—having access to this critical information. As a result, a big gap in the distribution of climate change materials remains. Farmers expressed a pressing need for a dependable tool to help them make daily farm decisions, which was exacerbated by the unpredictable nature of weather.

Another significant finding revealed that seasonal weather advisory information is broadcasted over an interactive session on radio stations known as *Mbaitu* FM and *Musyi* FM. The Meteorological officers and the extension officers actively participate in these broadcasts, which are conducted in the Kikamba language. The content disseminated encompasses crucial information such as the timing, duration, and distribution of rainfall within the county, along with recommendations regarding suitable seeds and crops to plant based on the prevailing weather forecast. This approach is meant to ensure delivery of climate adaptation messages directly to farmers, using their language preferences for comprehension. Amidst the efforts to disseminate climate-related information via radio broadcasts, a notable challenge arises due to farmers' inconsistent engagement with farming programs on radio. This inconsistency stems from various factors, notably the government's rural electrification initiative, which has spurred a preference for television over radio. Farmers express a preference for television due to its visual and entertaining nature, which offers a respite from the rigors of farming. Additionally, the competition between radio and TV timings further complicates farmers' listening habits, often leading to TV prevailing over radio. Consequently, the freedom afforded by airwaves presents a double-edged sword, as farmers struggle to keep track of pertinent programs amidst the plethora of options. As a result, the listening of radio programs on agriculture emerges as sporadic, highlighting the need for innovative approaches to ensure consistent and effective dissemination of vital information to farmers.

From the in-depth interview, one's female farmer (ID2 from the shop) has this to say- "*There are very many stations nowadays. Maybe by the time I tune into a station, the program is over because I was on another station. So, by the time I come back, the agricultural program is over*" (ID 2).

A noteworthy finding reveals that the majority of farmers exhibit a lack of awareness regarding the existence of radio weather advisories. For instance, one woman expressed surprise upon learning that *Mbaitu* FM, the primary radio station broadcasting in *Kikamba*, provides information on farming. This lack of awareness indicates a significant portion of farmers may not tune in to seasonal weather advisory broadcasts or other programs offering guidance on improved farming technologies. Moreover, our research uncovered that radio lacks an immediate feedback mechanism, limiting farmers' ability to provide timely feedback on the performance of new technologies. The absence of a mechanism for interaction or follow-up with radio presenters inhibits farmers from offering instant feedback on the efficacy of recommended agricultural products. This underscores a gap in communication channels, hindering the potential for dialogue and constructive engagement between farmers and broadcasters.

A significant finding of the study underscores the overwhelming preference among farmers for demonstrations and face-to-face meetings as the most effective channels for communicating climate-related messages. This preference stems from the interactive nature of such engagements, which are perceived as informal and conducive to open dialogue in the farmers' local language. In one of the demonstration meetings observed during the research, the extensionist slowly explains a new weed management approach where a lot of interaction was observed as farmers asked questions and engaged animatedly with him. They appreciated the conversational style. He breaks down content in simple terms, and each of the 15-group member's voice is heard. The extensionist has an opportunity to study their facial expressions to see if they understand and asks them for feedback – just to clarify if they do understand what he is saying.

Furthermore, the demonstration sessions encourage peer-to-peer learning, with fellow farmers in the group stepping in to explain concepts if the expert is having difficulty. During the observation, I noted how the experiential learning component of the demonstrations is invaluable. The 'expert' removes some herbicides from his bag, holds them up and explains their purpose to the farmers. The herbicides are passed around for farmers to touch and read for themselves and ask questions. The expert then leads them to the 'trial' plot where the farmer has planted '*ndengu*' (green gram). He puts down the spraying equipment, asks some two farmers to mix the herbicides with water as others watch – while another farmer is reading the label for instruction. He then directs the two

farmers to spray the weeds as others watch. All this while, conversation about different issues is going on. Farmers are asking questions, joking, and laughing around, while developing their critical thinking and decision-making skills since they are expected. Talking about the effectiveness of farm demonstrations, one farmer has this to say:

“It is just how they used to explain that recently prompted me to plant drought resistant crops and try new ways that would help me deal with the emerging climate change related challenges. The agricultural officers showed us, for example, how to dig the holes (zai-pits), put manure, mix soil, and use a rope to measure the distance between plants. These were techniques of planting in the dry season or when the rains are scarce. During the demonstration, I and my peers can touch the soil and plant seeds on the plot (FGD 2:1)”

Instant feedback mechanisms available in farmer field days/demonstrations stood out as a key pillar in sharing of messages; meaning the participatory method was appreciated. A notable finding from the research is the entrenched negative perceptions towards new drought-resistant crops and technologies, such as sorghum and cassava, are deeply rooted in cultural beliefs. Despite the potential of these crops to enhance resilience in harsh conditions, farmers resist their adoption due to ingrained cultural attitudes. Sorghum, for instance, is considered "a poor man's meal," and cassava is dismissed as food fit only for livestock. This resistance was exemplified when farmers rejected cassava seedlings promoted by a non-governmental organization, citing beliefs that goat milk should be reserved for its young, not for human consumption. Furthermore, maize holds a privileged status as the sole staple crop, referred to as "liu" or food, while other crops like cassava and sorghum are derogatorily labeled as "kivulani" or snacks. This finding underscores the significant cultural barriers hindering the adoption of resilient agricultural practices and highlights the need for culturally sensitive approaches to promote the acceptance and utilization of alternative crops among smallholder farmers in Machakos. Even more important, the finding points to the need to listen to farmers as the messages are being designed.

DISCUSSIONS

Smallholder farmers in Machakos, like most of sub-Saharan Africa, rely on rain-fed agriculture. Over time, they have adjusted their planting patterns and farming calendars to match the onset, duration, and end of the rainy seasons. However, due to changing rainfall patterns caused by climate change, their planting patterns and farming calendars no longer align with the seasonal rainfall distributions, often leading to crop losses. Researchers, scientists, and climate adaptation message designers assume that providing information on new technologies is sufficient for mitigating these changes. They expect farmers to read weather advisories, listen to messages about new technologies on the radio, and adapt accordingly. Consequently, their programs focus on providing information to fill the perceived knowledge gap.

This top-down communication approach, where knowledge producers control the messages and channels, aligns with the historical "banking model" of communication for development, as described by Freire (1970). In this model, knowledge transmission occurs through one-way delivery of data and information, reinforcing power structures and creating knowledge monopolies within societies. Wilson (2001, cited by Ensor and Harvey, 2015) argues that those encouraging social and behavioral changes, like climate change mitigation and adaptation, must critically analyze these politics of knowledge production and encourage the alteration of power relations embedded in learning. One way to make power dynamics more equitable is through shared or dialogical approaches to knowledge production, as illustrated in social learning theory. This process encourages discussion among various voices within a community, leading to the co-production of new knowledge that draws from a breadth of understanding of development challenges.

The study recommends refining demonstrations and other participatory approaches to message dissemination, emphasizing face-to-face communication as a key part of encouraging social learning. Collaborative learning tools that provide feedback functions can enable such collaborative learning. Message designers need to engage with farmers genuinely through their preferred communication channels. The Social Learning Theory, An HC3 Research Primer (accessed 10 November 2021), recommends using social learning principles to demonstrate how people can overcome challenges and succeed, as people tend to adopt behaviors, they observe others doing. The study further recommends designing climate adaptation messages after an in-

depth understanding of the intended audience, known as promoting a sense of self-efficacy in social learning. This involves placing people at the center of planning, implementation, and evaluation of new practices, creating a sense of collective empowerment and trust with system actors. Effective message design cannot be delegated solely to experts but should involve communication experts who bring in the audience's needs and professionals with facilitation skills that lean towards collective learning processes.

CONCLUSION

Upon analyzing the communication activities aimed at promoting adaptation practices among smallholder farmers, the study unveiled a significant conclusion that the conventional top-down and linear messaging approach has proven to be a hindrance to effective climate change adaptation. While farmers believe and have experienced climate change, ignoring their cultural and religious beliefs about the source being divine and beyond their control is a hindrance to adaptation. Furthermore, farmers claim that the new drought-resistant crops are not acceptable to their families, and due to cultural norms, gender disparities have emerged as a significant issue, with women—a significant farming demographic—frequently excluded from the messaging process. Therefore, to address these challenges, climate adaptation demands a shift in messaging that emphasizes participatory, farmer-centered approaches, taking into account the farmers' cultural and religious beliefs, as well as their preferences for crop varieties, and ensuring inclusive engagement of all members of the farming community, including women, in the communication and decision-making processes.

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