

Science Communication of Agricultural Research Outputs: A Case Study of Kenya Agricultural and Livestock Research Organization (KALRO)

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ABSTRACT

Agricultural Research Institutions (ARIs) and Development Organizations have made significant strides in developing climate-smart technologies, innovations, and management practices (TIMPS) aimed at enhancing productivity in crop and livestock systems. Unfortunately, many researchers continue to rely on limited communication strategies, often presenting their findings in academic seminars and conferences that do not engage farmers and policy makers directly. As a result, valuable innovations often fail to reach the very individuals who could benefit from them the most. This study examines the communication practices employed by the Kenya Agricultural and Livestock Research Organization (KALRO) to disseminate its research findings to farmers. Through purposive sampling, 29 KALRO researchers were interviewed to assess their communication methods. The results reveal a predominant reliance on traditional, top-down communication channels such as seminars and workshops, alongside the use of technical jargon that is difficult for farmers to understand. The study advocates for more inclusive, farmer-centred communication strategies. It highlights the potential of using local languages and digital platforms such as community radio, television, SMS, videos, and YouTube to broaden the reach and improve the clarity of research outputs. These approaches promote interactive, lateral communication, allowing farmers to engage more actively with the information provided. In conclusion, the paper stresses that agricultural development can only be realized when farmers have both access to and understanding of relevant innovations. Given the critical role farmers play in food production, the study calls for communication strategies that empower farmers through participation and feedback. The paper recommends that future extension services prioritize inclusive, accessible communication to bridge the gap between research institutions and the practical application of innovations in the field.

Keywords: Science Communication, Agriculture, Research Output

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1. INTRODUCTION

Agriculture remains a cornerstone of Kenya's economy, contributing significantly to food security, employment, and national development. To address the growing challenges posed by climate change, land degradation, pests and diseases, and population pressure, Agricultural Research Institutions (ARIs) have made great strides in developing Technologies, Innovations, and Management Practices (TIMPs) that need to be shared by farmers for adoption through science communication.

Knowledge is transferred from the field of research to the agricultural industry through science communication in agriculture. Agricultural scientists' scientific research produces important discoveries, breakthroughs, and best practices that could transform farming methods and boost agricultural output (Sunding and Zilberman, 2001). But the significance of this knowledge depends on how widely it is shared with those who can use it. Farmers and other agricultural stakeholders can make educated decisions on crop selection, pest control, soil health, and sustainable farming methods when they have access to the most recent research findings thanks to effective science communication.

Farmers frequently work in settings with difficult or restricted access to scientific information. Lack of technical infrastructure, low educational attainment, and language hurdles can all impede the transfer of knowledge from researchers to farmers (Lefebvre, 2013). By converting difficult scientific terms and ideas into

clear, useful guidance that farmers can easily comprehend and implement into their everyday farming operations, science communication plays a critical role in closing this gap.

Global initiatives to address environmental sustainability and food security are centred on sustainable agriculture (Pretty, 2008). Sustainable farming methods including precision agriculture, integrated pest management, and organic farming are frequently developed as a result of scientific study (Gliessman, 2015). Adoption of these methods is facilitated by effective science communication, which lessens agriculture's negative environmental effects while enhancing long-term food security.

In this landscape, the Kenya Agricultural and Livestock Research Organization (KALRO) stands as a leading institution mandated to undertake agricultural research and support the dissemination of findings across crops, livestock, and related value chains. Therefore, this paper investigated the science communication approaches adopted by KALRO, assessing their effectiveness in reaching and engaging farmers. It highlights the gaps in current dissemination practices and proposes alternative models for inclusive, participatory communication that promotes adoption and use of research outputs in the field. Understanding how researchers communicate, the tools they use, and the barriers they face is essential for bridging the gap between research and practice, especially in a country like Kenya where agriculture remains largely smallholder-driven.

2. LITERATURE REVIEW

Science communication in agriculture is essential to the development of the agricultural industry and is not merely a luxury. It makes it easier to disseminate important knowledge, closes the gap between research and practice, strengthens agricultural resilience, encourages sustainability, improves market access, and gives farmers the tools they need to successfully negotiate the challenges of contemporary agriculture.

According to Lefebvre (2013), the variety of languages spoken in agricultural communities is one of the main obstacles to effectively communicating science to farmers. Many farmers may be illiterate and unable to comprehend complicated scientific jargon, particularly in rural and isolated places. Furthermore, there is frequently a dearth of scientific knowledge available in regional languages. Effective information transfer is hampered by this language barrier, which makes the utilisation of plain language resources that are relevant to the region necessary.

Studies by Anderson and Mark (2007) found out that scientific knowledge is widely accessible in the digital age via a variety of platforms, such as social media, research journals, and the internet. It might be difficult for farmers to separate pertinent, evidence-based techniques from less reliable sources due to information overload. Farmers may become confused and be deterred from obtaining scientific advice due to the overwhelming amount of information available.

Though in today's world, majority of farmers access agricultural information through technology, Qamar et al. (2016) argued that not all agricultural communities have access to mobile technology and the internet, despite the fact that these resources have the ability to provide farmers with scientific information. Reaching farmers with online resources and mobile apps can be significantly hampered by poor connectivity, a lack of cell phones, and low levels of digital literacy. It is imperative to bridge these technological divides in order to distribute information fairly.

Giller et al (2011) argued that it can be difficult for farmers to adapt scientific findings to their particular contexts, and adapting and localising scientific information to suit regional conditions is essential for effective communication. Although scientific research frequently offers generalised recommendations, the applicability of these recommendations can vary significantly depending on local agroecological conditions, soil types, and farming systems

Davis and Nkonya (2008) proposed Farmers gather at Farmer Field Schools (FFS) as one of the strategies that can be used for effective science communication, which are participatory learning environments, to study and try out new methods and innovations. Peer-to-peer learning is encouraged by FFS, which enables farmers to exchange insights and expertise. By empowering farmers to apply scientific concepts to their own situations, these community-based initiatives promote sustainability and a sense of ownership in the adoption of new techniques.

While Christoplos et al. (2015) noted that community-based interactive workshops and field demonstrations are powerful instruments for communicating science Farmers are directly involved in these events, observing and taking part in hands-on activities. Farmers are more confident and motivated to embrace new methods on their farms when they can observe firsthand the advantages of following scientific recommendations.

Collaboration was mentioned by Rivera and Sulaiman (2009) as essential for agricultural extension services and research organisations in science communication as a strategy to boost science communication. Extension services are in charge of converting the scientific knowledge produced by research institutes into useful recommendations. Research findings that are immediately useful and pertinent to farmers' needs are guaranteed

3. METHODOLOGY

Materials and Methods

Study Design and Participants

A qualitative case study design was employed, focusing on KALRO as the unit of analysis. The aim was to gain in-depth insight into the institutional communication practices related to agricultural research dissemination. Purposive sampling was used to select a diverse pool of 29 researchers across multiple KALRO institutes, including those focused on crops, livestock, biotechnology, and socio-economics. These individuals were chosen based on their direct involvement in generating and disseminating agricultural research outputs.

Data Collection

Primary data for this study was collected through semi-structured interviews conducted with 29 purposively selected researchers from various KALRO institutes. The interviews were guided by a structured interview schedule designed to explore key dimensions of science communication, including current dissemination practices, tools and platforms used, language and format of communication, target audiences, and the perceived effectiveness of these strategies. Depending on the availability and preference of participants, interviews were conducted either face-to-face or virtually via online platforms.

The thematic focus of the interviews included: (i) the types of communication tools and platforms employed to disseminate research outputs; (ii) the degree to which communication approaches are tailored to the needs and comprehension levels of smallholder farmers; (iii) the extent of researchers' use of local languages and participatory communication methods; and (iv) the institutional and personal challenges encountered in science communication.

In addition to primary interviews, secondary data was reviewed to provide contextual background and to triangulate findings. These included KALRO's internal communication strategies, outreach reports, project evaluations, and relevant national agricultural policy documents. This multi-source approach aligns with established qualitative research methodologies that emphasize methodological triangulation to enhance the credibility and depth of findings (Creswell & Poth, 2018).

Data Analysis

Data from the interviews were transcribed and subjected to thematic content analysis. Codes were developed both deductively, based on the interview questions, and inductively, as new themes emerged from the data. These codes were then grouped into thematic categories, allowing for interpretation of patterns and relationships related to the communication of agricultural research outputs. The analysis was aimed at identifying strengths, weaknesses, and opportunities for improvement in KALRO's science communication framework.

Results

The analysis of interviews with KALRO researchers revealed several key insights into the current state of science communication practices within the organization. A dominant theme was the preference for academic-oriented communication, with the majority of researchers indicating that they primarily disseminate their findings through peer-reviewed journal publications, conference presentations, and technical workshops aimed at fellow scientists or policymakers. While these modes are considered essential for career progression and institutional visibility, they are generally inaccessible to farmers due to the complex language, technical terminologies, and lack of contextual relevance. This aligns with observations by Van den Ban and Hawkins (1996), who noted that traditional research communication tends to prioritize scientific rigor over usability by end-users.

"Most of our researchers here are publishing their research findings through peer-reviewed journal publications."

"I presented my research findings in a conference which was organized by KALRO"

"It's true that our researchers disseminate their findings through conferences and publishing in peer-reviewed journal

publications.”

Limited engagement with farmers

Another critical finding was the **limited engagement with farmers** in the dissemination process. Very few researchers reported that they have direct communication with farmers, with most engagement being mediated through extension officers or conducted within the framework of short-term, donor-funded projects. These interactions were often unidirectional, with farmers positioned as passive recipients rather than co-creators of knowledge. The lack of feedback loops and participatory design in communication further reduced the relevance and applicability of the disseminated innovations.

“We rarely get time with farmers to share our outputs, most of the time we may share our findings with the extension officers and lead farmers whom we believe always has direct contact with the farmer.”

“It’s not easy to share the results with the farmers because this will mean a face-to-face communication which the organization might not afford as it’s expensive to reach all farmers in the country. This is the reason we prefer to disseminate the research outputs to agricultural officers though it’s not the effective way because we rarely get farmers feedbacks.”

Underutilization of local media and digital platforms

The study also identified a significant **underutilization of local media and digital platforms**. Despite acknowledging the outreach potential of tools such as community radio, SMS, videos, and social media platforms, few of the researchers actively used these methods. Where used, they were typically tied to externally funded initiatives rather than institutional strategy. Barriers to adoption included limited training in digital communication, budget constraints, absence of dedicated communication staff, and a lack of clear institutional guidelines on public engagement.

“I have not been to any local media because I have never been invited to any though I haven’t requested to be hosted so that I can disseminate our research outputs.”

“Most of our projects are donor funded and don’t also include budget for digital media or local media therefore we can’t alter the project guidelines”

“KALRO do not have the media budget and I think this is an aspect that we should consider going forward as local media will help us reach more farmers with our research outputs.”

Language and format barriers

Moreover, **language and format barriers** were found to hinder the accessibility of research outputs. Nearly all communication materials were developed in English or technical Kiswahili, with minimal efforts made to translate content into local languages like Kikuyu, Luo, Kalenjin, or Luhya. Researchers expressed difficulty in simplifying scientific content without compromising its accuracy and reported a lack of tools for tailoring content to low-literacy audiences. Formats such as infographics, storytelling, or audio-visual aids were rarely used, thus narrowing the accessibility of innovations for non-literate or semi-literate populations.

“We are doing poorly in local languages, its true almost all our research outputs are in English and this might not be easy for the farmer to understand. Even for the journalist might not correctly translate some words to our local languages.”

“Our materials are more of narrations. Yes, its high time that we should start introducing infographics and audio-visuals aids”

Lack of integration between communication planning and research implementation.

Finally, there was a **lack of integration between communication planning and research implementation**. Most respondents viewed communication as an auxiliary function managed by a separate unit, typically the corporate communication office. Without explicit requirements from funding bodies, researchers did not consistently include communication strategies in project design. As a result, dissemination efforts were fragmented and poorly aligned with institutional objectives for scaling up research impact. This echoes Creswell and Poth's (2018) assertion that effective

qualitative research and its dissemination require intentional design and multi-level stakeholder engagement from the outset.

“We don’t work closely with the communication department to assist us disseminate our research outputs.”

Discussion

The findings confirm a persistent disconnect between agricultural research institutions and their primary beneficiaries. While KALRO continues to produce valuable TIMPs, these innovations often remain underutilized due to ineffective communication pathways. The dominance of academic-oriented dissemination is emblematic of a broader issue in research systems, where recognition is tied to scholarly output rather than real-world impact.

Farmer engagement remains limited, and the communication process is largely linear, where researchers create content and deliver it without seeking or incorporating user feedback. This model not only restricts innovation adoption but also reinforces the perception of farmers as passive recipients rather than active partners in the research-to-impact pathway.

Digital platforms, community radio, and other ICT-based tools present an enormous opportunity to transform how agricultural information is shared. In rural Kenya, where mobile penetration is high and radio remains a trusted source of information, integrating these tools could significantly improve reach and engagement. However, institutional inertia, lack of investment, and limited technical capacity continue to hinder progress in this direction.

Additionally, the use of English or technical Kiswahili restricts accessibility among a large segment of farmers, many of whom are more comfortable with local languages. Simplifying language, contextualizing research, and co-creating messages with communities are essential steps toward inclusive science communication.

There is a clear need for a systemic shift within KALRO and similar institutions: from viewing communication as a peripheral or end-of-project activity to embedding it within the core research process. This involves recognizing the communication function as strategic, allocating resources, and building the capacity of researchers to become effective science communicators.

Conclusion

Science communication is not merely about disseminating information; it is about ensuring that knowledge is shared in ways that are relevant, understandable, and actionable for diverse audiences. In the context of agricultural research, effective communication can accelerate technology adoption, enhance food security, and improve livelihoods.

This study concludes that while KALRO has made commendable strides in agricultural research, there remains a significant gap in how this research is communicated. The current overreliance on academic dissemination channels, limited use of local languages and digital platforms, and minimal farmer engagement hinder the transformative potential of KALRO's innovations.

Bridging this gap requires reimagining communication as a participatory, iterative process that involves co-creation of knowledge with farmers, extension agents, and media partners. Only through such inclusive approaches can the full value of agricultural research be realized on the ground.

Recommendations

In light of the findings, several actionable recommendations are proposed to improve the science communication of agricultural research outputs within KALRO and similar institutions:

First, there is an urgent need to adopt farmer-centered communication models that prioritize local languages, simple messaging, and interactive formats. Researchers and communication officers should co-develop content with farmers, using culturally appropriate methods such as storytelling, demonstration plots, and community radio programs. This approach will make scientific knowledge more relatable and usable at the grassroots level.

Second, KALRO should leverage media and ICT tools by forming partnerships with national and local media houses, mobile service providers, and digital content developers.

Expanding the use of radio shows, SMS alerts, videos, podcasts, and social media campaigns can broaden the reach of agricultural messages and make them available on-demand to farmers in remote areas.

Third, there is a critical need to train researchers in science communication. This training should focus on message design, use of visuals, audience segmentation, and strategies for engaging non-scientific audiences. Such capacity-building efforts will empower researchers to be more effective communicators and increase the uptake of their work.

Fourth, KALRO should institutionalize communication planning as a mandatory component of all research projects. Each project should have a communication strategy with clear objectives, timelines, budgets, and indicators of success. This will ensure that communication is integrated throughout the project lifecycle rather than treated as an afterthought.

Finally, monitoring and feedback mechanisms should be strengthened. Farmers and extension workers should be given platforms to provide feedback on the usefulness, clarity, and applicability of research outputs. Tools such as mobile surveys, participatory rural appraisals, and interactive voice response systems can help gather this feedback efficiently.

By implementing these recommendations, KALRO can bridge the science-to-practice gap and play a more impactful role in advancing agricultural transformation in Kenya. This shift will not only enhance the visibility of its research outputs but also empower farmers to make informed decisions and adopt innovations that improve their livelihoods.

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