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Exploring the impact of agricultural policies on the documentation and sharing of indigenous knowledge in sub-Saharan Africa

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The study sought to explore the extent to which agricultural policies in sub-Saharan Africa **(SSA) countries incorporate Indigenous Knowledge (IK) and its impact on the efforts to document and share agricultural IK through communication efforts. A qualitative content analysis of policy documents from seven SSA countries and eight key informant interviews with knowledge management officers from the seven countries was conducted. Purposive sampling was used to select the countries, determine documents examined, and for the selection of key informants for the interviews. The results revealed that IK was not included in several SSA countries' governmental agricultural policies. Activities aimed at capturing, documentation and sharing IK in SSA countries were not found despite the presence of evidence of its importance to agricultural research and development. These results provide insights on the need for researchers, communicators, educators, and decision makers to consider incorporating IK into policy associated with agricultural information dissemination to improve technology generation and adoption.**

Key words: Indigenous knowledge, agriculture, adoption, policy, research, development.

INTRODUCTION

Agriculture plays a crucial role in the economic development of most countries in sub-Saharan Africa (SSA), providing a source of employment for 40 to 60% of the working population and contributing over 25% of the Gross Domestic Product (Jayne et al., 2018). Advancements in sustainable agricultural practices in this part of the world are crucial for achieving the United Nation's Sustainable Development Goals (SDGs) of ending hunger, poverty and mitigating impacts of climate change among others (Nhemachena et al., 2020). Despite agriculture's important role in contributing to the economic development of the region, most SSA countries are underdeveloped (Fuglie and Rada, 2013). In fact, 27 of the 28 poorest countries in the world are in SSA (Pasara and Diko, 2020).

Low agricultural productivity, due to the limited adoption of new and improved agricultural technologies, is one of the major challenges facing SSA (Benson and Jafry,

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2013; Mbo'o-Tchouawou and Colverson, 2014; Thompson and Gyatso, 2020). Despite the scientific evidence that increasing access to information is key to improving agricultural productivity and production in the region, farmers' access to information in SSA countries is inadequate (Mbo'o-Tchouawou and Colverson, 2014; Thompson and Gyatso, 2020; Veettil et al., 2021). To improve farmers' access to information, most SSA countries have been revamping their agricultural research and extension policies to ensure improved dissemination of information related to agricultural technologies (Abdu-Raheem and Worth, 2016; Fuglie and Rada, 2013).

Despite political reforms designed to improve direct access to information, agricultural extension agents, and associated advisory service providers, largely focus on the adoption of new, scientifically proven technologies with extension agents often perceived by farmers as improved technology promoters rather than as educators (Benson and Jafry, 2013; Masangano et al., 2017; Ragasa and Chiyu, 2017). The technology promotion approach has reinforced the perceptions that farmers are solely recipients of agricultural advice and not information generators or conduits (Masambuka-Kanchewa et al., 2020). Therefore, not much is known regarding the role of traditional or indigenous knowledge (IK) in promoting sustainable agricultural development in the SSA region, as well as how it is informed by the policy.

IK is relational and knowledge-based – driven by an individual's worldview and previous experiences (Owunsu-Ansah and Miji, 2013). The use of IK provides a foundation for problem-solving in rural communities because IK is often established, exists within the community, and is compatible with its values, beliefs, and social norms (Egeru, 2012; Ossai, 2010). IK is accumulated over time through experience and, in many cases, has been used by communities for decades. Examples are evident throughout the literature of previous research showcasing the power of IK when addressing livestock diseases, resource depletion as well as addressing emerging issues such as climate change and mitigating the negative impacts of climate change in many SSA countries (Chinsembu et al., 2014; Egeru, 2012; Newsham and Thomas, 2011; Šūmane et al., 2018). In countries like China, IK has also been known to be useful in the protection of wildlife and forests (Su et al., 2020). Despite global evidence that IK is important when addressing issues such as the negative impacts of climate change in SSA, most extension programs focus on promoting western ideas and the scientific knowledge being generated by the developed world with little to no consideration of IK in SSA (Makondo and Thomas, 2018).

In addition, poor documentation, and lack of attention by SSA ministries of agriculture paid to IK has resulted in the belief that scientific knowledge is superior to IK (Gaillard and Mercer, 2013). In developed countries such as the U.S.A., Canada, Australia, and New Zealand, where IK is documented, it has only been documented when it is perceived to be in line with scientific explanations (Belfer et al., 2017). IK is often ignored despite recommendations from the United Nations Framework Convention on Climate Change (UNFCCC or 'the Convention'), a global body responsible for setting up rules and governance for global climate governance (Ford et al., 2016), calling for the inclusion of IK in policies and interventions aimed at mitigating the impacts of climate change (Ford et al., 2016). Following this recommendation, much of the western world and other developed countries have shown interest and commitment to document and share IK related to climate change mitigation measures and resilience strategies (Belfer et al., 2017). For example, in Canada, strides are being made towards incorporating IK when conducting environmental impact assessments, evidenced by the inclusion of IK in the 2019 *Impact Assessment Act* (Eckert et al., 2020).

However, in SSA, IK was viewed as irrelevant, outdated, useless, and was commonly ignored (Mawere, 2015). During colonization, the colonizers looked down on African indigenous farming practices and knowledge as primitive and backward; needing to be replaced by western knowledge and practices (Iloka, 2016). In many African countries little is known regarding IK due to the implementation of policies that promoted the popularization of western knowledge thereby limiting IK documentation efforts and regulatory restrictions associated with IK distribution (Abioye et al., 2014). Therefore, exploring how IK is currently addressed in agricultural policies in SSA and/or shared through knowledge management efforts with the farming community could inform the integration of IK in future knowledge management and communication efforts.

Theoretical framework

The current study was guided by the diffusion of innovations (Rogers, 2003) and the framing theory. The diffusion of innovations theory describes how new ideas diffuse in a community or society (Rogers, 2003). The theory emphasizes the importance of five characteristics of an innovation and how it affects adoption decisions regarding an innovation.

Compatibility of an innovation to the existing social norms, beliefs, previously introduced ideas and past experiences is one of the most important characteristics that can slow or improve adoption of an innovation (Rogers, 2010). Diffusion of innovations theory is often used to understand how new agricultural ideas, perceived as only originating from scientists, diffuse into society; therefore, an emphasis has been placed on the diffusion of scientific innovations by various governments and decision makers as they strive to create policy (Briggs and Moyo, 2012; Masambuka-Kanchewa et al., 2020; Rogers, 2010). However, such an approach ignores the importance of disseminating IK which is locally produced

and available among members of the community.

Scholars have differentiated IK and scientific knowledge, separating them into two knowledge systems based on distinctive characteristics (Agrawal, 1995; Howes and Chambers, 1979; Warren, 1996). Compared to scientific knowledge, IK is often considered to be fragmented, less methodological, less generalizable, rural, and less prestigious. It is also considered more cost-effective, more sustainable, more bound with local culture, traditions, values, and beliefs, and therefore more holistic and inclusive (Agrawal, 1995; Howes and Chambers, 1979; Warren et al., 1991). Scientific knowledge, on the other hand, is associated with modern western knowledge systems which have a greater ability to analyze data, have a higher level of readiness to respond to challenges, but is less accessible to local people and communities, and less reflective of local needs (Agrawal, 1995; Howes and Chambers, 1979; Warren et al., 1991).

In many cases scientific innovations are incompatible with people's beliefs, norms and values leading to slow or limited adoption (Rogers, 2010). Individuals' decision to adopt an innovation is largely influenced by what others think, believe, and do. Therefore, the extent to which an innovation is aligned to existing social norms and subjective values of a given society drives its adoption rate not the result of a thoughtful reflection and understanding of the science behind an innovation (Coleman et al., 1957; Rogers, 2003; Rogers, 2010; Ryan and Gross, 1943).

Beliefs, norms, values, and past experiences are usually embedded in IK systems (Egeru, 2012; Ossai, 2010). IK plays a critical role in diffusing innovations as it assists in positioning a new idea in relation to the existing and familiar ideas (Rogers, 2010). Rogers (2010) indicated the perception among practitioners and scientists that IK is inferior to a new idea contributes greatly to slowing down or the lack of adoption of a new idea. Lack of consideration of IK is evidenced by the presence of studies in agriculture in SSA which focus on understanding the impact of socio-economic factors such as farm size, education, and economic status (Jha et al., 2019; Matata et al., 2010; Mbavai et al., 2019; Rauniyar and Goode, 1993) with little to no emphasis on exploring the impact of local or IK.

"Indigenous knowledge provides a basis for decision making" (Warren, 1989) making it crucial for ensuring sustainable agricultural development. The exploration and use of IK could contribute to sustainable community development as it empowers communities to analyze their challenges, tap on their experiences and identify solutions (Briggs, 2005). However, IK is seen as outdated and detached from reality creating tension between indigenous and scientific knowledge (Briggs, 2005; Mawere, 2015). The suppression of IK mainly stems from ignorance, politics, and arrogance as well as the influence of western technology (Dube and Musi, 2002; Ocholla and Onyancha, 2005). Nevertheless, farmers have benefitted from the use of IK in agriculture for thousands of years as they strive to adapt to changing agro-ecological conditions (Lwoga et al., 2010).

Despite such benefits, IK is not fully tapped in and used in African agricultural development due to an increased focus on the use of knowledge generated by scientists and researchers across various universities and research stations (Lwoga et al., 2010; Ngulube, 2002). Therefore, the absence of documented IK denies researchers and agricultural development practitioners an opportunity to build on the existing knowledge so that they are better placed to identify solutions to various challenges affecting agricultural development (Dube and Musi, 2002). Unlike knowledge generated by researchers, IK collection and documentation is time-consuming and requires patience and commitment because such knowledge is embedded in peoples' experiences, beliefs, values, and norms (Lawas and Luning, 1996).

Apart from the Diffusion of Innovations theory, framing theory also guided this study. Framing theory highlights the profound impact of words, phrases, arguments, and visuals used by communicators as meaning is constructed around a specific issue (Scheufele, 1999). Scheufele (1999) illustrated the framing process from frame building to frame setting, individual level effects of framing, and journalists as audience. Frame building, the foundation of the process, is viewed as any influence that communicators receive to form or modify how they frame an issue (media frames). Three sources of such influences included (1) the communicators' ideology and professional norms (Donsbach, 1981; Shoemaker and Reese, 1996), (2) political orientation of the medium (Gans, 1979), and (3) external elite sources such as "political actors, authorities, and interest groups" (Scheufele, 1999).

Putting the framing process model to the context of this article, scientific knowledge, unlike IK, is often distributed using academic channels through a top-down approach by academic or industry elites (Agrawal, 1995; Schafer et al., 2004). In many cases, scientific knowledge is believed to be superior to IK by most scientific and indigenous knowledge bearers (Warren, 1989). However, critics have cautioned that the documentation of IK alone will not bring IK to life, and called for a progressive approach that engages politics, to give those who possess IK the right to make decisions on how to save and use it (Agrawal, 1995). Hence, the need for understanding the role of policy in the documenting and sharing of IK. Gans (1979) has famously described the relationship between political actors and journalists (or communicators) as a tangle dance, and emphasized the asymmetrical relationship stating, "although it takes two to tango, either sources or journalists can lead, but more often than not, sources do the leading". Many framing scholars have emphasized the need to understand how political sources drive the force of media discourse for a

certain issue (De Vreese, 2005; Hänggli, 2011).

Global organizations and some state governments, such as South Africa, have promulgated policies and guidelines regarding conserving IK (Department of Science and Technology, Republic of South Africa, (n.d.); Diáz et al., 2015; United Nations Environmental Program, 2006). For example, United Nations Educational, Scientific and Cultural Organization (UNESCO) created *Indigenous and Local Knowledge of Biodiversity and Ecosystem Services* for Africa, Americans, Asian, and South Asia. UN's Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) announced their goal of bringing different knowledge systems, including IK, to inform policy (Diáz et al., 2015; United Nations Environmental Program, 2006). In addition, South Africa has an IK system policy which among others highlights the importance of IK in agriculture and serves as a legislative regulatory framework (Department of Science and Technology, Republic of South Africa, n.d). The presence of such policies is crucial for promoting the documentation, sharing and use of IK by knowledge management officers. In this study, framing building was used as a conceptual guide of an IK inquiry at the policy and policy-makers level in SSA countries to investigate the political discourse of IK in policy documents, examine how IK was being encouraged or neglected at the policy-makers level, and provide suggestions on improving IK preservation from the framing process standpoint.

Purpose and questions

The purpose of this study was to explore the extent to which agricultural policies in SSA countries address IK and its impact on efforts to document and share agricultural IK through agricultural communication efforts. The study was guided by the following research questions:

(1) How are the collection and dissemination of IK addressed in agricultural policies in SSA countries?
(2) How do Knowledge Management officers' perceptions of IK and/or research-based information influence the dissemination of IK to improve agricultural production?

METHODOLOGY

Context

The study examined the eight SSA countries within the Southern African Development Community (SADC) member states namely, Botswana, Eswatini, Tanzania, Zimbabwe, Namibia, Mozambique, Lesotho, and Zambia. The SADC was established to ensure economic development and sustainable development to alleviate poverty and enhance the standard and quality of life of the peoples from the member states through regional integration (Southern African Development Community (SADC), 2012). Among others, the SADC recognizes the value of IK for improving science and technology. For example, IK is highlighted as one of the objectives under the Science, Technology and Innovation protocol (SADC, 2012). Apart from being in SSA and SADC member states, these countries also fall under the Centre for the Coordination of Agricultural Research and Development in Southern Africa (CCARDESA). CCARDESA is a sub-regional organization that is responsible for coordinating agricultural research and development in the SSA region.

Sampling

In this study, a qualitative research design was employed using a content analysis of policy documents from seven SSA countries and key informant interviews. Purposive sampling was used to select the countries, determine documents examined, and for the selection of key informants for the interviews. The countries were selected based on their location in SSA as well as their membership to the SADC. SSA countries were selected based on the increased poverty levels and dependency on agriculture for economic development. In addition, the inclusion of IK as one of the objectives of the SADC Science, Technology and Innovation protocol made it necessary to include these countries in the study. The SADC Science, Technology and Innovation protocol calls for the need "to recognize, develop, and promote the value of indigenous knowledge systems and technologies" (SADC, 2008) to achieve economic development in the region. Therefore, studying how the SADC member countries incorporated IK in agriculture research and development was worthy of exploration. As such, eight countries (Zambia, Tanzania, Zimbabwe, Botswana, Eswatini, Namibia, Mozambique, and Lesotho) were among the countries involved in knowledge management activities implemented by CCARDESA making them relevant to exploring how countries were incorporating IK in their knowledge management activities. In addition, four of the countries (Tanzania, Zimbabwe, Botswana, and Lesotho) were also selected because they participated in a pilot project for the establishment of a regional food and nutrition knowledge-sharing platform associated with national agricultural policies (Moalosi and Diop, 2016).

Documents for the content analysis were selected based on their alignment with the agricultural sector. Therefore, documents such as national agricultural policies, strategies, and investment plans were collected. In cases where specific agricultural policies of strategies were non-existent, national investment plans and strategies were reviewed (Abdu-Raheem and Worth, 2016). The documents used for the content analysis were public documents and were accessed from the various organization's websites. Some are also available on the internet and were accessed from various websites.

Representatives from the selected countries' ministries of agriculture were selected for the key informant interviews. Only individuals who served as a national contact person for agricultural information and knowledge management within each country were acceptable participants. A total of eight participants were recruited based on their expert status regarding their experience in agricultural knowledge management activities (Ranjbar et al., 2012). All the participants except one worked as staff within their respective countries' ministries of agriculture. Five of the participants worked for the department of research, two worked for the department of information and public relations department within the ministry of agriculture respectively, and one participant was an outside consultant for the ministry of agriculture.

Data collection

Data were collected through key informant interviews. Participants were asked to provide knowledge management policy documents, strategies, and investment plans during the key informant

interviews with participants from the participating countries. In cases where the participants were unable to provide the documents requested, internet searches were used to identify various government websites to locate the documents. Key informant interview data was collected using the WhatsApp platform. The interviews were conducted through WhatsApp as it was feasible and economical to reach out to the participants who were in different countries during the time of the study. The interviews were recorded using an audio recorder after receiving consent from the participants. Interviews were transcribed verbatim for data analysis.

A researcher-developed codebook with themes identified *a priori*, based on a comprehensive literature review grounded in diffusion of innovations and framing theory, was used throughout both the qualitative content analysis and key informant interview analysis process. For the content analysis, the codebook guided the identification of statements or quotes that addressed IK. In addition, a semi-structured interview guide was used when conducting the interviews to capture participants' knowledge and experience in the dissemination of IK and or scientific knowledge as well as their perceptions of both pieces of knowledge allowing the conversation to flow naturally. Member checking was conducted at the conclusion of each interview to ensure the information was understood correctly and the participant felt their sharing of information was complete. Notes were taken throughout the process to ensure transferability and later used for triangulation (Lincoln and Guba, 1985).

Data analysis

In this qualitative research study, a codebook was used when analyzing documents to ensure consistency of the process (Abdu-Raheem and Worth, 2016). Table 1 provides the modified framework.

A total of four agricultural policies (Lesotho, Zambia, Tanzania, Zimbabwe), three strategic plans (Mozambique, Botswana, and Zambia), and one national investment plan (Eswatini) were analyzed. An approach similar to that used by Neuchatel Initiative Group (1990) was used to analyze the various documents focusing on the mission, policy statement, functions, goals and objectives. In addition, inductive content analysis was conducted to ensure open coding was employed (Elo and Kyngäs, 2008). Therefore, modified codes such as type of documents, focus area, choice of knowledge sources and awareness of knowledge were developed which were used to inform the themes and subthemes for the results (Abdu-Raheem and Worth, 2016). Codes were then reviewed by a team of researchers as a form of peer debriefing to ensure trustworthiness of the results (Lincoln and Guba, 1985).

Subjectivity statement

As required in any qualitative research it is important for researchers to provide details regarding their positionality in relation to the research (Tracy, 2010). The primary researcher specializes in social constructivist research and science communication. She has served as an agricultural knowledge manager and communication specialist for Malawi, one of the countries in sub-Saharan Africa. As such she has first-hand experience implementing agricultural communication and knowledge management activities which may have influenced her interest and approach to the research. One of the secondary researchers has been an extensionist in the United States for over 20 years, currently teaches and conducts research around agricultural science communication and has worked to build capacity of extension services in three of the countries under study. Her familiarity with the extension systems in place in the SSA provides context but may alter her perspectives on the policies and data. The third researcher specializes in communication research that informs agricultural policy making. She is familiar with farmers' innovation technology adoption and agricultural indigenous knowledge preservation in China. She provides an additional cultural and political perspective to the indigenous knowledge documentation and distribution of this study.

RESULTS

Policy and strategy guidelines on indigenous data collection

Table 2 provides a description of the areas of emphasis and focus areas highlighted in the most current and updated policy statements, strategic plans, and National Investments plans different countries.

Agricultural knowledge management officers' perceptions of IK and/or research-based information for improved agricultural production

Three themes emerged during the key informant interviews regarding perceptions of communicators associated with IK and/or research-based information designed to improve agricultural production namely: scientific researchers as main information sources, sharing information to assist farmers, and awareness of IK capture and dissemination policies.

Scientific researchers as main information sources

The participants focused on collecting content on improved or scientific technologies primarily depending on researchers as their main source of content. As indicated in the following quote from a participant from Eswatini,

Basically, us here at the research, or the agricultural sector in Swaziland, we deal with specific research that generates technologies, generates certain activities that a farmer can adopt to maximize his or her own production. That's the kind of data that we generate mostly. Practices that a farmer can adopt. So that's the kind of data. It's more scientific.

These sentiments were echoed by another participant from Tanzania who indicated they focus on collecting and sharing content from the researchers for visibility purposes as,

Normally, we want our researchers' activities to be visible worldwide. So, we give them the priority.
Researchers' desire to have their work visible influenced the communicators' priorities to collect and share scientific information. A participant from Zambia stated, "… for those researchers who want their work to be seen, they' re always on hand to help you with whatever

Table 1. Framework for analyzing documents.

Type of document	Focus of analysis	Area of focus
Policy statements (Mission, objectives, goals and major activities)	Description of the mission and goals for of the policy	Involved a list of the focus areas of the policy such as agricultural extension or research
Strategies and investment plans. Policy recommendations, priorities, objectives, and activities	Description of the priority areas, objectives, and major activities	Focus areas document in line with agriculture

Source: Adapted from Abdu-Raheem and Worth, 2016.

Table 2. Description of areas of emphasis for various agricultural policies, strategic and investment.

Area(s) of emphasis	Documents with specific statements	Focus area(s)
Provision of information on improved farming systems and technologies	Eswatini National Agriculture Investment Plan	Agriculture and extension (Eswatini)
	Zambia National Agricultural Extension strategy	Agriculture and extension (Zambia)
	Tanzania National Agricultural Policy	Agricultural research, extension, and development (Tanzania)
	Botswana Climate Change Response policy	Agricultural Research and Development (Botswana)
	Mozambique National Agricultural Strategic plan	Agricultural production and productivity (Mozambique)
	Zimbabwe Comprehensive Agricultural Policy Framework	Agriculture (Zimbabwe)
	Lesotho Climate Change Policy	Climate change (Lesotho)
	Namibia National Agricultural Policy	Information Communication Technologies and Agricultural extension (Namibia)
Improve adoption of improved technologies	Zambia National Agricultural Extension strategy	Agriculture and extension (Zambia)
	Tanzania National agricultural policy	Agricultural Research and Development (Tanzania)
	Namibia Namibian National Agricultural Policy	Agricultural information systems (Namibia)
	Zimbabwe Comprehensive Agricultural Policy Framework	Agricultural production and productivity (Zimbabwe)
	Mozambique National Agricultural Strategic plan	Agricultural production and productivity (Mozambique)
	Lesotho Climate Change Policy	Climate change (Lesotho)
	Botswana Climate Change Response policy	Agricultural Research and Development (Botswana)
	Eswatini National Agriculture Investment Plan	Agriculture and extension (Eswatini)
Integration and promotion of indigenous knowledge	Tanzania National Agricultural Policy	Agricultural Research, extension, and development (Tanzania)
	Lesotho Climate Change Policy	Forest Management (Lesotho)
	Zimbabwe Comprehensive Agricultural Policy Framework	Irrigation Research and Development (Zimbabwe)
	Botswana Ministry of Agricultural Development and Food Security strategic plan	Agricultural Research and Development (Botswana

Source: Field data 2020

information that you need."

Sharing information to assist farmers

The main purpose for collecting and sharing agricultural information was the need to identify and address farmer's problems. A participant from Zambia stated,

I remember one time when we had the fall armyworm outbreak…. We developed messages in the local languages and … we developed messages that were aired. We developed radio programs that were aired on how farmers can identify the pest … the mechanical control, the biological control and all those issues.

This was echoed by another participant from Mozambique who described the process of content collection and sharing as identifying farmers' needs which are used to inform technology development. Furthermore, another participant from Tanzania indicated that the purpose for collecting and sharing agricultural data was to ensure that farmers adopt improved technologies. The same sentiments were also echoed by participants from Lesotho, Botswana, and Zimbabwe.

Awareness of IK capture and dissemination policies

The analysis revealed that many communication officers were not aware or confident enough to discuss their awareness of IK capture, documentation and sharing policies as well as guidelines in their countries as many participants failed to answer this question. In addition, participants indicated that they were not aware or that they felt that they were not better placed to comment on the question. As such only one participant from Eswatini mentioned something about IK policies stating,

I might not be well versed in terms of policy regarding indigenous knowledge, but what I know is there is an act that was passed some years that is being regulated by the environment authority and Swaziland national trust commission that deals the nation of indigenous plants.

CONCLUSION, RECOMMENDATIONS, AND IMPLICATIONS

The results indicated IK was only mentioned in agricultural research and extension policy documents for four (Lesotho, Tanzania, Zimbabwe and Botswana) of the eight countries. Within the four policies where IK was included, there was no indication regarding how IK was going to be incorporated. Furthermore, none of the documents reviewed mentioned the need for promoting the capture, documentation and sharing of IK. These results are in line with Abioye et al. (2014), Lwoga et al. (2010), and Ngulube, (2002) who reported that most of the agricultural policies in SSA focus on promoting the dissemination of new scientific knowledge.

The results indicated an emphasis continues to be placed on promoting the adoption of scientifically proven technologies to the farmers with little emphasis on how IK fits into the adoption process. Rogers (2010) indicated that compatibility of an innovation with IK is important in ensuring acceptability of a given technology. Additionally, IK is crucial for promoting the adoption of improved technologies providing a point of reference for the end users. Poor agricultural productivity in most of the SSA countries has been associated with the limited adoption of improved technologies without exploring the role of IK (Jha et al., 2019; Matata et al., 2010; Mbavai et al., 2019; Rauniyar and Goode, 1993). Therefore, the findings from this study confirm the lack of inclusion of IK in policy. The lack of inclusion during technology development and transfer may be contributing to the limited adoption of the improved technologies due to the absence of a reference point. As such, future research on the role of compatibility of new agricultural technologies with previous experiences, beliefs and IK of the farmers needs to be conducted.

Improving agricultural productivity in the SSA requires inclusion of clear policy guidelines for enhancing the capture, management and sharing of IK. Such guidelines should include the establishment of Community IK Management Resource Centers (CIMRC). These resource centers could be managed by the local communities with support from development partners, such as agricultural extension agents. With technical support from the extension agents, the members of a community could be encouraged to share IK and experiences through storytelling (Cunsolo et al., 2013; Fernández-Llamazares and Cabeza, 2018). The knowledge managers at the CIMRCs could work with the extension agents to capture, manage, and share IK by incorporating various information communication tools. In addition, to the establishment of the CIMRCs there is also a need to ensure that capturing, documentation and dissemination IK is incorporated in metrics for evaluating the effectiveness of agricultural extension services.

Even though this study is qualitative, and the results cannot be generalized beyond the scope of the agricultural documents in SSA countries, the absence of IK in the policies aimed at promoting the capture, documentation and sharing of information is worth exploring. Previous research has provided evidence that IK is important for achieving community led sustainable development (Egeru, 2012; Ossai, 2010). The increased dependency on agriculture as a driver for economic development among most SSA countries calls for the need to invest in agricultural research and improved agricultural production. The contribution IK can make when improving science, research, and development in

SSA should not be overlooked as it is also highlighted as one of the objectives for the Science, Technology, and Innovation protocol (SADC, 2012).

The results of this study can provide a foundation for those working in SSA countries (researchers, communicators, educators, and decision makers) to consider further incorporating IK into policy associated with agricultural information dissemination. Among others, the exclusion of IK in policies has been reported as being due to the perception of IK being backward and inferior to scientific knowledge (Briggs, 2005; Mawere, 2015). For IK to be incorporated effectively in various agricultural policies, there is a need to explore perceptions of various players such as scientists, farmers, funding organizations and policy makers as it relates to IK.

As of 2008, SSA countries were reported to be among those most heavily impacted by the negative impacts of climate change; evidenced by declines in agricultural production due to erratic rainfall, pests, and disease outbreaks (Barrios et al., 2008). Despite the global recognition that IK is crucial when addressing the negative impacts of climate change (Ford et al., 2016), the results of this study show that SSA country ministries of agriculture have not taken heed of the recommendation. The SSA is rich in IK. However, if IK continues to be excluded from policies associated with its collection and dissemination, the region is bound to lose IK over time. Therefore, it is important to capture and use perceptions of IK among the various key players to identify and address barriers associated with the integration of IK into agricultural policies.

The key informant interview participants, identified as knowledge management experts by the ministries of agriculture, were not knowledgeable about IK capture, documentation and sharing. They expressed a heavy emphasis was placed on the dissemination of scientifically proven technologies, signaling increased emphasis on frame building for scientific knowledge while silencing IK (Scheufele, 1999). A lack of emphasis on the capture, documentation and sharing of IK in agricultural policies in most of the countries may explain the experts' failure to acknowledge and capture IK. In many cases, the participants were not confident about their expertise when it came to the guidelines and provisions provided in their countries' agricultural policies despite their roles as communicators and knowledge managers in their respective countries at the regional level. Therefore, there is a need to conduct short-term capacity building programs on IK targeting policy makers, researchers, extension agents, communication officers and knowledge managers. Among others the training programs should be aimed at creating awareness among various players regarding capturing, documentation and sharing of IK as well as its importance in research and development. These capacity-building programs have potential to improve integration of IK into policies, hence, improve knowledge sharing among the farmers and communities. Increased sharing of IK among farmers and policy makers would in the long run contribute towards change of mindset towards IK as being complementary and not inferior to scientific knowledge, hence, contributing towards sustainable agricultural development.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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