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Assessing the Integration of Farmer Socio-Cultural Context in the Diffusion of Improved Maize Varieties in the Semi-Arid Lower Eastern Kenya

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Abstract

Purpose: The purpose of this study was to evaluate the extent of the integration of farmer socio-cultural context in the diffusion of improved maize varieties in the Semi-Arid Lower Eastern Kenya. Qualitative data was collected from farmers, agricultural scientists, agricultural extension officers and documents.

Materials and Methods: It was analysed using a thematic analysis method and with apriori themes developed by the researcher from the literature, principles of participatory communication approaches and the concerns of the research questions.

Findings: The study results revealed several key issues which include, Selection bias: The selection process for farmer participants in the diffusion activities was biased, favouring those with higher socio-economic status and the role of agricultural extension officers, key actors in the agricultural sector, was ignored. Overlooking farmer values on maize: The communication methods employed could not facilitate the tapping of the values farmers place on maize as a crucial food source. Neglecting farmer knowledge and perceptions: There was lack of dialogic interactions to leverage farmers' existing knowledge about farming conditions and their perceptions.

Unique Contribution to Theory, Practice and Policy: The study recommends, Inclusive Participant Selection: Innovators in agriculture should ensure a more balanced selection of stakeholders through participatory approaches to ensure the inclusion of farmers from various socio-economic backgrounds as well as agricultural extension officers who are key players in agriculture. This will facilitate a more comprehensive understanding of the diverse information needs, existing community knowledge and perceptions. Value-centric communication: Communication activities should be designed actively with the involvement of stakeholders and should provide avenues for farmers to voice the values they associate with foods and their traditional agricultural practices. This can help tailor agricultural innovations to better meet their needs and preferences. Leverage farmers' existing knowledge about farming: Innovators in agriculture should establish platforms for dialogic interaction where farmers can share their knowledge and perceptions about farming conditions and agricultural innovations. This can enhance the relevance and effectiveness of innovative agricultural practices by integrating local insights.

Keywords: *Participatory Communication, Agricultural Innovations, Farmer Values, Dialogic Interaction, Local Knowledge, Communication Strategies, Participant Engagement*

JEL Codes: *O13, O22, D78, Z13, L31*

INTRODUCTION

Central to the application of the participatory communication approach in the diffusion of innovations is the socio- cultural context of the community for which the development initiative is indented. The importance of taking into account the socio-cultural context stems from the recognition that members of a community are not passive recipients of information but active evaluators whose decisions are shaped by deeply held values, norms, and cultural traditions (Freire, 1970). This reflects a move away from top-down, linear models of information transfer toward dialogical, people-cantered approaches that value local knowledge and experiences. Research has shown that when innovators acknowledge and respect a community's cultural context, they are more likely to design culturally resonant messages, select appropriate communication channels, and co-develop innovations that are relevant and acceptable to the community (Curry et al., 2021; European Commission, 2021).

Community sociocultural context influences how agricultural innovations are perceived, prioritized, and adopted by farmers. The sociocultural context also shapes attitudes toward risk, change, technology, and gender roles in production systems; factors that ultimately determine the success or failure of innovation diffusion (Rao et al., 1995; Kuehne et al., 2017). In participatory communication, key cultural barriers to adoption often include rigid gender norms that limit who can speak or be heard in public forums, and communal decision-making traditions that may resist externally introduced communication tools or processes perceived as disrupting collective harmony (UN-Women, 2023). These factors can significantly shape how communities engage with and accept participatory approaches.

In Kenya, the Kenya Agricultural and Livestock Research Organization (KALRO) has acknowledged the significance of the sociocultural context in its innovation dissemination efforts. This commitment is articulated in KALRO's 2017–2021 Strategic Plan, which calls for tailoring communication and extension strategies to align with farmers' cultural realities. Such alignment is particularly important in the semi-arid region of Lower Eastern Kenya, where climate variability, especially erratic rainfall, makes the adoption of improved maize varieties critical to achieving household food security.

However, despite strong policy support and the availability of technically sound maize varieties developed by KALRO and its partners, adoption rates in the region remain low, consistently under 30% (Mbithi, 1972; De Groote, 2005; Bett et al., 2017). This disconnect raises important questions for communication scholars and practitioners. According to Van de Fliert (2010), when participatory communication is employed yet adoption rates remain low, the underlying issue often lies in the inappropriate application of the participatory communication approach itself. This highlights the need to critically assess how participatory communication is implemented and whether it meaningfully incorporates the cultural context of the farmers for whom it seeks to innovate.

Purpose of the Study

This study investigated the extent to which the sociocultural context of farmers was integrated into the diffusion of KALRO improved maize varieties in the semi-arid region of Lower Eastern Kenya. Specifically, it sought to answer the research question:

To what extent was the farmers' sociocultural contest taken into account in the diffusion of improved maize?

Unlike previous studies, this research adopted a qualitative approach to provide deeper insights into farmers' experiences, perceptions and attitudes toward the diffusion activities. Framing the

investigation within the lens of communication for development, the study contributes to scholarship in communication studies by offering a more critical assessment of the implementation process specifically the methods of selecting participants to ensure diversity of voices through inclusion and the degree to which the communication strategies were able to tap into farmers' values, knowledge and perceptions. Its findings are expected to inform the design of more culturally responsive communication interventions, enhancing not only the adoption rates of agricultural innovations but also enhancing the livelihoods of farmers.

THEORETICAL REVIEW

This study is anchored on two complementary theoretical frameworks: Diffusion of Innovations Theory (Rogers, 2003) and Paulo Freire's Theory of Dialogical Action (1974). These theories provide an integrated perspective to analyse stakeholder involvement in the diffusion of KALRO improved maize varieties in semi-arid Lower Eastern Kenya. Diffusion of Innovations Theory systematically explains how innovations spread through a social system, emphasizing the role of communication channels, social norms, and adopters' perceptions. Freire's Theory of Dialogical Action, on the other hand, introduces a participatory dimension, highlighting the importance of dialogue, reflection, and critical consciousness in fostering locally driven adoption. Combined, these theories offer a comprehensive framework to assess stakeholder participation in the diffusion of KALRO improved maize varieties.

Diffusion of Innovations Theory

Diffusion of Innovations Theory, developed by Rogers (2003), explains how, why, and at what rate new ideas or technologies spread within a society. Rogers (2003) defines diffusion as the process by which an innovation is communicated over time through specific channels among members of a social system. An innovation, as conceptualized by Rogers (2003), refers to any idea, practice, or object perceived as new by an individual. The adoption of an innovation follows a process involving information-seeking and information-processing activities. Rogers (2003) outlines five stages in the innovation-decision process:

i. Knowledge: Individuals become aware of an innovation but lack sufficient information to make a decision.
ii. Persuasion: Individuals actively seek information and form opinions about the innovation.
iii. Decision: Individuals evaluate the innovation and decide whether to adopt or reject it.
iv. Implementation: The innovation is put into use, sometimes with modifications to suit specific needs.
v. Confirmation: Individuals assess the continued use of the innovation, either reinforcing their decision or discontinuing its use.

The successful diffusion of an innovation depends on communication channels, which facilitate information exchange and shape individuals' perceptions of the innovation. The structure of the social system also plays a crucial role, influencing the rate at which innovations spread. Rogers (2003) asserts that factors such as previous practices, community norms, and felt needs influence an individual's willingness to adopt innovations. Bessette (2004) adds that purposive dissemination, or designing for diffusion, can enhance the chances of innovation adoption by ensuring that the innovation aligns with local values and social structures.

Freire's Theory of Dialogical Action

Freire's Theory of Dialogical Action (1974), rooted in participatory communication theories, and emphasizes interactive, two-way communication as a means to empower stakeholders in

the development and diffusion of innovations. Many researchers and practitioners regard this theory as the foundation of participatory communication approaches to diffusion and adoption of innovations (Mefalopulos, 2008; Cornish & Dunn, 2009). Freire (1968) developed this theory in response to the top-down, authoritarian communication methods prevalent in educational systems in Brazil and Chile. He argued that true education should be liberating, engaging both students and teachers in dialogue to facilitate meaningful learning (Melkote & Steeves, 2001; Micheletti, 2010). Freire (1974) distinguishes between dialogical actions, which promote understanding, cultural creation, and liberation, and non-dialogical actions, which distort communication and suppress creativity. According to Freire (1970), dialogical communication is a tool that enhances individuals' capacity for reflection on their own living conditions. This reflection fosters active participation and commitment to the change process, thereby enhancing the effectiveness of innovation diffusion.

The key concepts of Freire's theory of dialogic action are:

i. Dialogue: Free and open dialogue is the main concept of participatory communication. Dialogue allows the sharing of information, perceptions and opinions among the various stakeholders, thereby facilitates their empowerment. It is not just the exchange of information and experiences: it is also the exploration and generation of new knowledge aimed at addressing situations that need to be improved.
ii. Conscientization: Another key concept in Freire's approach is conscientization, ways in which individuals and communities develop a critical understanding of their social reality through reflection and action. This involves examining and acting on the root causes of oppression as experienced in the here and now. Conscientization should be learned through teaching based on dialogue and communication; a dialogue that should be between participants engaged in critical thinking. The process of developing a critical awareness of one's social reality through reflection and action is fundamental because it is the process of changing the reality.
iii. Ownership: Freire noted that, without dialogue, people accept content in a passive way and they rarely reflect on them as validity of the knowledge. Dialogue enables partners in an initiative to become deliberate, goal-seeking participants and therefore owners of an initiative.
iv. Praxis: Finally, there is praxis which is the act of engaging, applying and exercising, the new ideas. It is the culmination of dialogue, conscientization and ownership of an initiative by a community.

In the diffusion of agricultural innovations. Freire's dialogical approach fosters participatory engagement, allowing farmers and innovators to exchange knowledge and make collective decisions unlike the linear diffusion model, which depends on mass media and opinion leaders to persuade end user to adopt innovations, By incorporating these principles, approaches to diffusion of agricultural innovations can move beyond top-down models toward more inclusive, participatory frameworks. This approach ensures that stakeholders actively contribute to both the diffusion and sustainability of implementation of innovations. In the context of KALRO improved maize varieties in the semi-arid Lower Eastern Kenya, this framework provides a valuable lens for analysing stakeholder involvement in the diffusion process.

In examining the diffusion of KALRO-improved maize varieties in the semi-arid region of Lower Eastern Kenya, this framework integrating the principles of diffusion of Innovation theory and Freire's theory of Dialogical action offers a robust analytical lens for understanding stakeholder engagement throughout the diffusion process.

MATERIALS AND METHODS

Participant Selection and Data Collection

This study utilized an explanatory research design, targeting farmers who belong to farmer groups that participated in the Kenya Cereal Enhancement Programme-Climate Resilient Agriculture Livelihoods (KCEP-CRAL) in Lower Eastern Kenya, specifically in Machakos and Makueni, counties. The target population also included agricultural extension officers working in these counties as well as agricultural scientists. Purposive sampling was employed to select participants who could provide valuable insights into the sociocultural context of farmer participants involved in the diffusion activities of the improved maize seeds. Farmer focus group discussion (FGD) participants were drawn from individual members of the farmer groups. In total, 12 FGDs were conducted, and 11 extension officers from the selected areas were purposively chosen for interviews. The overall participant pool comprised 125 individuals, including farmer FGD participants, scientists, and Agricultural Extension Officers (AEOs). Table 1 below provides a detailed summary of the total number of farmers involved in FGDs and AEO interviewees, along with the specific areas covered. Purposive sampling was particularly appropriate for this study as it enabled the inclusion of individuals who were knowledgeable and directly engaged in the communication and diffusion processes of improved maize varieties. By selecting participants based on specific characteristics and their relevance to the research focus, the study ensured that the data collected would be rich and contextually relevant.

The research employed qualitative data collection methods, including FGDs, in-depth interviews, and document analysis, to gather comprehensive insights. The data were analysed using a thematic analysis method guided by apriori themes developed by the researcher from the literature, principles of participatory communication approaches and the concerns of the research questions. The themes are:

i. Process of selection of farmer participants
ii. Tapping farmer values
iii. Farmer existing knowledge and perceptions.

Table 1: AEOs and Agricultural Scientist Interviewees and Farmer Focus Group Discussion Participants by Location and Gender

Sub County	No of FGDs	No. of Participants	No. of Participants	Total no. of Participants
		Men	Women	
Makueni	6	18	36	54
Yatta	4	12	22	34
Mbooni	2	7	16	23
Subtotal	**12**	**37**	**74**	**111**
AEOs	--	--	--	11
AS	--	--	--	3
Total	**12**	**37**	**74**	**125**

Data Collection and Analysis Methods

Data was collected using FGDs, in-depth interviews and documents analysis.

Participant Coding

Participants were sequentially assigned numbers with abbreviations depending on their occupations for professionals, thus. AS01-03 for Agricultural scientists and AEO 01 – 11 for Agricultural Extension Officers. Farmer were identified with letters FGD (for focus group discussion) followed by numbering denoting the specific focus group. Sequel numbering followed the gender identification (M for men or W for women), for instance FGD 6, M01.

Thematic Analysis of Data

The findings were analyzed using thematic analysis, guided by the apriori themes derived from the research questions, as shown in Table 2.

Table 2: Research Questions (RQ) and Apriori Themes

RQ1)	Themes
To what extent was the sociocultural context of farmers taken into account in the diffusion of improved maize varieties in the semi-arid regions of Lower Eastern Kenya.	• Process of selection of farmer participants • Tapping farmer values. • Farmer existing knowledge and perceptions

FINDINGS

The following are the findings of the analysis of the qualitative data on the evaluation of the extent to which the sociocultural context of farmers was taken into account in the diffusion of improved maize varieties in the semi-arid regions of Lower Eastern Kenya.

Process of Selection of Farmer Participants

The study explored the process of selection of farmer participants and focused on establishing whether community segmentation was done to ensure that socio-economic factors such as age, gender, education, and socio-economic status of farmers were taken into account in the selection of participants. The process of selection of participants in a communication initiative influences the diversity of voices within the communication activities which has an impact on horizontal communication networks impacting on the diffusion process.

Bias in Participant Selection Process

Responses from the discussion groups revealed that no segmentation of the community was conducted by the agricultural scientists implying that the identification and selection of farmer participants for the maize seed development and dissemination activities was not systematically facilitated. Most participants' comments indicated bias in the selection process. An example is this comment of a discussant in one focus group who explained how they were selected to host on-farm demonstrations:

'Their concern is reliability. So, farmers who are reliable and already well known in the community are selected to take part in the trials. Like our chairlady is called because she is known. She is involved in many other community activities.' - (FGD 02, W04)

A statement by an extension officer agreed with this when he stated:

"Scientists prefer to work with farmers who have large tracks of land for use on condition that they are willing and the farms are accessible and that they must belong to a farmer group so that the members of the group will be involved in land preparation, planting and monitoring." - (AEO, 01, Interviews)

The statement was echoed by another officer who stated:

'Characteristics of the farmers [that participated] were identified by the researcher; from my experience, I have seen, they work with lead farmers who have big pieces of land.' – (AEO, 05)

Repeated use of Farmer Groups

In some cases, breeders repeatedly used the same farmer groups because of their dependency and assurance that they will deliver results. This is illustrated by a statement made by a participant who explained:

"As I said, we had been working with a researcher on another activity and he gave our contacts to his colleague who needed a group to work with."- (FGD 03, W 02)

The repeated use of the same farmers by the scientists in the development and dissemination activities was confirmed by an agricultural extension officer who stated:

"Once the researchers have worked with a group, they keep recommending them to others. As a result, you may find some farms are used for testing various farm innovations" (AEO 5)

These insights suggest that the selection process of the participants was influenced by reliability of the farmers for the convenience of the scientists as well as availability of land rather than a structured communication appraisal, potentially impacting the inclusivity and representativeness of the participants. As a result, the initiative failed to identify the horizontal communication networks that existed in the community which would facilitate self-propelling diffusion of the innovation. Similarly, repeated use of the same farmers suggests the need for convenience by the researchers and thus defeats the principles of participatory communication approach as the community is not genuinely involved.

Exclusion of Agricultural Extension Officers

Despite being key stakeholders, many agricultural extension officers stated that they were excluded from the maize seed diffusion activities. As a result, their statements indicated that they often did not know the criteria that was used by the researchers to select participants and that they felt that they were left out of the process. In the rare circumstances that they were involved, their role was usually limited to logistical support.

One officer explained:

"I don't know how they do the selection of farmers for participation in their demos. I have never been asked... I have never been involved. I guess they may have the need to save time."- (AEO, 06 Interviews)

In instances where they were consulted, their involvement was limited. An extension officer said:

"I was once asked by a researcher to assist him get farmers who could attend an on-station demo. And I was given the criteria on the kind of farmers to invite. I was also given a specific number of farmers to invite." - (AEO, 01 Interviews)

Scientists' Selection Criteria

According to a scientist (AS02), the selection of participants is based on several factors:

"For on farm trials, choice of whose farm we do trials in is based on how the farmers interact with others; we prefer farmers who have good interactions with others. And they are known by the extension officers. We identify farms for planting demo crops, then farmers are regularly invited to observe the progress and learn at every stage. If materials are sufficient, they are given to as many farmers as possible so that they can critique and give their reasons" - (AS 01)

Overall, these findings highlight significant issues in the selection process of participants for on-farm demonstrations, one of the key communication channels preferred by the scientists. Socio-economic status played a crucial role and the reliance on referrals and non-participatory selection methods may have led to a biased sample that could not adequately represent the diverse farming community. The lack of segmentation of the community resulted in a skewed representation which could have potentially affected the diffusion of the improved maize as it could not fully tap the true communication needs of farmers in Lower Eastern Kenya. This non-inclusive approach also risked missing out on existing horizontal communication channels, which are vital for effective communication activities. Similarly, the exclusion of agricultural extension officers, key actors in agriculture, could alienate them as they could not develop a sense of ownership of the activities. Ownership of an initiative is developed through participation in communication activities and is essential for effective diffusion of innovations This approach would be described as passive participation in the Pretty's (2006) Typology of Participation where stakeholders are merely informed about decisions that have been taken rather than being actively involved. The importance of involving all socio-economic segments in participatory communication is underscored by the realization that socio-economic differences significantly impact how information is understood and responded to. This conclusion is supported by similar findings in other studies, such as those by Tufte and Mefalopulos (2009) and Maharani (2013), who observed that community involvement in a project in Indonesia was often merely consultative rather than genuinely participatory.

Farmer Values on Maize

This study also aimed to determine whether the communication activities among stakeholders in the diffusion process of KALRO improved maize varieties facilitated sufficient dialogue to capture community values regarding maize. The values a community places on food influence their farming priorities. According Tanko and Ismaila, (2021), cultural factors are particularly important constraints to the adoption of farm technology in sub-Saharan Africa where adoption of farm innovations is influenced by practices, belief systems, values, community history and experience. Community food values also determine the roles each gender plays in the production of food. Indeed, according to Internal Labour Organization, (ILO) (2022) because of traditional gender roles, women control 60 per cent of farm decisions and work in sub-Saharan Africa. Farmer values are imbedded in their culture and norms and they act as a barrier to information that is incompatible.

Rao et al (1995) states that the scientist with an agricultural innovation has to be keen to pick up signals and information from the farmers that show farmer values when developing messages, and while planning to disseminate them to the farmers. In a paper, "Predicting farmer uptake of new agricultural practices: A tool for research, extension and policy", Kuehne etal, (2017) state that the rate of adoption of an agricultural innovation has a high relationship with its combability with a community's values.

Community Food Values on Maize

From the farmer responses in the study area, it was evident that these communication activities were more focused on advancing the scientists' research interests as there was no dialogic interaction to tap farmer values on maize. A farmer commented:

"In demonstration farms, we discuss what is displayed. We do not talk about other things that we may desire to see in maize seeds. For example, we have Kikamba maize which is important to us… it cannot be compared with improved varieties when it comes to taste. Also, it is solid

and doesn't crush when you make muthokoi (traditional food). You cannot raise these issues during demonstrations." (FGD 01, W 01)

Another farmer added:

"There is no room for us to tell them (the researchers) what we like. We only meet them during demos where we do evaluations… It is true ugali of Kikamba maize is also very tasty… its flour also lasts longer." (FGD 01, W 07)

A third farmer shared:

"When we are evaluating the varieties, we are guided by what we can see – how quick it has taken to flower… It is not about other qualities you may like. Because of that, even when I plant improved maize, I reserve a space for Kikamba maize for my family. Kikamba cooks nicely. The husk doesn't come off like with the new varieties." (FGD 06, W 01)

An agricultural extension officer also echoed these sentiments:

"I don't think that what farmers know and do has really been the major concern for researchers. They (the scientists) have pre-set ideas. I think what they do when they involve farmers is just an opportunity to validate those ideas." (AEO, 01 Interviews)

A scientist explained the rationale behind their approach to communication with farmers:

"I see the purpose of involving farmers as that of education… We educate them on what we have… on new farming technologies. When we call them for demos, the purpose is to create awareness of the activities of the research station in their area." (AS 01)

The research findings highlight inability of the scientist to apply communication techniques that can enable them to pick up signals and information from the farmers that show farmer values; information that would be taken into account when developing messages and while planning strategies for dissemination to the farmers. The importance of understanding farmer values when developing agricultural innovations is illustrated in the KALRO strategic plan 2017- 2021, which states that understanding how cultural factors influence the success of an agricultural innovation is crucial and therefore incorporating farmer values into the innovating development process is essential for ensuring the successful formulation and implementation of innovations.

Community Gender Roles

From farmer responses in Lower Eastern Kenya, it was also evident that the communication activities did not have the capacity to identify farmer gender roles yet it was clear that gender roles influenced maize planting patterns, with men engaging in income-earning opportunities while women were concerned with feeding and the welfare of the family. This researcher found that concern for family food and welfare, roles traditionally assigned to women, led most of the women to devote large portions of their land to traditional maize varieties.

"When you plant Kikamba maize, you know you are not taking chances with your family's welfare even when the rains are little. Kikamba maize manages with our rain patterns. "- (FGD 11, W 01)

Another female participant shared:

"I have to provide food for the family. The only way I can plant new maize types is to give them a small plot in my shamba. I devote the rest of the shamba to traditional maize." - (FGD 11, W 03)

The findings show the inability of the scientists to initiate dialogic interaction that can uncover traditional gender roles and their importance in farming decision making. International Labour Organization (ILO, 2022), emphasises the importance of traditional gender roles in farming, especially in Africa. The ILO's study shows that women control most farm decisions and work in sub-Saharan Africa. This means that communication strategies that do not take into account these gender roles would not be able to promote the effective diffusion of agricultural innovations. Taking traditional gender roles into account when designing communication strategies can assist in developing and sharing relevant and appropriate messages to farmers. Research in India has shown how communication strategies that do not consider traditional gender roles led to the development and dissemination of messages that failed to improve the adoption of improved cow breeds (Singh and Schiere, 1995).

Existing Farmer Knowledge and Perceptions

The overall purpose of participatory communication is to initiate dialogic interactions that can tap farmer knowledge and perceptions so that farming innovations can be aligned with their felt needs. This is emphasised because of the realization that people are not empty vessels into which new ideas can be poured, but intricate creatures with their own values, customs and cultural influences that offer intricate methods of evaluating new ideas (Freire, 1970). Stakeholders can form negative perceptions if their expectations formed from prior knowledge are out of line with the outcomes of the innovation, (KALRO's Strategic Plan 2017 – 2021). Engaging farmers in participatory communication can lead to sharing of such knowledge and perceptions which can help the scientist to develop messages that are more relevant to the farmers. According to Mbithi (1972) and Musembi (1998) maize farmers in Lower Eastern Kenya have a wealth of knowledge about maize planting under the conditions of their region as well as a long experience with improved maize varieties. This theme therefore was intended to establish whether the communication activities among stakeholders involved in the diffusion of improved maize varieties in Lower Eastern Kenya could tap farmer existing knowledge and perceptions.

Farmer Knowledge and Perceptions

To understand the extent to which farmer existing knowledge and farmer perceptions were considered in the diffusion of improved maize varieties, two questions were designed:

Question 4 (a): Do you recall any instance when you were asked to provide any knowledge you had about farming that was relevant to the improved maize?

From the participants' responses, it was clear that the farmers' role was limited to evaluating a maize variety that was already developed by the scientists. Respondents spoke of lack of avenues to share their insights despite their extensive knowledge of maize and local farming practices. In answer to the question, participants answered:

"No, the purpose of the demos is to see, and learn more about the crops in the plots. We don't discuss other issues."- (FGD 02, M02)

'When someone demonstrates something, it's not appropriate to bring up other topics. It feels like undermining the process. I think also it was for the researcher to explain about the seeds, so there wasn't much discussion.' - (FGD 04 M01)

An Agricultural Extension Officer (AEO) commented:

'I don't think they have any methods of getting to understand the community. And since they do not ask us, they do not know what the farmers need to know, what is relevant to the farmers.

Even they can't know what the farmers know. We are the ones who know what the farmers think, what they want.'- (AEO 01)

This perspective aligns with the views of scientist AS 01, who emphasized the role of agricultural scientists as that of educating farmers about farm innovations – a focus that could not capture the voices of the farmers and could have limited the scientists' ability to understand the reasons behind farmers' maize planting decisions.

Farmer Perceptions

The researcher also sought to understand the extent to which farmer perceptions had changed following their involvement in efforts to introduce improved maize varieties by posing the following question:

Question 4(e): How have your perceptions of improved maize seeds changed since you got involved in the activities?

While the communication methods used managed to create awareness of the availability of improved maize varieties, and participants frequently mentioned certified seeds, it was clear that perceptions had not significantly changed:

"We have learnt a lot about improved maize varieties, especially about the importance of certified seeds. But we always plant Kikamba maize because it always yields in this area." (FGD 10, M03)

"Kikamba maize has always been there. So, you know farmers like to hold on to them." (FGD 10, W01)

A participant in the Farmer Focus Group discussions (FGDs) alluded to the historical influence on farmer perceptions:

'You know, to the farmers here, Katumani maize (improved maize variety from KALRO) has not changed even when it has been given another name. I remember we used to have it even in the Seventies and it was still the same … tiny maize cobs and not tasty.'- (FGD 01 M01)

This sentiment was echoed by an agricultural extension officer:

"Many farmers don't grow Katumani improved maize varieties - even me. They have always said it is too short… It can be eaten by dogs." (AEO, 01 Interviews)

Despite the critical role of farmers' knowledge and perceptions in agricultural innovations, there was no effort to leverage this through dialogic interaction during the diffusion process of improved maize varieties in semi-arid Lower Eastern Kenya. Focus group discussions revealed that farmers possess significant knowledge about maize farming, gained through their long history with improved maize varieties. Their perceptions of "maize" are also shaped by community values.

The knowledge and perceptions of farmers are evident in the maize growing patterns in semi-arid Lower Eastern Kenya. This is illustrated by a Focus Group Discussion with six participants: three men and three women. As shown in Table 2, farmers in this region predominantly plant traditional Kikamba maize. The table also highlights the influence of cultural values on gender roles in maize growing decision-making.

Table 7: Example of Maize Planting Pattern of Participants of One FGD (traditional/Kikamba Vs Improved)

Farmer	Traditional Kikamba No. of Acres	Improved maize No. of Acres	Total Acreage
Woman 01	3	0	3
Woman 02	1	1	2
Woman 03	2	0	2
Man 01	0	2	2
Man 02	2	0	2
Man 03	2	1	3
TOTAL	**10**	**4**	**14**

The findings are similar to those of other studies, such as Simtowe et al. (2020) and Bett et al. (2003), which report adoption levels of improved maize in Kenya at below 30 percent. According to Reddy, Cradock-Henry, and Kirk (2023), each community brings with it a wealth of first-hand observations, cultural context, and experiences related to their land and agroecological systems. Studies have shown that prior knowledge affects the adoption of innovations (Sauer and Zilberman, 2009; Gedikoglu et al., 2011; Baffoe-Asare et al., 2013).

Evaluating the Integration of Farmer Socio-Cultural Context in the Diffusion of Improved Maize Varieties in the Semi-Arid Lower Eastern Kenya

This study aimed to evaluate the integrating farmers' socio-cultural context in the diffusion of improved maize varieties in the Semi-Arid Lower Eastern Kenya. A qualitative method was employed to collect data from farmers, agricultural extension officers, and scientists involved in implementing participatory communication during the improved maize diffusion process.

From the results, it is evident that the socio-cultural context of farmers was not taken into account in the development and dissemination activities of the improved maize varieties. The results revealed several critical issues. Firstly, the selection of farmer participants was biased against those with lower socio-economic status and agricultural extension officers, key players in agricultural development were often ignored. Secondly, farmers were not engaged in dialogic interactions that could uncover the values they associate with maize as a food source, which is essential for tailoring agricultural innovations to better meet their needs and preferences.

Despite farmers' extensive knowledge of maize farming in Lower Eastern Kenya, informed by geographical conditions and a long history with Katumani improved maize varieties, the communication activities failed to initiate meaningful dialogue to tap into this knowledge and their perceptions. This may have hindered the adoption of improved maize varieties. Consequently, traditional maize varieties remain the dominant crop among farmers in Lower Eastern Kenya, reflecting the limited impact of the communication

CONCLUSIONS AND RECOMMENDATIONS

Summary

The study results revealed several critical issues. Firstly, the selection of farmer participants for the diffusion activities was biased and non-inclusive and agricultural extension officers, key actors in agriculture were excluded. Secondly, the communication activities failed to capture farmers' values regarding maize as a staple food. Additionally, there was no effort to establish dialogic interactions that could have tapped into the existing knowledge of farming conditions

and farmers' perceptions of agricultural innovations. Consequently, the innovations developed did not address the actual needs of the farmers concerning maize, leading to poor adoption rates.

Conclusions

In conclusion, this study assessed the extent to which the socio-cultural context of farmers was considered in the development and diffusion of improved maize varieties in the semi-arid regions of Lower Eastern Kenya. From the results, it is evident that the socio-cultural context of the farmers was not taken into account and that the involvement of the agricultural extension officers in the dissemination activities, was minimal or lacking in most instances. The findings align with prior research by De Groote et al. (2002) and Wekesa et al. (2003), which also highlighted a general trend of insufficient stakeholder engagement in the diffusion process of improved maize varieties in Eastern Africa, particularly in Kilifi, Kenya. While agricultural scientists may have their reasons for not involving stakeholders in communication activities such as time and resource limitations, participatory communication approach requires that they initiate dialogue to uncover the socio-cultural context of farmers so that they can align their innovations to felt farmer needs. Freire (1970) emphasises that the need to take into account the socio-cultural context of stakeholders in a project comes from the realization that stakeholders are not empty vessels into which new ideas can be poured, but intricate creatures with their own values, customs and cultural influences that offer intricate methods of evaluating new ideas. Ignoring these community perspectives can lead to the failure of development initiatives (Anyaegbunam, Mefalopulos, and Moetsabi, 2004). Therefore, it can be concluded that the lack of understanding of farmers' socio-cultural context significantly contributed to the poor diffusion of improved maize varieties among farmers in the semi-arid Lower Eastern Kenya. Evidence shows that when researchers and breeders appreciate the role of socio-cultural context, they can develop more relevant innovations and increase adoption levels.

Recommendations

Based on the conclusions of this study, the study recommends:

i. Participant Selection: Agricultural researchers should ensure a more balanced selection of farmer participants to gain a comprehensive understanding of diverse information needs, as well as inclusion of agricultural extension officers, key actors in agriculture, to enable them to develop a sense of ownership of the activities. Ownership is essential for effective diffusion of innovations.
ii. Value-Centric Communication: Innovation research activities should actively seek to understand and incorporate the values farmers associate with food crops. This can help tailor agricultural innovations to better meet their needs and preferences.
iii. Foster Dialogic Interaction: Agricultural researchers need to establish platforms for dialogic interactions where farmers can share their knowledge and perceptions about farming conditions and agricultural innovations. This can enhance the relevance and effectiveness of new agricultural practices by integrating local insights and experiences.

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